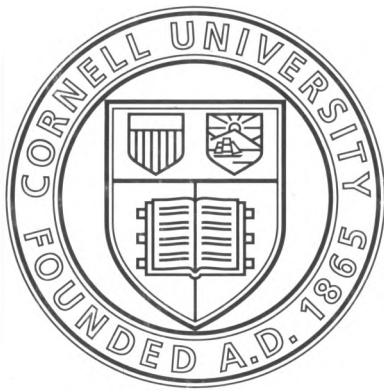


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2006–2007

# COURSES of Study

## Cornell University

# Cornell University Calendar

## Fall Semester

Residence halls open  
 New undergraduate student registration  
 New student orientation begins  
 New graduate student registration  
 Course add/drop begins  
 Instruction begins  
 Fall break: instruction suspended  
 Instruction resumes  
 Homecoming  
 First-Year Family Weekend  
 Thanksgiving recess:  
   instruction suspended, 1:10 P.M.  
 Instruction resumes  
 Instruction ends  
 Study period  
 Final examinations begin  
 Final examinations end  
 Residence halls close

## Winter Session Period Begins

Three-week classes begin  
 Winter session period ends

## Spring Semester

Residence halls open  
 Course add/drop begins  
 Instruction begins  
 Spring break: instruction suspended  
 Instruction resumes  
 Instruction ends  
 Study period  
 Final examinations begin  
 Final examinations end  
 Residence halls close (students who are graduating  
   may stay through Commencement Day)  
 Senior Week  
 Commencement

## Summer Session

Three-week session classes begin  
 Eight-week session classes begin  
 Six-week session classes begin

## 2006-07

Friday, August 18  
 Friday, August 18  
 Friday, August 18  
 Monday, August 21  
 Wednesday, August 23  
 Thursday, August 24  
 Saturday, October 7  
 Wednesday, October 11  
 Saturday, October 14  
 Friday–Sunday, October 20–22  
  
 Wednesday, November 22  
 Monday, November 27  
 Saturday, December 2  
 Sunday–Wednesday, December 3–6  
 Wednesday, December 6  
 Friday, December 15  
 Saturday, December 16  
  
 Tuesday, December 26  
 Monday, January 2  
 Friday, January 20

Monday, January 15  
 Thursday, January 18  
 Monday, January 22  
 Saturday, March 17  
 Monday, March 26  
 Saturday, May 5  
 Sunday–Wednesday, May 6–9  
 Wednesday, May 9  
 Friday, May 18  
  
 Saturday, May 19  
 Sunday–Saturday, May 20–26  
 Sunday, May 27

Wednesday, May 30  
 Monday, June 11  
 Monday, June 25

## 2007-08

Friday, August 17  
 Friday, August 17  
 Friday, August 17  
 Monday, August 20  
 Wednesday, August 22  
 Thursday, August 23  
 Saturday, October 6  
 Wednesday, October 10  
 Saturday, October 13  
 Friday–Sunday, October 26–28  
  
 Wednesday, November 21  
 Monday, November 26  
 Saturday, December 1  
 Sunday–Wednesday, December 2–5  
 Wednesday, December 5  
 Friday, December 14  
 Saturday, December 15  
  
 Wednesday, December 26  
 Wednesday, January 2  
 Saturday, January 19

Monday, January 14  
 Thursday, January 17  
 Monday, January 21  
 Saturday, March 15  
 Monday, March 24  
 Saturday, May 3  
 Sunday–Wednesday, May 4–7  
 Wednesday, May 7  
 Friday, May 16  
  
 Saturday, May 17  
 Sunday–Saturday, May 18–24  
 Sunday, May 25

Wednesday, May 28  
 Monday, June 9  
 Monday, June 23

\*Exams begin Wednesday at 7:00 p.m.

The dates shown in this calendar are subject to change at any time by official action of Cornell University.

In this calendar, the university has scheduled classes, laboratories, and examinations on religious holidays. It is the intent of the university that students who miss those activities because of religious observances be given adequate opportunity to make up the missed work.

The Law School and College of Veterinary Medicine calendars differ in a number of ways from the university calendar. Please consult the catalogs of those colleges for details.

The courses and curricula described in this catalog, and the teaching personnel listed herein, are subject to change at any time by official action of Cornell University.

The rules and regulations stated in this catalog are for information only and in no way constitute a contract between the student and Cornell University. The university reserves the right to change any regulation or requirement at any time.

This catalog was produced by the Office of Publications and Marketing at Cornell University.





Cornell University

# Courses of Study

2006–2007

## Change in Course Numbering System

In the near future, the university will be moving from a three-digit to a four-digit course numbering system (e.g., HIST 404 becomes HIST 4041). As part of this transition, this issue of Courses of Study shows both three- and four-digit (in parentheses) course numbers for course listings. For a complete explanation of the course numbering system, see page 12.

## Accreditation

Cornell University is accredited by the Middle States Commission on Higher Education.

A copy of the most recent reaffirmation of Cornell's accreditation can be found at [dpb.cornell.edu/accreditation.htm](http://dpb.cornell.edu/accreditation.htm). Requests to review additional documentation supporting Cornell's accreditation should be addressed to Paul Streeter, director, Office of Institutional Planning and Assessment, Cornell University, 440 Day Hall, Ithaca, NY 14853-2801, [ps33@cornell.edu](mailto:ps33@cornell.edu).

Cornell University  
(USPS 132-860)

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**Key**

M Monday  
T Tuesday  
W Wednesday  
R Thursday  
F Friday  
S Saturday  
S-U Satisfactory-Unsatisfactory  
disc discussion  
lab laboratory  
lec lecture  
rec recitation  
sec section  
TBA to be announced/to be arranged  
@ geographic breadth  
# historical breadth  
Courses with names and descriptions enclosed in brackets—[ ]  
—are not offered fall 2006 and spring 2007.  
All area codes are 607 unless otherwise specified.

## CORNELL UNIVERSITY—GENERAL INFORMATION

### Introduction

*Courses of Study* ([www.cornell.edu/academics/courses.cfm](http://www.cornell.edu/academics/courses.cfm)), a catalogue of Cornell University's many academic programs and resources, contains information about colleges and departments, interdisciplinary programs, undergraduate and graduate course offerings, and procedures. Students also should consult with their college's advising office for specific information on their college's academic policies and procedures, degree programs, and requirements. Not included in this publication is information concerning the Medical College and the Graduate School of Medical Sciences, located in New York City.

It is not possible to keep this single volume completely up-to-date. The most current information regarding course descriptions, schedules, sections, rooms, credits, and registration procedures may be found at [www.cornell.edu/academics/courses.cfm](http://www.cornell.edu/academics/courses.cfm), which also includes the Course and Time Roster and the Course and Room Roster. Students are also advised to consult individual college and department offices for up-to-date course information.

Cornell community members are expected to comply with all university policies, including the Code of Conduct and the Code of Academic Integrity available at [www.policy.cornell.edu](http://www.policy.cornell.edu).

The following are offices and sources of information about admission to Cornell University.

**Undergraduate Admissions Office**, 410 Thurston Avenue, Ithaca, NY 14850-2488, 255-5241, [admissions.cornell.edu](http://admissions.cornell.edu).

**Graduate School**, 143 Caldwell Hall, Ithaca, NY 14853-2602, 255-4884, [gradschool.cornell.edu](http://gradschool.cornell.edu).

**Law School**, Myron Taylor Hall, Ithaca, NY 14853-4901, 255-5141, [www.lawschool.cornell.edu/admissions](http://www.lawschool.cornell.edu/admissions).

**Samuel Curtis Johnson Graduate School of Management**, Office of Admissions, 111 Sage Hall, Ithaca, NY 14853-4201, 255-4526, [johnson.cornell.edu/academic/admissions/](http://www.johnson.cornell.edu/academic/admissions/).

**College of Veterinary Medicine**, Admissions Office, Cornell University, Schurman Hall, Ithaca, NY 14853-6401, 253-3700, [www.vet.cornell.edu/admissions/](http://www.vet.cornell.edu/admissions/).

**Joan and Sanford I. Weill Medical College and Graduate School of Medical Sciences**, Office of Admissions, 445 E. 69th Street, New York, NY 10021, 212-746-1067/-6565, [www.med.cornell.edu/education/admissions/](http://www.med.cornell.edu/education/admissions/).

### University Registration

University registration is the official recognition of a student's relationship with the university and is the basic authorization for a student's access to services and education. Completion of registration is essential to enable the university to plan for and provide

services and education, guided by the highest standards for efficiency and safety. Unauthorized, unregistered persons who use university services and attend classes have the potential to use university resources inappropriately and to displace properly registered students. In addition, the university assumes certain legal responsibilities for persons who participate as students in the university environment. For example, policy states that New York State health requirements must be satisfied. Because these requirements are intended to safeguard the public health of students, the university has a responsibility to enforce the state regulations through registration procedures.

The policy on university registration is intended to describe clearly the meaning of and the procedures for registration so that students can complete the process efficiently and be assured of official recognition as registered students. With the clear communication of the steps for registration, it is hoped that compliance will occur with a minimum of difficulty.

To become a registered student at Cornell University, a person must

- complete course enrollment according to individual college requirements;
- settle all financial accounts, including current semester tuition;
- satisfy New York State and university health requirements;
- have no holds from their college, the Office of the Judicial Administrator, Gannett: Cornell University Health Services, or the bursar.

Individuals must become registered students by the end of the third week of the semester or they will be subject to a financial penalty.

Cornell University does not allow persons who are not registered with the university in a timely manner to attend classes, reside in university-owned residences, or use any other university services. The university reserves the right to require unauthorized, unregistered persons who attend classes or in other ways seek to exercise student privileges to leave the university premises. The university does not permit retroactive registration and does not record courses or grades for unregistered persons.

### LEAVES AND WITHDRAWALS

A leave of absence must be requested from the college in which the student is enrolled. A leave of absence is granted for a specified time, after which the student is expected to return to resume course work. Students should inform their college of intent to return.

Students may withdraw from the university at their own discretion. In addition, a college may withdraw a student who fails to return at the end of a period of authorized leave.

Medical leaves are granted by the student's college upon recommendation by Gannett: Cornell University Health Services.

### Bursar Information

#### TUITION, FEES, AND EXPENSES

##### Tuition for Academic Year 2006–2007

###### Endowed Divisions

###### Undergraduate

Architecture, Art, and Planning	
Arts and Sciences	
Engineering	
Hotel Administration	\$32,800

###### Graduate

Graduate School (with chairman in an endowed college)	\$32,800
Johnson Graduate School of Management	\$38,800

###### Professional

Law School	
entering students	\$40,580
second-year students	\$39,640
third-year students	\$38,850

###### Contract Divisions (tuition rates are tentative)

###### Undergraduate

Agriculture and Life Sciences	
Human Ecology	
Industrial and Labor Relations	
New York State resident*	\$18,060
Nonresident (first- to third-year students)*	\$31,700
Nonresident (fourth-year students)	\$30,500

###### Graduate and Professional Students

Graduate School (with chair in a contract college)	\$20,800
Veterinary Medicine	
New York State resident DVM	\$23,000
Nonresident DVM	\$33,000
Graduate, Ph.D.	\$20,800

###### Student Activities Fee (Tentative)

Undergraduate students	\$181
Graduate and professional students	\$68

<b>Summer Session (2006)</b> per credit**	\$835
----------------------------------------------	-------

###### In Absentia Fees

Undergraduate	\$15 per semester
Graduate and professional	\$200 per semester
Law and management	\$75 per semester

*The amount, time, and manner of payment of tuition, fees, or other charges may be changed at any time without notice.*

\* **Residency status** is determined at the time of admission by the college. Change in residency status is determined by the university bursar following matriculation.

The deadline for submission of requests for the Fall 2006 semester is June 1, 2006. The deadline for the Spring 2007 semester is November 1, 2006. Further information and an application can be found at [www.bursar.cornell.edu](http://www.bursar.cornell.edu).

**New contract college undergraduate nonresident students** are defined as

- new entering students (i.e., freshmen).
- new transfers from external colleges (including transfers from two-year institutions with which Cornell has transfer agreements).
- new transfers from an endowed Cornell college to a contract college.
- students who have deferred entry of more than one semester.
- returning students who had withdrawn from the university.
- graduates who are returning for additional degrees.
- students who have taken a leave of absence for more than one year.

**\*\*Regular session rate.** Special program rates may vary.

Admission application fees and forms may be found at [www.cornell.edu/admissions/](http://www.cornell.edu/admissions/).

### Tuition Refund Policy

Amounts personally paid for tuition may be refunded if the student requests a leave of absence or withdrawal from the office of the dean of his or her college of enrollment. The date of this request will determine the tuition liability for the semester. All students refer to the "Proration Schedule for Withdrawals and Leaves of Absence" below.

**Repayment policy.** Students receiving financial aid from the university who withdraw during a semester will have their aid reevaluated, possibly necessitating repayment of a portion of aid received. Repayment to aid accounts depends on the type of aid received, government regulations, and the period of time in attendance. Cornell is authorized to offset any credit balances against any debts owed by the student to the university.

### Proration Schedule for Withdrawals and Leaves of Absence

#### Fall 2006 and Spring 2007

Percentage	All Students	
	Fall 2006	Spring 2007
no charge	8/22-8/28	1/18-1/24
10% charge	8/29-9/4	1/25-1/31
20% charge	9/5-9/18	2/1-2/14
30% charge	9/19-9/25	2/15-2/21
40% charge	9/26-10/2	2/22-2/28
50% charge	10/3-10/9	3/1-3/7
60% charge	10/10-10/16	3/8-3/14
80% charge	10/17-10/23	3/15-3/21
100% charge	10/24	3/22

Special programs, such as Cornell Abroad and Executive MBA, may follow their own tuition refund policies for withdrawals and leaves of absence. Please refer to the appropriate program office for details regarding those policies.

## BILLING AND PAYMENT

### Billing

Tuition and room and board charges will be billed in July and December and must be paid before registration. The due date for these semester bills will normally be 5 to 10 working days before registration day. All other charges, credits, and payments will appear on monthly statements mailed before the middle of the month.

It is possible that some charges will not be listed on the first bill and will appear on a subsequent monthly bill. *A student must be prepared to pay any charges appearing on a subsequent bill even though the student receives a financial aid stipend before the charges are billed.*

All bills are due by the date stated on the bill; all payments must be received by that date to avoid finance charges. Payments are not processed by postmark.

Changes to billing addresses can be made via Just the Facts. *Address changes made at other offices will not change the billing address.* The address initially used on billing statements will be the home address as listed on each student's application for admission.

The Office of the Bursar conducts all business directly with the student. Monthly charges, as well as any awards, grants, scholarships, and loans, are listed and billed under the student's name. Refund checks and direct deposit refunds are also drawn in the name of the student. Cornell is also authorized to offset any credit balances against any debts owed by the student to the university.

### Payments

An individual who has outstanding indebtedness to the university will not be allowed to register or reregister in the university, receive a transcript of record, have academic credits certified, be granted a leave of absence, or have a degree conferred. University policy precludes the use of any current financial aid for payment of past-due charges.

The Office of the Bursar acts as a clearinghouse for student charges and credits that are placed directly on a student's bill by several departments and offices of the university. *Because the Office of the Bursar does not have detailed records concerning many items that appear on a bill, students should contact the office involved if they have questions.*

For further information, students should contact the Office of the Bursar, Cornell University, 260 Day Hall (tel. 255-2336; fax 255-6442; [ucb-bursar@cornell.edu](mailto:ucb-bursar@cornell.edu); [www.bursar.cornell.edu](http://www.bursar.cornell.edu)). Bursar account and Cornellcard information may be viewed real time on *Just the Facts*.

## Student Health Insurance

Because of the high cost of medical care, it is Cornell University policy that every full-time registered student must have health insurance coverage.

The Student Health Insurance Plan (SHIP) is developed especially for Cornell students and provides extensive coverage at a reasonable cost for most on- or off-campus medical care.

Complete and current details of the SHIP, its cost, and population-specific material for undergraduates, graduate students, and professional students are mailed to each student in July. Undergraduates, graduate students, and professional students each have separate deadlines and guidelines. Please be sure to check the July mailing for complete details.

The Student Health Insurance Plan provides coverage 24 hours a day, 365 days a year, anywhere in the world. Students graduating midyear may be eligible to purchase a five-month plan. Those enrolled in the SHIP may enroll their eligible dependents for an additional cost (fall deadline: September 30). Graduate and professional students who prefer to pay monthly must enroll in the installment payment plan no later than September 30. Because of policy restrictions, the plan is nonrefundable (except for dependents who no longer meet eligibility requirements and students who withdraw from Cornell within the first 30 days of the academic year).

For more information, students should contact Cornell University Office of Student Health Insurance, 409 College Avenue, Suite 211 (tel. 255-6363; [sicu@cornell.edu](mailto:sicu@cornell.edu); [www.studentinsurance.cornell.edu](http://www.studentinsurance.cornell.edu)).

## Student Records

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. Further details may be found in Cornell University Policy 4.5 Access to Student Information, available at [www.policy.cornell.edu/VOL4\\_5.cfm](http://www.policy.cornell.edu/VOL4_5.cfm). These rights include:

1. The right to inspect and review the student's education records within 45 days of the day the university receives a request for access.

Students should submit to the registrar, dean, head of the academic department, or other appropriate official, written requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes is inaccurate.

Students may ask the university to amend a record that they believe is inaccurate. They should write the university official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate.

If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is a person employed by the university in an administrative, supervisory, academic (including emeritus faculty) or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the university has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

A school official has a legitimate educational interest if the official needs to review an education record to fulfill his or her professional responsibility.

Upon request, the university discloses education records without consent to officials of another school in which a student seeks or intends to enroll.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by Cornell University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is:

Family Policy Compliance Office  
U.S. Department of Education  
400 Maryland Avenue, SW  
Washington, DC 20202-5901

5. Cornell University has defined directory information to include the following: name, local address, local telephone listing, e-mail address, major field of study and college attended, dates of attendance, enrollment status, participation in officially recognized activities (in athletics, the weight and height of members of athletic teams), and any degrees earned and awards. Directory information may be released unless the student informs the Office of the University Registrar otherwise in writing or on Just the Facts. Students who wish to suppress their directory information from the printed telephone directory must inform the Office of the University Registrar in writing or through Just the Facts within 10 days of the date of official university registration. Students may rescind their no-release request at any time by writing to the Office of the University Registrar or on Just the Facts.

## Academic Integrity

Absolute integrity is expected of every Cornell student in all academic undertakings. Any fraudulent act by a student to advance his or her academic status merits a severe penalty and such cases are governed by the Code of Academic Integrity. A pamphlet titled the *Code of Academic Integrity and Acknowledging the Work of Others* is available from the office of the dean of faculty, and at [www.policy.cornell.edu/Code\\_of\\_Academic\\_Integrity.cfm](http://www.policy.cornell.edu/Code_of_Academic_Integrity.cfm).

## Protection of Human Subjects in Research

The University Committee on Human Subjects is the official review board for all university projects that use humans as research subjects, assuring compliance to federal regulations protecting human subjects in research at universities. A human subject is defined by federal regulations as "a living individual about whom an investigator obtains data through intervention or interaction with the individual, or identifiable private information." Projects affected by regulation include, but are not limited to, experiments and psychological or physical tests on humans, surveys, questionnaires, and studies of existing data, documents, or records in which there are individual identifiers. All proposals involving human subjects in any category, including those initiated by students, must be submitted to the University Committee on Human Subjects for review before the research projects begin. The guidelines for the use of human subjects in research are available at [www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm](http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm). Inquiries and communications about the guidelines should be directed to the committee's coordinator (255-5138; [UCHS@cornell.edu](mailto:UCHS@cornell.edu)).

## Use of Animals for Courses

Vertebrate animals serve as an invaluable aid in instruction. It is recognized, however, that some students have ethical objections to the use of vertebrate animals in this manner. Courses that use vertebrate animals are identified as such in the course descriptions. Students who have concerns about the use of animals in these courses should consult the course instructor for more information about the precise ways in which the animals are used. A set of university guidelines on the use of vertebrate animals in teaching for faculty and students is printed below and is available from departments in which the courses are offered. The use of live vertebrates in instruction is reviewed and approved by the Institutional Animal Care and Use Committee (IACUC).

Students should contact the Occupational Medicine Office of Gannett Health Services, or their personal health care provider, before working with animals or entering an animal facility, if they may have any medical conditions that may increase their risk.

Background: On December 8, 1987, the Cornell University Institutional Animal Care and Use Committee approved a series of guidelines recommended to them by the University Animal Welfare Committee. These guidelines were prepared by a subcommittee of faculty members, after they had the opportunity to evaluate the use of animals in undergraduate teaching (and student concerns for the same) from a representative sample of instructors.

### Guidelines

1. For demonstrating certain principles and procedures, the use of animals in teaching is recognized as an invaluable, often essential, pedagogical device.

2. For courses in which vertebrate animals are to be used in dissection, surgery, or in other experimental procedures, the course description that appears in *Courses of Study* should alert students to this fact.
3. A detailed description of the intended use of vertebrate animals should be available to students upon request to the instructor of each course.
4. Faculty members are encouraged to explain their reasons and need for using vertebrate animals and should indicate to students the availability of the procedures described in item 8 below.
5. Students are encouraged to discuss their concerns about the instructional use of vertebrate animals with the instructor of the course.
6. When consistent with pedagogical objectives, faculty members are encouraged to consider adopting alternative methods and procedures that do not involve the use of live animals.
7. When students object on ethical or other valid grounds to participating in an exercise using vertebrate animals, instructors are encouraged to provide alternative means when consistent with pedagogical objectives for learning the same material.
8. A student who is reluctant to voice his or her concerns about animal use in a particular course or who thinks these concerns have not received proper attention may seek assistance from the chair of the Institutional Animal Care and Use Committee (IACUC) at 253-3845 or by e-mail at [iacuc-mailbox@cornell.edu](mailto:iacuc-mailbox@cornell.edu).
9. Faculty members should instruct students in the responsible use of animals. For more information, see [www.policy.cornell.edu/vol1\\_4.cfm](http://www.policy.cornell.edu/vol1_4.cfm).

## Advanced Placement

### Definition and Purpose of Advanced Placement Credit

Advanced placement credit is college credit that students earn before they matriculate as freshmen and that counts toward the degree and degree requirements as specified by the individual college at Cornell. Its primary purpose is to exempt students from introductory courses and to place them in advanced courses. Its value is that it allows students to include more advanced courses in their course of study.

### Sources of Advanced Placement Credit

Advanced placement credit may be earned from the following:

1. The requisite score from the Advanced Placement Examinations (AP exams) from the College Entrance Examination Board (CEEB) in Princeton, N.J. The requisite scores, which vary by subject, are determined by the relevant departments at Cornell and are listed on pages 8-10.
2. Acceptable performance on a Cornell department exam (offered only in some subjects, usually during orientation).
3. A regular course taught at an accredited college to college students and approved



by the relevant department at Cornell. Some departments accept credit from virtually all accredited colleges; some do not.

4. GCE Advanced Level and International Baccalaureate Examinations are listed on page 11.

*Note: Cornell University does not accept credit for courses sponsored by colleges but taught in high schools to high school students, even if the college provides a transcript of such work. Students who have taken such courses may, however, earn credit by taking an appropriate examination as described in paragraph 1 or 2 above.*

The appropriate department of instruction within the university sets the standards of achievement that must be met for advanced placement in its subject, recommends Advanced Placement credit for those who meet the standards, and determines which Cornell courses the credit places students out of. The final decision for awarding advanced placement credit at Cornell and applying it to degree requirements rests with each individual college (consult the relevant college sections of *Courses*

*of Study*). Students need not accept advanced placement, although forfeiting the advantage of moving quickly into advanced courses affects one's overall education. If they take the Cornell course they have placed out of, they relinquish the advanced placement credit.

**Advanced placement examinations.** Entering first-year students should have their scores from CEEB Advanced Placement Examinations sent to their college or school registrar's office (see list below).

**Departmental advanced standing examinations.** In certain subjects, students may also qualify for advanced placement or credit, or both, on the basis of departmental examinations given on campus during Orientation Week. A schedule of these examinations appears in the orientation booklet mailed in late summer to entering students. The departments that award advanced placement and credit on the basis of departmental examinations are shown on pages 8-10. Students need to register for those examinations in the relevant department.

**Transfer of credit.** Entering first-year students who have completed college courses for which they want to receive credit toward their

Cornell degree should send transcripts and course syllabi to their college or school office (see the list below).

**Written inquiries.** Students can address questions to departments, schools, or college offices by adding Ithaca, NY 14853 to the addresses given in the following sections.

*College of Agriculture and Life Sciences*  
140 Roberts Hall

*College of Architecture, Art, and Planning*  
B1 West Sibley Hall

*College of Arts and Sciences*  
55 Goldwin Smith Hall

*College of Engineering*  
158 Olin Hall

*School of Hotel Administration*  
180 Statler Hall

*College of Human Ecology*  
145 Martha Van Rensselaer Hall

*School of Industrial and Labor Relations*  
101 Ives Hall

## CREDIT AND PLACEMENT

The tables below summarize how credit and placement are determined for most subjects. Supplementary information for some subjects follows immediately.

### CEEB's AP Exams

<i>Subject</i>	<i>Score</i>	<i>Advanced Placement (AP) Credit</i>	<i>Placement</i>
Arabic	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
Biology	see <a href="http://www.biology.cornell.edu">www.biology.cornell.edu</a> for credit and placement information.		
Chemistry	5	4 credits	Department determines placement on basis of student/advisor meeting before registration and/or an exam given during fall orientation. Placement out of 206, 207, or 211; if students take 215 they may also receive 4 AP credits.  Pre-med students with AP credit should contact the Health Careers Center to determine how many general chemistry courses they should take. A few medical schools require two semesters of general chemistry; they do not accept AP credit as one of the required courses.
Computer science AB	4,5	4 credits	Placement out of COM S 100. Department also offers placement exam during fall orientation.
Computer science A	5	4 credits	Placement out of COM S 100. Department also offers placement exam during fall orientation.
Economics, micro	4,5	3 credits	Placement out of ECON 101 and H ADM 141.
Economics, macro	4,5	3 credits	Placement out of ECON 102.
English literature and composition			varies by college
English language and composition			varies by college
Environmental science	4,5	3 credits	Placement out of EAS 101 or 111 and NTRES 201. (Engineering and BEE students receive no credit.)
French language	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.



## CEEB's AP Exams (continued)

<i>Subject</i>	<i>Score</i>	<i>Advanced Placement Credit</i>	<i>Placement</i>
French literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
German	4,5	3 credits	Department of German Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Government and politics, U.S.	4,5	3 credits	Placement out of GOVT 111.
Government and politics, comparative	4,5	3 credits	Placement out of GOVT 131.
Greek, Ancient	Department of Classics determines credit and placement based on departmental examination.		
Greek, Modern	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
Hebrew	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
American history	4,5	4 credits	Placement out of HIST 153 (also AM ST 103) and 154 (also AM ST 104).
European history	4,5	4 credits	Placement out of HIST 151 and 152.
Human geography		no credit	
Italian language	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Italian literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Latin	Department of Classics determines credit and placement based on departmental examination.		
Mathematics BC	4,5	8 credits	Placement out of MATH 106, 111, 122, 191. Permission to take MATH 221, 223, 213, or 231. Students wishing to take engineering calculus will place into MATH 192. (Engineering and BEE students receive only 4 credits.)
	3	4 credits	Placement out of MATH 106, 111, and 121. Permission to take MATH 112, 122, 190, 191, or 231. (Engineering and BEE students receive no credit.)
Mathematics AB or AB subscore of BC exam	3,4,5	4 credits	Placement out of MATH 106 and 111. Permission to take MATH 112, 122, 191, or 231. (Engineering and BEE students receive no credit.)
Music	Department of Music determines credit and placement based on departmental examination.		
Persian	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
Physics B	5	8 credits	Placement out of PHYS 101–102. Students who also have a score of 4 or 5 on Mathematics BC may choose to accept 4 AP credits for 207 or 112 and then take 208 or 213. Students in the College of Engineering should refer to <a href="http://www.engineering.cornell.edu/student-services/academic-advising/academic-information/ap-credit/index.cfm">www.engineering.cornell.edu/student-services/academic-advising/academic-information/ap-credit/index.cfm</a> for credit and placement information.
	4	4 credits	Placement out of PHYS 101.

**CEEB's AP Exams (continued)**

<i>Subject</i>	<i>Score</i>	<i>Advanced Placement Credit</i>	<i>Placement</i>
Physics C-Mechanics	4,5	4 credits	Placement out of PHYS 112 or 207, or placement into PHYS 116 with no AP credit. For more information, contact department representative.
Physics C-Electricity/ Magnetism	5	4 credits	Placement out of PHYS 213.
Psychology	4,5	3 credits	Placement out of PSYCH 101.
Spanish language	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Spanish literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Statistics (excluding engineering students)	4,5	3 credits	Placement out of AEM 210, PAM 210, or MATH 171 (not H ADM 201).
Studio art		no credit	
Turkish			Department of Near Eastern Studies determines credit and placement based on departmental examination.
World history		no credit	

†Cornell Advanced Standing Examination. Contact Callean Hile, 303 Morrill Hall, for French, Italian, and Spanish. Contact Miriam Zubal, 183 Goldwin Smith Hall, for German.

**International Credentials**

The policies currently in effect for General Certificate of Education (GCE) "A" Level Examinations and International Baccalaureate Higher Level Examinations are summarized in the table below. Students may submit results of the French Baccalaureat or German Abitur for possible credit depending on the stream or specialization followed. Accepted students holding any other secondary school credentials are urged to sit for the Advanced Placement Examinations of the College Entrance Examination Board or for the departmental examinations offered during Orientation Week.

The table lists subjects and the marks for which credit will be awarded.

**SUPPLEMENTARY INFORMATION****Chemistry and Chemical Biology**

The Department of Chemistry and Chemical Biology offers two 8-credit sequences that satisfy prerequisites for further work in the department: CHEM 207-208 and 215-216. CHEM 215-216 is the sequence intended for students with a solid background in chemistry and strong math skills.

Freshmen may qualify for advanced placement and advanced standing credits in chemistry by satisfactory performance on the CEEB Advanced Placement Examination or an

international examination, or by passing an advanced standing examination offered by the department. A score of 5 on the CEEB examination entitles a student to 4 credits. A student may earn 4 or 8 credits by suitable performance on the departmental examination. To take the departmental examination students must sign up beforehand in the Chemistry and Chemical Biology Instructional Office, 131 Baker Laboratory.

The specific course in which a student will register after having received a certain advanced placement standing will be decided by consultation between the student, his or her advisor, and the professors teaching the courses. Questions may also be directed to the director of undergraduate studies, in 760A S. T. Olin Laboratory. Students receiving advanced placement who are interested in a major in chemistry or a related science should consider taking CHEM 215-216 and should consult the CHEM 215 instructor or department staff.

**Computer Science**

Students who receive a score of 4 or 5 on the AB version of the CEEB Advanced Placement Examination in computer science, a score of 5 on the A exam, or a score of 6 or 7 on the IB exam will receive 4 advanced placement credits and may take COM S 211. These credits may be used to satisfy the requirement in computer programming for students in the College of Engineering.

Freshmen may also earn 4 credits by suitable performance on a departmental examination to be given during Orientation Week. To take the departmental examination, students need only show up at the time and location indicated on the Orientation Week Schedule; advanced signup is not necessary.

**Mathematics and Statistics**

Students entering Cornell before fall 2004 should contact the Department of Mathematics for placement information. The following applies to students in fall 2004 or later.

The calculus courses MATH 111, 112, and 191 cover substantially the same topics as calculus courses given in many high schools, and it is best to avoid repeating material that has already been covered at an appropriate level. Secondary-school students who have had the equivalent of at least one semester of calculus should, if possible, take one of the CEEB's two Advanced Placement Examinations (Calculus AB or Calculus BC) during their senior year.

<i>Subject</i>	<i>Marks</i>	<i>Credit</i>
International Baccalaureate (IB) Higher-Level Examination are awarded advanced standing and credit on receipt of the original or a certified copy of the examination results.		
Anthropology		subject to departmental review
Biology		see <a href="http://www.biology.cornell.edu">www.biology.cornell.edu</a>
Chemical and Physical Systems	6 or 7	8 credits (PHYS 101 and 102)
Chemistry	6 or 7	4 credits (CHEM 207)
Computer Science	6 or 7	4 credits (COM S 100)
Economics	6 or 7	6 credits (ECON 101 and 102)
English Literature	7	3 credits and placement out of one first-year writing seminar
	6	3 credits (excluding Arts and Sciences students)
Mathematics	6 or 7	4 credits and placement out of MATH 106 and 111. Students may obtain more credit by taking the Mathematics Department placement exam. (Engineering and BEE students receive no credit.)
Music		by departmental examination
Philosophy	7	3 credits
Physical Science	6 or 7	8 credits (4 credits, CHEM 206; 4 credits, PHYS 101)
Physics	6 or 7	4 credits (PHYS 101, 112, or 207)

General Certificate of Education (GCE) Advanced ("A") Level Examination are awarded advanced standing and credit. Students must present the original or a certified copy of their examination certificate to receive credit.

Biology	see <a href="http://www.biology.cornell.edu">www.biology.cornell.edu</a>	
Chemistry	A	8 credits (CHEM 207 and 208)
	B	4 credits (CHEM 207)
Economics	A	6 credits (ECON 101 and 102)
English Literature	A	3 credits and placement out of one first-year writing seminar
	B	3 credits (excluding Arts and Sciences students)
Mathematics	A, B, or C	4 credits and placement out of MATH 106 and 111. Students may obtain more credit by taking the Mathematics Department placement exam. Students who take the A level exam in Singapore will receive 8 credits and placement out of MATH 106, 111, 112, 122, and 191. (Engineering and BEE students receive 4 credits.)
Music		by departmental examination
Philosophy	A or B	3 credits
Physics	A or B	4 credits for PHYS 101, 112, or 207.
4 additional credits for PHYS 213 are granted for a combination of grades of A or B and a minimum of 8 advanced placement or advanced standing credits in mathematics. Students planning to major in physics are encouraged to enroll in PHYS 116. If students take 116, they do not receive 4 credits for 112. If students take 217, they do not receive credit for 213. Students in the College of Engineering should refer to <a href="http://www.engineering.cornell.edu/student-services/academic-advising/ap-credit/index.cfm">www.engineering.cornell.edu/student-services/academic-advising/ap-credit/index.cfm</a> for credit and placement information.		

The Department of Mathematics offers a placement examination during orientation week. (Separate mathematics placement exams are offered for students in the College of Engineering or the College of Agriculture and Life Sciences.) The Department of Mathematics exam should be taken by

1. students who have had at least a semester of calculus but did not take a CEEB Advanced Placement Examination; or
2. students who believe that their placement is incorrect.

The exam covers the material of the AP calculus program. Students are strongly urged to take this departmental placement exam even if they feel that their grasp of the material is uncertain. The placement information is useful in any case, and the grade on this test does not become a part of the student's record. No advance registration for the departmental examination is necessary.

Students who have been awarded advanced placement credit for calculus or statistics may not also receive academic credit for similar courses taken at Cornell. Students who have been awarded AP credit for statistics (3 academic credits) will forfeit those credits if they take AEM 210, ILRST 210, MATH 171, or PAM 210.

**Students who are in neither the College of Engineering nor in the Biological and Environmental Engineering (BEE) program of the College of Agriculture and Life Sciences.** Students who have 4 AP credits for calculus will forfeit those credits if they take MATH 106 or 111. Students who have 8 AP credits for calculus will forfeit 4 credits if they take MATH 112, 122, or 191 and all 8 credits if they take MATH 106 or 111.

**Students in the College of Engineering or the Biological and Environmental Engineering (BEE) program of the College of Agriculture and Life Sciences.** Engineering students will take the engineering calculus sequence,

which assumes students have one semester of calculus experience before entering Cornell. Because the engineering sequence is more advanced than other sequences at Cornell, engineering students may receive at most 4 AP credits, which they will forfeit if they take MATH 191, the first course in the sequence.

### Modern Foreign Languages

Students who have studied a language for two or more years and want to continue study in that language at Cornell must present the results of a placement test. See "Placement Tests and Advanced Placement Credit" under "Foreign Language Requirements" in the College of Arts and Sciences section of this catalog. Students who have had a year of formal study or substantial informal study since they last took a placement test should take the examination again during orientation week if they plan to continue course work.

Advanced standing credit may be earned as follows:

1. Students with a score of 4 or 5 on the language Advanced Placement Examination of the CEEB earn 3 credits and are eligible to take the Cornell Advanced Standing Examination (CASE).
2. Students who achieve a minimum score of 65 on the Cornell language placement test given during orientation week are eligible to take the Cornell Advanced Standing Examination (CASE). Outstanding performance on this examination can result in a maximum of 3 credits.
3. For formal language work at an accredited college, credit is considered by the relevant department on submission of a syllabus and transcript. Sometimes an exam score or the CASE is also required.
4. Native speakers of languages other than English may, if an examination by the appropriate department is available, be granted a maximum of 3 credits for proficiency equivalent to that required in English for a first-year writing seminar.

Information about times and places of placement tests is available in the orientation booklet and from Academic and Career Counseling Services at [sao.cornell.edu/orientation/placement.htm](http://sao.cornell.edu/orientation/placement.htm). For more information, see "College of Arts and Sciences" on language course placement, or contact Callean Hile, 303 Morrill Hall, for French, Italian, and Spanish; Miriam Zubal, 183 Goldwin Smith Hall, for German; Doreen Silva, 226 Morrill Hall, for Russian; Kim Robinson, 388 Rockefeller Hall, for Asian languages; Nava Scharf, 409 White Hall, for Hebrew; or Munther Younes, 409 White Hall, for Arabic.

## Music

Advanced placement and credit are awarded only in music theory, and only on the basis of an examination administered by the Department of Music; that is, credit cannot be earned on the basis of the AP, IB, or other examinations from outside Cornell, nor on the basis of course work done elsewhere. Outstanding performance on the departmental examination will earn students 3 credits and placement directly into MUSIC 152. In rare instances students may place into MUSIC 251, in which case they will earn 6 credits. The placement examination is normally administered on the Sunday during fall orientation week and, when necessary, at the beginning of the spring semester. For more information about the examination, see the departmental web site.

## Physics

Advanced placement and credit are awarded on the basis of the CEEB Advanced Placement Examination in physics (Physics B or Physics C), certain international examinations, or the departmental examination (offered only during orientation week, fall semester; appointment required). For information about the departmental examination, students should consult the director of undergraduate studies, 101 Clark Hall ([physicsdus@cornell.edu](mailto:physicsdus@cornell.edu)), or the department chair, 109 Clark Hall.

Physics B—Students earning a score of 5 may receive 8 credits for non-calculus-based PHYS 101 and 102. Those earning a score of 5 in Physics B and a score of 4 or 5 in Calculus BC may choose to accept 4 credits in calculus-based PHYS 112 or 207 instead of 8 credits in PHYS 101 and 102. Those earning a score of

4 may receive 4 credits in PHYS 101. Students in the College of Engineering should refer to [www.engineering.cornell.edu/student-services/academic-advising/academic-information/ap-credit/index.cfm](http://www.engineering.cornell.edu/student-services/academic-advising/academic-information/ap-credit/index.cfm).

Physics C—Mechanics: Students earning a score of 4 or 5 may receive 4 credits for PHYS 112 or 207, or placement into PHYS 116, a more analytic first-semester course, with no AP credit.

Physics C—Electricity and Magnetism: Students earning a score of 5 may receive 4 credits for PHYS 213.

Students will not receive credit for an advanced placement course if they receive credit for a Cornell course with similar content. Students may receive credit for only one of the courses in each group:

PHYS 101, 112, 116, 207

PHYS 102, 208, 213, 217

A student planning a major in physics or applied and engineering physics and who is eligible for AP credit should consult with his or her advisor or the department representative.

Advanced placement into a next-in-sequence course depends on the completion of the appropriate mathematics prerequisites before enrolling. To qualify for advanced placement credit, it is not necessary to continue the study of physics.

General information and advice may be obtained from the director of undergraduate studies, 101 Clark Hall, or from the Department of Physics, 109 Clark Hall.

## Course Enrollment

### PREENROLLMENT

Pre-course enrollment for each semester at Cornell takes place partway through the preceding semester using an online application through Just the Facts. Dates are announced in advance and are posted in school and college offices. Students are expected to meet with their faculty advisors during this period to affirm that the courses they plan to take will ensure satisfactory progress toward a degree.

New students and transfer students may be sent course enrollment instructions by their college offices before they arrive on campus. Procedures vary from college to college.

### COURSE ADD/DROP/CHANGE

Students may adjust their schedules during add/drop/change periods. Courses may be added, dropped, or changed online through Just the Facts. Permission-only courses and courses with specific add/drop procedures will be handled using a written add/drop form. The form is completed by the student and signed by both the student's advisor and an appropriate representative of the department offering the course (an instructor, department staff member, or college registrar, depending on the college). The completed and signed form must be returned to the student's college office to be processed. Professional schools, the School of Continuing Education and Summer Sessions, and the Department of Physical Education and Athletics have different course enrollment and

add-drop policies. See the chart below for their course add/drop/change fees.

### Late Course Enrollment and Late Add/Drop/Change Fees

Academic Unit	Late Course Enrollment Fee	Late Course Add/Drop/Change Fee
Continuing Education and Summer Sessions	†	
Johnson Graduate School of Management	\$100	\$100
Law School	No fee	No fee
Physical education	\$30	\$20*
Veterinary medicine	\$100*	\$100*

†Consult the Summer Session catalog and the Division of Extramural Study brochure for fees.

\*Consult the college office for special considerations and requirements.

## AUDITING COURSES

Summer school and extramural students may officially register as visitors (auditors) in courses and have this entered on their permanent records if their attendance is reported as satisfactory. Graduate students may register for courses as auditors but will not have the courses listed on their transcripts. Undergraduates may not register to audit courses.

## EXPLANATION OF COURSE NUMBERING SYSTEMS AND COURSE PREFIXES

As the university makes the transition to a new course numbering system, the course levels for three-digit (current) and four-digit (future) course numbers will correspond in the manner shown in the list below. In this issue of *Courses of Study*, all of the current three-digit course numbers and most of the future four-digit course numbers have been included in the course listings (some four-digit course numbers were not available at press time).

100(1100) level—introductory course, no prerequisites, open to all qualified students

200(2000) level—lower-division course, open to freshmen and sophomores, may have prerequisites

300(3000) level—upper-division course, open to juniors and seniors, prerequisites

400(4000) level—upper-division course, open to seniors and graduate students

500(5000) level—professional level (e.g., management, law, veterinary medicine)

600(6000) level—professional and graduate-level course, open to upper-division students

700(7000) level—graduate-level course

800(8000) level—master's level, thesis, research

900(9000) level—doctoral level, thesis, research

The list of courses that follows is arranged in two broad groups.

*Group 1:* Divisions that offer both undergraduate- and graduate-level courses

Agriculture and Life Sciences  
Architecture, Art, and Planning  
Arts and Sciences  
Engineering  
Hotel Administration  
Human Ecology  
Industrial and Labor Relations  
Nutritional Sciences  
Officer Education

*Group 2:* Graduate professional divisions

Law  
Management  
Veterinary Medicine

No courses are offered by the Graduate School as a unit; graduate-level courses are contained in the various departments that offer the instruction.

Within each division, courses are generally arranged in alphabetical order by department and in numerical order within the departments. All courses are briefly described for those divisions (group 1) offering instruction to both undergraduate and graduate students. Courses in the graduate professional divisions (group 2) are designated by number and title only.

#### Course Prefixes and Their Meanings

AAS	Asian American Studies
AEM	Applied Economics and Management
A&EP	Applied and Engineering Physics
AIR S	Aerospace Studies
AIS	American Indian Studies
ALS	Agriculture and Life Sciences
AM ST	American Studies
AN SC	Animal Science
ANTHR	Anthropology
ARCH	Architecture
ARKEO	Archaeology
ART	Art
ART H	History of Art
ASIAN	Asian Studies
AS&RC	Africana Studies and Research Center
ASTRO	Astronomy
BEE	Biological and Environmental Engineering
BENGL	Bengali
BIOAP	Animal Physiology
BIOBM	Biochemistry, Molecular and Cell Biology
BIOEE	Ecology and Evolutionary Biology
BIO G	Biology
BIOGD	Genetics and Development
BIOMI	Microbiology
BIONB	Neurobiology and Behavior
BIOPL	Plant Biology
BIOSM	Shoals Marine Laboratory

BME	Biomedical Engineering	ILRHR	Human Resources Studies
B&SOC	Biology and Society	ILRIC	International and Comparative Labor
BTRY	Biometry and Statistics*	ILRID	Interdepartmental
BURM	Burmese	ILRLE	Labor Economics
CAPS	China and Asia Pacific Studies	ILROB	Organizational Behavior
CATAL	Catalan	ILRST	Social Statistics
CEE	Civil and Environmental Engineering	INDO	Indonesian
CHEM	Chemistry	INFO	Information Science
CHEME	Chemical and Biomolecular Engineering	ITALA	Italian
CHIN	Chinese	ITALL	Literature in Italian
CHLIT	Literature in Chinese	JAPAN	Japanese
CIS	Computing and Information Science	JAVA	Javanese
CLASS	Classics	JPLIT	Literature in Japanese
COGST	Cognitive Studies	JWST	Jewish Studies
COM L	Comparative Literature	KHMER	Khmer (Cambodian)
COMM	Communication	KOREA	Korean
COM S	Computer Science	KRLIT	Korean Literature
CRP	City and Regional Planning	LA	Landscape Architecture
CSS	Crop and Soil Sciences	LAT A	Latin American Studies
CZECH	Czech	LATIN	Latin
DANCE	Dance	LAW	Law
DEA	Design and Environmental Analysis	LING	Linguistics
D SOC	Development Sociology	M&AE	Mechanical and Aerospace Engineering
DUTCH	Dutch	MATH	Mathematics
EAS	Earth and Atmospheric Sciences	MEDVL	Medieval Studies
ECE	Electrical and Computer Engineering	MIL S	Military Science
ECON	Economics	MS&E	Materials Science and Engineering
EDUC	Education	MUSIC	Music
ENGL	English	NAV S	Naval Science
ENGLF	English for Academic Purposes	NBA	Business Administration
ENGRC	Engineering Common Courses	NCC	Graduate School of Management Common Course
ENGRD	Engineering Distribution Courses	NEPAL	Nepali
ENGRG	Engineering General Interest	NES	Near Eastern Studies
ENGRI	Engineering Introductory Courses	NMI	Graduate School of Management, Research and Advanced Studies
ENTOM	Entomology	NRE	Graduate School of Management, Doctoral Seminars
FGSS	Feminist, Gender, and Sexuality Studies	NS	Nutritional Sciences
FILM	Film Studies	NS&E	Nuclear Science and Engineering
FD SC	Food Science	NTRES	Natural Resources
FRDR	Freehand Drawing and Scientific Illustration	OR&IE	Operations Research and Industrial Engineering
FRLIT	Literature in French	PALI	Pali
FRROM	French	PAM	Policy Analysis and Management
GERST	German Studies	PHIL	Philosophy
GREEK	Greek	PHYS	Physics
H ADM	Hotel Administration	PL BR	Plant Breeding
HD	Human Development	PL PA	Plant Pathology
HE	Human Ecology	POLSH	Polish
HINDI	Hindi	PORT	Portuguese
HIST	History	PSYCH	Psychology
HORT	Horticulture	QUECH	Quechua
HUNGR	Hungarian	RELST	Religious Studies
IARD	International Agriculture and Rural Development	ROM S	Romance Studies
ILRCB	Collective Bargaining, Labor Law, and Labor History	RUSSA	Russian

RUSSL	Literature in Russian
SANSK	Sanskrit
SEBCR	Serbo-Croatian
S HUM	Society for the Humanities
SINHA	Sinhala
SNES	Science of Natural and Environmental Systems
SNLIT	Literature in Sanskrit
SOC	Sociology
SPANR	Spanish
SPANL	Literature in Spanish
S&TS	Science and Technology Studies
SWED	Swedish
TAG	Tagalog
T&AM	Theoretical and Applied Mechanics
THAI	Thai
THETR	Theatre Arts
TOX	Toxicology
TXA	Textiles and Apparel
UKRAN	Ukrainian
URDU	Urdu
VETCS	Clinical Sciences
VETMI	Microbiology and Immunology
VETMM	Molecular Medicine
VIET	Vietnamese
VISST	Visual Studies
VTBMS	Biomedical Sciences
VTLIT	Literature in Vietnamese
VTMED	Veterinary Medicine
VTPMD	Population Medicine and Diagnostic Sciences

\*Courses in these departments may also be offered in the Department of Statistical Science and listed as STBTRY, STRENGR, STMATH, or STSOC under "General Information" in this catalog.

## Class Attendance, Meeting Times, and Examinations

### CLASS ATTENDANCE AND MEETING TIMES

Students are expected to be present throughout each semester at all meetings of courses for which they are registered. The right to excuse a student from class rests at all times with the faculty member in charge of that class.

**Absences because of religious beliefs.** In accordance with Section 224-a of the New York State Education Law, each student who is absent from school because of his or her religious beliefs must be given an equivalent opportunity to register for classes or make up examinations, study, or work requirements that he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the university for making available to such student such equivalent opportunity.

### Class Meeting Times

#### Monday/Wednesday

	Start Times	End Times
50 MIN	08:00 A.M.	08:50 A.M.
75 MIN	08:40 A.M.	09:55 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
75 MIN	02:55 P.M.	04:10 P.M.
50 MIN	03:35 P.M.	04:25 P.M.
50 MIN	07:30 P.M.	08:20 P.M.
75 MIN	07:30 P.M.	08:45 P.M.
50 MIN	08:35 P.M.	09:25 P.M.

#### Tuesday/Thursday

50 MIN	08:00 A.M.	08:50 A.M.
75 MIN	08:40 A.M.	09:55 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
75 MIN	10:10 A.M.	11:25 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
75 MIN	11:40 A.M.	12:55 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
75 MIN	01:25 P.M.	02:40 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
75 MIN	02:55 P.M.	04:10 P.M.
50 MIN	03:35 P.M.	04:25 P.M.

#### NO EVENING CLASSES

#### Friday

50 MIN	08:00 A.M.	08:50 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
50 MIN	03:35 P.M.	04:25 P.M.

#### NO EVENING CLASSES

### Laboratories and similar exercises

1 HR 55 MIN	08:00 A.M.	09:55 A.M.
	10:10 A.M.	12:05 P.M.
	12:20 P.M.	02:15 P.M.
	02:30 P.M.	04:25 P.M.
(Mon. and Wed.)	07:30 P.M.	09:25 P.M.
2 HR 25 MIN	07:30 A.M.	09:55 A.M.
	10:10 A.M.	12:35 P.M.
	02:00 P.M.	04:25 P.M.
(Mon. and Wed.)	07:30 P.M.	09:55 P.M.
3 HR	08:00 A.M.	11:00 A.M.
	10:10 A.M.	01:10 P.M.
	01:25 P.M.	04:25 P.M.
(Mon. and Wed.)	07:30 P.M.	10:30 P.M.

On Monday, Tuesday, Wednesday, and Thursday the hours of 4:25 P.M. to 7:30 P.M., on Fridays the hours after 4:25 P.M., on Saturday the hours after 12:05 P.M., and all day Sunday shall be free from all formal undergraduate classes or laboratory exercises.

Evening preliminary examinations that will be given outside of normal class hours may be scheduled on Tuesday and Thursday evenings only, beginning at 7:30 P.M. All room assignments are scheduled by the Office of the University Registrar. The dates and times of these examinations are listed in the course rosters for each semester.

Evening academic activities commencing at 7:30 P.M. on Mondays and Wednesdays, other than regularly scheduled courses and prelims previously approved by the office of the university faculty, are not permitted. Violation of these rules interferes with other university activities (e.g., athletic, musical, theatrical, or employment).

Any exception to the above regulations, other than those for evening preliminary examinations, will require permission of the dean or director of the college or school offering the course. Exceptions to the regulations on evening preliminary examinations require approval of the dean of the university faculty. All such exceptions must include provision of special arrangements for the students for whom conflicts are generated by such an exception.

## FINAL EXAMINATIONS

Final examinations for undergraduate courses are scheduled by the Office of the University Registrar. Examinations may be one, two, or two and one-half hours in length at the discretion of the department concerned. The schedule of final examinations is available online at [www.cornell.edu/academics/courses.cfm](http://www.cornell.edu/academics/courses.cfm).

### General Rules Governing Final Examinations

Legislation of the university faculty governing study periods and examinations is as follows:

1. No final examinations can be given at a time other than the time appearing on the official examination schedule promulgated by the Office of the University Registrar without prior written permission of the dean of the faculty.
2. No permission will be given, for any reason, to schedule final examinations during the last week of classes or the designated study period preceding final examinations.
3. Permission will be given by the dean of the faculty to offer an alternate examination during the examination period itself if requested in writing by the faculty member, but only on condition that a comparable examination also be given for those students who wish to take it at the time the examination was originally scheduled. The faculty member requesting such a change shall be responsible for making appropriate arrangements for rooms or other facilities in which to give the examination. This should be done through the university registrar's office.



- No tests are allowed during the last week of scheduled classes unless such tests are part of the regular week-by-week course program and are followed by an examination (or the equivalent) during the final examination period.
- Papers may be required of students during the study period if announced sufficiently far in advance that the student did not have to spend a significant segment of the study period completing them.
- Faculty can require students to submit papers during the week preceding the study period.
- Take-home examinations should be given to classes well before the end of the regular semester and should not be required to be submitted during study period but rather well into the examination period.

### The university policies governing study period and final examinations are:

- Each course should require that a final examination or some equivalent exercise (for example, a term paper, project report, final critique, oral presentation, or conference) be conducted or due during the period set aside for final examinations.
- Although not specifically prohibited, it is university policy to discourage more than two examinations for a student in one 24-hour time period and especially on any one day. It is urged that members of the faculty consider student requests for a make-up examination, particularly if their course is the largest of the three involved and thus has the strongest likelihood of offering a make-up for other valid reasons, such as illness or death in the family.
- Students have a right to examine their corrected exams, papers, etc., to be able to question their grading. (Note that students have no absolute right to the return thereof.) Exams, papers, etc., as well as grading records, should be retained for a reasonable time after the end of the semester, preferably till the end of the following semester, to afford students such right of review.

### EVENING PRELIMINARY EXAMINATIONS

The most convenient times and places for "prelims" are the normal class times and classrooms. In cases where the only alternative is to hold evening preliminary examinations, they may be scheduled only on Tuesday and Thursday evenings and only after 7:30 P.M.

An alternative time to take the examination must be provided for those students who have academic, religious, athletic, or employment conflicts at the time scheduled.

Note that instructors holding evening examinations are strongly urged to indicate this in the course descriptions listed in *Courses of Study* and must notify students of the dates of such examinations as early as possible in the semester, preferably when the course outline is distributed. For more information on the policy governing evening examinations,

contact the office of the dean of the faculty, 315 Day Hall.

## Grading Guidelines

The official university grading system is composed of letter grades with pluses and minuses. Passing grades range from A+ to D-; F is failing, INC denotes a grade of incomplete, and R is the grade given at the end of the first semester of a yearlong course. The grades of INC and R do not have quality-point equivalents attached. These are the quality-point equivalents:

A+ =4.3	B+ =3.3	C+ =2.3	D+ =1.3
A =4.0	B =3.0	C =2.0	D =1.0
A- =3.7	B- =2.7	C- =1.7	D- =0.7
			F =0.0

This is how a semester average is computed:

Course	Grade	Points	Credits	Quality	
				Product	
CHEM 103	B+	3.3	x 3	=	9.9
ENGL 151	C-	1.7	x 3	=	5.1
DEA 145	B	3.0	x 4	=	12.0
PAM 100	B	3.0	x 3	=	9.0
DEA 111	C	2.0	x 3	=	6.0
Total				16	42.0

To arrive at the semester average, add the products (credits x quality points) and divide by the number of credits taken. Here, 42 divided by 16 equals 2.63.

The cumulative average (an average of grades from two or more semesters) equals the sum of the products of all the grades at Cornell divided by the total number of credits taken.

## S-U GRADES

On September 6, 1972, the Faculty Council of Representatives passed the following legislation:

"Resolved, that:

- the S-U system have symbol equivalents which are uniform within the university: S means C- or above; U means D+, D, D-, or failure.
- S-U options be chosen by the student during the first three weeks of the semester.
- the Announcements and/or supplementary course registration materials describing each course include a description of the course grading options, particularly if the course is graded with an exclusive S-U. Any change in grading options must be announced by the instructor within the first two weeks of the semester.
- course requirements (required reading, term paper, etc.) be the same for students electing S-U grades as for those electing letter grades."

The rules for the S-U option are further defined by each of the academic units. They are as follows:

**Agriculture and Life Sciences.** (1) Must have 100 credit hours with A, B, C, D grades. (2) The S-U option is available only in those courses so designated in the course catalog

after approval by the Educational Policy Committee. (3) Freshmen may not exercise the S-U option. (4) Only one optional S-U course is allowed per semester.

**Architecture, Art, and Planning.** (1) All courses specifically required for a degree excluded. Various departments may designate specific required courses where S-U will be permitted. (2) In a course designated as S or U, the entire class is so graded. The instructor must announce this decision within the first two weeks of class. (3) Where the option for S or U exists, both student and instructor must agree on the option. This agreement must be made by the end of the third week of classes on the appropriate form in the college office. Once agreed upon, this grade option will be used for the final grade.

**Arts and Sciences.** (1) Courses that count toward satisfaction of major requirements should not be taken for an S or U grade unless the department grants permission. (2) Permission of instructor. (3) A minimum of 80 of the 120 hours required for the A.B. degree must be in courses for which the student has received letter grades.

**Engineering.** (1) The course in question must be offered with an S-U option. (2) The student must have completed at least one full semester of study at Cornell. Freshmen may not take any courses on an S-U basis during their first semester with the exception of courses graded "S-U only" such as physical education, ROTC, supplemental courses, and writing workshops. (3) The proposed S-U course must count as either a liberal studies distribution or an approved elective in the Engineering curriculum. (4) Students may elect to enroll S-U in only one course each semester in which the choice between letter grade and S-U is an option. (Additional courses offered "S-U only" may be taken in the same semester as the "elected S-U" course.) (5) After the end of the third week of classes, the grading option may not be changed nor will students be permitted to add a course in which they were previously enrolled (in the current semester) under a different grading option. Note: Courses graded S-U do not count toward eligibility on the Dean's List and may weaken a student's chances for acceptance into graduate school. Questions regarding the S-U grading option should be addressed to Engineering Advising.

**Graduate School.** (1) Seminars and thesis research courses are usually graded S-U, and should be registered accordingly or a grade error results at semester's end. Other courses may be registered as S-U only if offered as S-U option.

**Hotel.** (1) Maximum of 4 free-elective credit hours per semester. (2) Exceptions are by petition only.

**Human Ecology.** (1) Not part of student's major. (2) May be used in the 9 credit hours required outside the major in Human Ecology courses. (3) Not part of hours required in humanities, natural sciences, and social sciences. (4) A department may approve S-U grading in specific courses if approved by Educational Policies Committee. (5) Freshmen enrolled in ENGL 137 and 138, which are offered only for S-U credit, are permitted to apply these courses to the first-year writing seminar requirements. (6) Total of 12 credits in S-U courses (not counting physical education) may be counted toward degree requirements during a student's college career.

**Industrial and Labor Relations.** (1) This option may be elected, if available in ILR electives, or in out-of-college electives but not including directed studies. (2) Degree requirements include a minimum of 105 letter grade (A+ to D-) credits. (3) Student must also be in good academic standing. (4) A U grade is considered the equivalent of an F in determining a student's academic status. (5) Limited to two courses per semester, not to exceed four hours in any one course.

**Internal Transfer.** (1) S-U grades permitted only when it is the only option or (2) when specifically approved by an admissions officer in the school or college to which the student plans to transfer.

**Veterinary Medicine.** (1) There is one foundation course in the veterinary curriculum that is offered on an S-U basis only. All other required core courses must be taken for a letter grade. (2) Elective courses for veterinary students may be offered on an S-U basis at the option of the professor.

## INCOMPLETE

The grade of incomplete is appropriate only when two basic conditions are met:

1. the student has a substantial equity at a passing level in the course with respect to work completed; and
2. the student has been prevented by circumstances beyond the student's control, such as illness or family emergency, from completing all of the course requirements on time.

A grade of incomplete may not be given merely because a student fails to complete all course requirements on time. It is not an option that may be elected at the student's own discretion.

While it is the student's responsibility to initiate a request for a grade of incomplete, reasons for requesting one must be acceptable to the instructor, who establishes specific make-up requirements. The instructor has the option of setting a shorter time limit than that allowed by the student's college for completing the course work. Several colleges require that a statement signed by the instructor be on file indicating the reason for the grade of incomplete and the restriction, if any.

It is the responsibility of the student to see that all grades of incomplete are made up before the deadline and that the grade has been properly recorded with the student's college registrar.

## CHANGES IN GRADES

Changes in a grade may be made only if the instructor made an error in assigning the original grade.

## OFFICIAL TRANSCRIPTS

An official transcript is one that bears the official signature of the university registrar, sent in a sealed envelope directly from the Office of the University Registrar to another institution or agency as directed by the

student. Transcripts may be requested at [transcript.cornell.edu](http://transcript.cornell.edu). There is no fee except for overnight and/or express mail services.

## University Requirements for Graduation

The university has only two requirements for graduation that must be fulfilled: the swim test and physical education courses. A student's college determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. See the individual requirements listed by each college or school or contact the college registrar's office.

## STUDENT RESPONSIBILITIES

Students are responsible for meeting all requirements for the courses in which they are enrolled, as defined by the faculty members teaching the courses. It is also the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing his or her chosen program of studies. Students should know how far they have progressed in meeting those requirements at every stage of their academic career.

## PHYSICAL EDUCATION

### Classes

All undergraduate students must complete two semesters of work in physical education unless exempted from this requirement for medical or other special reasons or by virtue of advanced standing on admission. For transfer students the requirement is reduced by the number of semesters satisfactorily completed, not necessarily including physical education, in a college of recognized standing before entering Cornell.

Credit in physical education may be earned by participating in courses offered by the Department of Athletics and Physical Education, participating on an intercollegiate athletic team as a competitor or manager, or performing in the marching band.

Physical education is a requirement of the first two terms at Cornell. Students must register for it in each semester, except those in which postponements are granted, until the requirement is satisfied.

Temporary postponements may be granted on the basis of physical disability, schedule conflicts, or excessive work load (employment exceeding 20 hours per week). Gannett Health Services can provide certifications based on health, and the financial aid office can provide certifications of employment. Students should see the director or assistant director of Physical Education to establish postponements or waiver of the requirement. Questionable or unusual cases may be resolved by petition to the Faculty Advisory Committee on Athletics and Physical Education.

### Swim Test

The University Faculty Committee on Physical Education has established a basic swimming and water safety competency requirement

for all entering freshman undergraduate students. Normally, the test is given for women in the Helen Newman pool and for men in the Teagle pool as part of their orientation process. The test consists of a feet-first entry into the deep end of the pool and a continuous 75-yard swim using front, back, and optional strokes. Any student who cannot pass the swim test is required to include the course Basic Swimming and Water Safety in his or her program of physical education before electives can be chosen. Students will receive a grade of incomplete in physical education until they have passed the swim test or fulfilled the requirement by satisfactory attendance in two semesters of Basic Swimming and Water Safety. Students unable to meet the swim requirement because of medical, psychological, or religious reasons must petition the University Faculty Committee on Physical Education for a waiver of the requirement. When a waiver is granted by the Faculty Committee on Physical Education, an alternate requirement is imposed. The alternate requirement substitutes a course in either Advanced First Aid (Emergency Response) or Wellness and Fitness for the original swimming requirement.

## Internal Transfer Division

Students may not always be satisfied with the original Cornell school or college into which they've been admitted, and may decide to transfer from one college to another within the university. This process is called internal transfer, and application procedures and deadlines vary by college. It may be possible to be admitted directly into a new program. Students who are uncertain if they immediately qualify for direct transfer, however, should apply to the Internal Transfer Division (ITD).

To apply, candidates must interview with the division's director and submit an essay to the ITD office outlining their reasons for wanting to transfer. Internal Transfer Division applicants must also fulfill the application requirements (e.g., interviews, essays) of their target college as if they were applying for direct transfer. In many cases, colleges formally sponsor students in ITD and essentially guarantee admission if students successfully complete the requirements (taking particular courses, earning a specified grade point average while enrolled in ITD) that are outlined in their letter of sponsorship. Sponsorship is the most important factor determining acceptance into ITD. Students can apply simultaneously for direct transfer and to ITD, so that if direct transfer is denied they might be offered the option of being sponsored in the Internal Transfer Division.

For more information about transfer requirements, students should contact the admissions office of the college they hope to enter and the office of the Internal Transfer Division, 220 Day Hall (255-4386).



## Interdisciplinary Centers, Programs, and Studies

### ANDREW D. WHITE PROFESSORS-AT-LARGE

726 University Avenue (255-0832)  
web.cornell.edu/Professors-at-Large/

The program has its origins in Cornell's early history. Andrew D. White, the first president of Cornell University, inaugurated the position of nonresident professor, to be held by eminent scholars, scientists, and intellectuals who periodically visit the university for the stated purpose of "contributing to the intellectual and cultural life of the university." Toward this end, Andrew D. White Professors-at-Large engage in a variety of activities including public lectures, ongoing courses, and collaborative research, as well as holding office hours for undergraduate and graduate students. They serve for a six-year term and are full members of the faculty when in residence.

#### Term Ending in 2007

Pretty, Jules, sustainable agriculture ecologist  
Short, Roger, reproductive physiologist

#### Term Ending in 2008

Goldsworthy, Andy, sculptor  
Hölldobler, Bert, zoologist  
Subrahmanyam, Sanjay, economic historian

#### Term Ending in 2009

Behrends, Okko, legal historian  
Butler, Judith, cultural theorist  
Venter, Craig, geneticist

#### Term Ending in 2010

Aldous, David, statistician  
Leeson, Lynn Hershman, digital artist  
Peskin, Charles, mathematician  
Sala, Osvaldo, ecologist  
Tibi, Bassam, Islamist

#### Term Ending in 2011

Sims, Lowery Stokes, art curator

#### Term Ending in 2012

Angier, Natalie, science writer

### FRANK H. T. RHODES CLASS OF '56 UNIVERSITY PROFESSORSHIP

To commemorate their 40th reunion, the Class of 1956 initiated an endowment to create the Frank H. T. Rhodes Class of '56 University Professorship in honor of Cornell's ninth president (1977–1995). The purpose of the Rhodes Class of '56 Professorship is to strengthen the undergraduate experience by bringing to the university individuals from every walk of life who represent excellence of achievement and to create opportunities for interaction with undergraduates. The endowment also makes it possible to create public events related to the professorship such as lectures, performances, films, art exhibits, or conferences. Rhodes Class of '56 Professors are full members of the faculty while in residence. Appointments are awarded for a period of one to five years. During each year of their appointment, Rhodes Class of '56 Professors visit the campus for a minimum of two weeks to engage in a variety of activities including public lectures, ongoing courses, and collaborative research.

#### Current Appointments

Grandin, Temple, associate professor of animal science

### CENTER FOR APPLIED MATHEMATICS

657 Frank H. T. Rhodes Hall (255-4335)

The Center for Applied Mathematics administers a broad-based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. Each student develops a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student's program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in applied mathematics, students should contact the director of the Center for Applied Mathematics, 657 Frank H. T. Rhodes Hall.

There is no special undergraduate degree program in applied mathematics. Undergraduate students interested in an application-oriented program in mathematics may select an appropriate program in the Department of Mathematics, the Department of Computer Science, or some department of the College of Engineering.

Graduate students in the center take courses related to their program of study that are offered by various departments. Below are listed selected courses in applied mathematics in the main areas of research interest of the center's members. Detailed descriptions of these courses can be found in the listings of the individual departments.

### Selected Applied Mathematics Courses

#### Basic Graduate Courses in Mathematics and Applied Mathematics

MATH 413 Honors Introduction to Analysis  
MATH 414 Honors Introduction to Analysis  
MATH 433 Honors Linear Algebra  
MATH 434 Honors Introduction to Algebra  
MATH 611 Real Analysis  
MATH 612 Complex Analysis  
MATH 615 Mathematical Methods in Physics  
MATH 621 Measure Theory and Lebesgue Integration  
MATH 622 Applied Functional Analysis  
MATH 631–632 Algebra  
MATH 633 Noncommutative Algebra  
MATH 634 Commutative Algebra  
MATH 651 Algebraic Topology  
MATH 661 Geometric Topology  
T&AM 610, 611, 613, 614 Methods of Applied Mathematics

#### Analysis (and Differential Equations)

MATH 428 Introduction to Partial Differential Equations  
MATH 617 Dynamical Systems  
MATH 618 Smooth Ergodic Theory  
MATH 619–620 Partial Differential Equations  
MATH 652–653 Differentiable Manifolds  
MATH 662 Riemannian Geometry  
MATH 711–712 Seminar in Analysis  
MATH 713 Functional Analysis  
MATH 715 Fourier Analysis  
MATH 722 Topics in Complex Analysis  
MATH 728 Seminar in Partial Differential Equations

#### Logic and Theory of Computing

COM S 671 Introduction to Automated Reasoning

COM S 677 Reasoning about Uncertainty  
COM S 682 Theory of Computing  
COM S 715 Seminar in Programming Refinement Logics  
MATH 486 Applied Logic (also COM S 486)  
MATH 681 Logic  
MATH 781–782 Seminar in Logic  
MATH 783 Model Theory  
MATH 784 Recursion Theory  
MATH 787 Set Theory  
MATH 788 Topics in Applied Logic

#### Numerical Mathematics and Operations Research

COM S 522 Computational Tools and Methods for Finance  
COM S 621 Matrix Computations  
COM S 622 Numerical Optimization and Nonlinear Algebraic Equations  
COM S 624 Numerical Solution of Differential Equations  
COM S 664 Machine Vision  
COM S 681 Analysis of Algorithms  
COM S 721 Topics in Numerical Analysis  
MATH 425 Numerical Analysis and Differential Equations  
MATH 728 Seminar in Partial Differential Equations  
OR&IE 625 Scheduling Theory  
OR&IE 630–631 Mathematical Programming, I and II  
OR&IE 632 Nonlinear Programming  
OR&IE 635 Interior-Point Methods for Mathematical Programming

#### Discrete Mathematics and Geometry

MATH 441 Introduction to Combinatorics I  
MATH 442 Introduction to Combinatorics II  
MATH 455 Applicable Geometry  
OR&IE 633 Graph Theory and Network Flows  
OR&IE 636 Integer Programming  
OR&IE 639 Convex Analysis

#### Information Communication and Control Theory

CHEME 472 Feedback Control Systems (also ECE 472, M&AE 478)  
ECE 411 Random Signals in Communications and Signal Processing  
ECE 425 Digital Signal Processing  
ECE 467 Digital Communication Receiver Design  
ECE 468 Telecommunication Systems  
ECE 521 Theory of Linear Systems (also M&AE 521)  
ECE 526 Signal Representation and Modeling  
ECE 561 Error Control Codes  
ECE 562 Fundamental Information Theory  
ECE 563 Communication Networks  
ECE 564 Detection and Estimation  
ECE 567 Digital Communications  
M&AE 677 Robust and Optimal Control

#### Mathematical Biology

BIOEE 460 Theoretical Ecology  
BTRY 697 Individual Graduate Study in Biometry and Statistics

#### Mathematical Economics

ECON 619 Econometrics I  
ECON 620 Econometrics II  
ECON 710 Stochastic Economics: Concepts and Techniques  
ECON 717–718 Mathematical Economics  
ECON 719–720 Advanced Topics in Econometrics

#### Mechanics and Dynamics

CHEME 731 Advanced Fluid Mechanics and Heat Transfer  
CHEME 751 Mathematical Methods of Chemical Engineering Analysis

- CHEME 753 Analysis of Nonlinear Systems: Stability, Bifurcation, and Continuation  
 M&AE 601 Foundations of Fluid Dynamics and Aerodynamics  
 M&AE 602 Fluid Dynamics at High Reynolds Numbers  
 M&AE 733 Stability of Fluid Flow  
 M&AE 734 Analysis of Turbulent Flows  
 M&AE 736 Theory of Computational Aerodynamics  
 M&AE 737 Computational Fluid Mechanics and Heat Transfer  
 T&AM 570 Intermediate Dynamics  
 T&AM 578 Nonlinear Dynamics and Chaos  
 T&AM 671 Hamiltonian Dynamics  
 T&AM 672 Celestial Mechanics (also ASTRO 579)  
 T&AM 673 Mechanics of the Solar System (also ASTRO 571)  
 T&AM 675 Nonlinear Vibrations  
 T&AM 751 Continuum Mechanics and Thermodynamics  
 T&AM 752 Nonlinear Elasticity  
 T&AM 776 Applied Dynamical Systems (also MATH 717)

### Probability and Statistics

- ECE 562 Fundamental Information Theory  
 ECE 563 Communication Networks  
 ECE 566 Wireless Networks  
 MATH 671-672 Probability Theory  
 MATH 674 Introduction to Mathematical Statistics  
 MATH 777-778 Stochastic Processes  
 OR&IE 561 Queuing Systems: Theory and Applications  
 OR&IE 563 Applied Time-Series Analysis  
 OR&IE 650 Applied Stochastic Processes  
 OR&IE 651 Probability  
 OR&IE 662 Advanced Stochastic Processes  
 OR&IE 670 Statistical Principles  
 OR&IE 671 Intermediate Applied Statistics  
 BTRY 408 Theory and Probability  
 BTRY 409 Theory of Statistics

### Robotics and Vision

- COM S 664 Machine Vision  
 ECE 547 Computer Vision

### Theoretical/Mathematical Physics/Chemistry

- CHEM 792 Molecular Collision Theory  
 CHEM 793 Quantum Mechanics I  
 CHEM 794 Quantum Mechanics II  
 CHEM 796 Statistical Mechanics  
 CHEM 798 Bonding in Molecules  
 PHYS 553-554 General Relativity (ASTRO 509-510)  
 PHYS 561 Classical Electrodynamics  
 PHYS 562 Statistical Physics  
 PHYS 572 Quantum Mechanics I  
 PHYS 574 Applications of Quantum Mechanics II  
 PHYS 651-652 Relativistic Quantum Field Theory

## THE MARIO EINAUDI CENTER FOR INTERNATIONAL STUDIES

170 Uris Hall (255-6370)

The Mario Einaudi Center for International Studies, established in 1961 to encourage and support comparative and interdisciplinary research on international subjects, is one of the largest and most diverse centers of its kind in the United States. Currently, it includes five U.S. Department of Education Title VI National Resource Centers and 16 other area, development, topical, and educational programs. More than 500 faculty members voluntarily collaborate in the

center's programs with well over 300 graduate students involved directly in its international programs. Undergraduate students may choose concentrations in international relations, Latin American studies, modern European studies, East Asian studies, South Asian studies, or Southeast Asian studies. (See also Africana Studies and Research Center, Asian Studies, and International Agriculture for related majors and concentrations.)

Cornell's international programs are poised to anticipate and respond to changing global circumstances and perspectives. While some programs offer study of geographic regions, others focus on such topics as international agriculture, nutrition, population, law, planning, politics, rural development economics, and world peace. As programs gain momentum and recognition to attract their own resources, the center applies its resources to new pilot activities that bring faculty members and students together across traditional disciplines and departmental boundaries.

Each year the center brings an eminent world leader to campus as the Henry E. and Nancy Horton Bartels World Affairs Fellow to deliver a public lecture, meet with classes, and interact informally with faculty members and students. The center also hosts a Current Events Roundtable each June that enables Cornell alumni to join faculty members in discussion of key world events.

The center promotes graduate students' overseas field research through an annual competition for travel grants and assistance with the Fulbright fellowship program and the Fulbright-Hayes awards, both administered by the center.

Cornell is committed to the study of the global community in all its complexity—through a faculty of preeminent scholars and teachers, outstanding research facilities, instruction in more than 40 languages, and a library system that houses 2,500,000 volumes related to international and comparative studies.

For additional information on current programs, publications, and courses, contact:

### The Mario Einaudi Center for International Studies

Cornell University  
 170 Uris Hall  
 Ithaca, NY 14853-7601 USA  
 255-6370 (tel.)  
 254-5000 (fax)  
[www.einaudi.cornell.edu](http://www.einaudi.cornell.edu)

### The Einaudi Center Administration:

Nicolas van de Walle, director  
 Leilani Peck, associate director  
 170 Uris Hall

### Comparative Muslim Societies Committee:

Eric Tagliacozzo, director  
 346 McGraw Hall

### East Asia Program (formerly China-Japan Program):

Ed Gunn, director  
 140 Uris Hall

### Latin American Studies Program:

John Henderson, director  
 190 Uris Hall

### South Asia Program:

Alaka Basu, director  
 170 Uris Hall

### Southeast Asia Program:

Thak Chaloemtiarana, director  
 180 Uris Hall

### Institute for African Development:

Muna Ndulo, director  
 170 Uris Hall

### Institute for European Studies:

Davydd Greenwood, director  
 120 Uris Hall

### International Programs in the College of Agriculture and Life Sciences:

James Haldeman, senior associate director  
 31 Warren Hall

### Berger International Legal Studies:

John Barcelo, director  
 318 Myron Taylor Hall

### International Political Economy:

Jonathan Kirshner, director  
 328 White Hall

### Gender and Global Change:

Josephine Allen and Rosemary Batt, co-directors  
 354 Martha Van Rensselaer Hall and 387B Ives Hall

### International Studies in Planning:

William Goldsmith, director  
 200 West Sibley Hall

### Population and Development Program:

Thomas Hirschl, director  
 333 Warren Hall

### Comparative Societal Analysis:

Valerie Bunce, acting director  
 209 White Hall

### Cornell Participatory Action Research Network:

[cs13@cornell.edu](mailto:cs13@cornell.edu)  
 450 Caldwell Hall

### Peace Studies Program:

Matthew Evangelista, director  
 130 Uris Hall

### Program in International Nutrition:

Rebecca Stoltzfus, director  
 120 Savage Hall

### Program on Comparative Economic Development:

Kaushik Basu, director  
 458 Uris Hall

### Cornell International Institute for Food, Agriculture, and Development:

Alice Pell, director  
 31 Warren Hall

### Cornell Food and Nutrition Policy Program:

David Sahn, director  
 3M12 Savage Hall

### International Relations Concentration:

David Lee, director  
 248 Warren Hall

## CENTER FOR THE STUDY OF INEQUALITY

363 Uris Hall  
 254-8674 (tel.)  
[inequality@cornell.edu](mailto:inequality@cornell.edu)  
[www.inequality.cornell.edu](http://www.inequality.cornell.edu)

The Center for the Study of Inequality (CSI) fosters basic and applied research on social and economic inequalities as well as the processes by which such inequalities change and persist. The study of inequality lies at the heart of current debates about welfare reform, affirmative action, the "glass ceiling," globalization, and any number of other contemporary policy issues. In recent years, public and scholarly interest in issues of inequality has intensified, not merely because of historic increases in income inequality

in the United States and other advanced industrial countries, but also because inequalities of race, ethnicity, and gender are evolving in equally dramatic and complicated ways. The mission of CSI is to support research and teaching relevant to issues of inequality, to disseminate findings coming out of this research, and to otherwise facilitate the study of inequality in the United States and throughout the world.

### Undergraduate Concentration

The inequality concentration allows undergraduate students to supplement their studies for their major with a coherent program of courses oriented toward the study of inequality. The concentration is organized into tracks examining such topics as globalization and inequality; social policy; the ethics of inequality; poverty and economic development; social movements; education and inequality; race and ethnicity in comparative perspective; the family and inequality; and literature, postmodernism, and inequality. The concentration is open to students enrolled in any of the seven Cornell undergraduate colleges. If the requirements of the concentration are met, a special notation to this effect will be recorded on the transcript (see [www.inequality.cornell.edu/academics/](http://www.inequality.cornell.edu/academics/) for further information).

### Internships

The CSI serves as a clearinghouse for student internships that are relevant to the study of inequality. For a full listing of possible internships, please contact CSI at [inequality@cornell.edu](mailto:inequality@cornell.edu).

### Symposia and Lecture Series

The CSI regularly sponsors symposia, workshops, and lecture series that draw attention to the most pressing problems and controversies in the field. The current schedule of symposia and lecture series is listed on the center's web site ([www.inequality.com](http://www.inequality.com)).

For more information about CSI, contact us at 254-8674 or [inequality@cornell.edu](mailto:inequality@cornell.edu).

## COGNITIVE STUDIES

278G Uris Hall  
255-6431  
[cogst@cornell.edu](mailto:cogst@cornell.edu)  
[www.cogstud.cornell.edu](http://www.cogstud.cornell.edu)

Cognitive Studies focuses on the nature and representation of knowledge. It approaches the study of perception, action, language, and thinking from several perspectives—theory, experiment, and computation—with the aim of gaining a better understanding of human cognition and the nature of intelligent systems. The comparison between human and artificial intelligence is an important theme, as is the nature of mental representations and their acquisition and use. Cognitive Studies draws primarily from the disciplines of computer science, linguistics, neuroscience, philosophy, and psychology. The field of Cognitive Studies is primarily represented by faculty members in the following departments: Communication, Computer Science, Design and Environmental Analysis, Economics, Education, Electrical and Computer Engineering, Human Development, Information Science, Linguistics, Mathematics, Mechanical and Aerospace Engineering, Neurobiology and Behavior, Philosophy,

Psychology, and Sociology, as well as the Johnson Graduate School of Management.

### Undergraduate Programs

An undergraduate concentration in Cognitive Studies in the College of Arts and Sciences provides a framework for the design of structured, individualized programs of study in this growing interdisciplinary field. Such programs of study are intended to serve as complements to intensive course work in a single discipline as represented in an individual department. For further information on the undergraduate program, see the Cognitive Studies Program under College of Arts and Sciences. Contact Julie Simmons-Lynch (255-6431 or [cogst@cornell.edu](mailto:cogst@cornell.edu)).

### Graduate Programs

Cornell offers a graduate field minor in Cognitive Studies. Cornell's unique program of graduate training, which seeks to tailor an optimal program of study and research for each individual, fosters interdisciplinary committees. It is the norm for students interested in Cognitive Studies to combine faculty members from such fields as philosophy, computer science, linguistics, psychology, or neurobiology and behavior on common committees. For further information on the graduate field of Cognitive Studies, contact Michael J. Spivey, director of graduate studies (255-9365, [spivey@cornell.edu](mailto:spivey@cornell.edu)) or Julie Simmons-Lynch, program coordinator, 278G Uris Hall, Office of Cognitive Studies (255-6431 or [cogst@cornell.edu](mailto:cogst@cornell.edu)).

### Courses

Courses from across the university that are relevant to the Cognitive Studies Program are listed in this catalog in the Cognitive Studies Program section under Arts and Sciences.

## CORNELL ABROAD

300 Caldwell Hall  
255-6224 (tel.)  
255-8700 (fax)  
[cuabroad@cornell.edu](mailto:cuabroad@cornell.edu)  
[www.cuabroad.cornell.edu](http://www.cuabroad.cornell.edu)

Study abroad is an integral part of a Cornell education. Recent events have made us aware that those aspiring to lead in this century need, more than ever before, knowledge and experience of the diverse world beyond the boundaries of their home country. To help students develop the knowledge, skills, and attitudes necessary for informed citizenship in a transnational world, Cornell Abroad offers a wide range of international study opportunities that reflect the fundamental educational goals and objectives of the university. Study abroad is a continuous experience with study on campus, enabling students to make regular progress toward the degree.

Qualified students study abroad through programs administered by Cornell and other institutions, and by enrolling directly in foreign universities. Among the many study abroad programs available, students select programs with thoughtful planning and apply with the approval of their colleges and faculty advisors. To earn credit for overseas study during the fall and/or spring semester(s), students must apply through Cornell Abroad, whose staff members assist in the planning and application process.

## LOCATIONS ABROAD

Cornell students majoring in a broad array of fields in all seven undergraduate colleges study in more than 40 countries each year. The following list includes programs chosen frequently by students with college approval; those locations preceded by an asterisk (\*) are programs run directly by Cornell.

### AFRICA

Botswana, Cameroon, Ghana, Kenya, Madagascar, Tanzania, Uganda: School for International Training (SIT)

Ghana: University of Ghana (through the Council of International Educational Exchange, CIEE); NYU

Kenya: Wildlife Management (School for Field Studies)

South Africa: Universities of Cape Town and KwaZulu-Natal, Organization for Tropical Studies, School for International Training (SIT)

### ASIA

China: Chinese University of Hong Kong; \*Cornell FALCON for the spring semester or full year at the Inter-University Program for Chinese Language Studies at Tsinghua University, Beijing; Peking, Nanjing, and East China Normal Universities (CIEE); International Chinese Language Program at National Taiwan University; IES Beijing; CET in Beijing, Harbin, or Hangzhou; Hong Kong University of Science and Technology

India: School for International Training; St. Stephen's College Delhi (through Brown or Rutgers Universities); CIEE at University of Hyderabad

Japan: \*Kyoto Center for Japanese Studies; International Christian University and other university programs; IES Tokyo; CIEE Tokyo at Sophia University

Korea: Yonsei University; Ewha University

Nepal: \*Cornell-Nepal Study Program (Samyukta Adhyayan Karikam Nepal) at Tribhuvan University

Thailand: Khon Kaen University (CIEE)

Vietnam: University of Hanoi (CIEE)

### AUSTRALIA AND NEW ZEALAND

Australia: Australian National University, Canberra; University of Sydney; University of Melbourne; University of New South Wales, Sydney; University of Queensland, Brisbane; University of Western Australia, Perth; School for International Training; Sydney Internship (Arcadia, Boston University)

New Zealand: Otago and Lincoln Universities; EcoQuest

### EUROPE

Czech Republic: CERGE at Charles University, CET program in Jewish Studies

Denmark: \*Denmark's International Study Program (DIS)

France: \*EDUCO (Cornell, Duke, and Emory in Paris) at Université de Paris VII, Paris IV, Paris I, Institut d'Études Politiques de Paris ("Sciences Po"); Critical Studies Program at the University of Paris (CIEE); Paris Internship (Boston University)

Germany: \*Berlin Consortium for German Studies at the Free University of Berlin; Wayne State University in Munich and Freiburg; Heidelberg University

Greece: College Year in Athens, Arcadia

Hungary: Central European University

Ireland: Trinity College Dublin and the National University Colleges of Dublin, Galway, and Cork

Italy: \*Bologna Consortial Studies Program; \*Cornell College of Art, Architecture, and Planning Program in Rome; Arcadia University in Florence at the Accademia Italiana; Boston University Program in Padova; IES Milan and Rome; Intercollegiate Center for Classical Studies in Rome; Syracuse University program in Florence

Netherlands: University of Amsterdam; Leiden University

Russia: St. Petersburg University (CIEE); Moscow International University and other universities (American Council of Teachers of Russian); Smolny College, Math in Moscow

Spain: \*Cornell-Michigan-Penn program at the University of Seville; various language and culture programs

Sweden: \*Swedish Practicum in Childhood, Family, and Social Policy at the University of Göteborg; The Swedish Program at the University of Stockholm

United Kingdom: \*Direct enrollment at: the University of Birmingham; University of Bristol; Cambridge University; City University; University of East Anglia; University of Edinburgh; University of Glasgow; University of Manchester; University of Oxford; University of St. Andrews; University of Sussex; University of Warwick; University of York; University of London: King's College, University College (including the School of Slavonic and East European Studies), Imperial College of Science and Technology, the London School of Economics and Political Science, and the School of Oriental and African Studies, the University of the Arts (including London College of Fashion), as well as other universities and art schools of choice.

Externally sponsored programs in the UK include the British American Drama Academy; the Arcadia, Boston, and Rochester University internships; and the Hansard Parliamentary Internship Programme.

Students studying in the United Kingdom enjoy a variety of services, and cultural activities, provided by the Cornell-Brown-Penn Centre in London.

#### **LATIN AMERICA, CENTRAL AMERICA, AND THE CARIBBEAN**

Argentina and Chile: various university-based study abroad programs, through the Institute for Study Abroad of Butler University

Belize, Brazil, Chile, Ecuador, Mexico, Nicaragua, Panama, Peru: School for International Training (SIT)

Costa Rica: Organization for Tropical Studies (OTS) Undergraduate Semester Abroad in tropical biology; School for Field Study

Cuba: University of Havana through COPA: School for International Training (currently suspended)

Ecuador and Jamaica: Partnership for Service Learning

Honduras: Escuela Agrícola Panamericana (Zamorano)

Mexico: Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM); Universidad de las Américas-Puebla (UDLA); Universidad Iberoamericana; School for Field Studies in Baja California; ISFA-Butler program at Universidad Autónoma de Yucatán, Merida

#### **MIDDLE EAST AND NORTH AFRICA**

Egypt: American University in Cairo

Israel: Ben-Gurion University; Haifa University; Hebrew University of Jerusalem; Tel Aviv University

Jordan: University of Jordan (CIEE)

Lebanon: American University of Beirut

Morocco: School for International Training

#### **Other Locations**

Cornell students are by no means limited to the locations listed above or to the programs identified for particular countries. In recent years, they have also studied in Austria, Croatia, Dominican Republic, Finland, Mongolia, Poland, Portugal, Switzerland, Turkey, Venezuela, and elsewhere.

#### **Who Studies Abroad**

Students from all seven undergraduate colleges and from all major fields study abroad; they are expected to have a cumulative grade point average of 3.0 or above. More than 500 undergraduates studied abroad last year. Because the colleges usually require that students complete at least 60 hours of undergraduate credit on the Ithaca campus, students who transfer to Cornell as juniors are usually unable to count study abroad credit toward their Cornell degree.

#### **When Students Study Abroad and for How Long**

Students may study abroad during their sophomore, junior, or senior year. Junior year is the traditional choice, but second-semester sophomore year or first-semester senior year abroad is increasingly popular. To ensure preparation, it is important to begin planning for study abroad as early as freshman year. Although semester-long programs are usually available, academic-year programs are highly recommended.

#### **Application Process**

Applications for all study abroad programs—Cornell programs, as well as those administered externally by other institutions—are available at Cornell Abroad, 300 Caldwell Hall, where students are encouraged to consult the library of study abroad materials, talk with staff members, and attend information meetings. The Cornell Abroad web site is an excellent resource for program offerings and links to universities and programs worldwide, as

well as for applications to download and comprehensive information on all aspects of study abroad. Students meet with the study abroad advisors in their colleges to discuss how they will meet college degree requirements.

Each applicant completes a written statement of academic purpose outlining goals for study abroad and the program of study that will be followed. Applications are signed by both the faculty advisor and the college study abroad advisor. Arts and Sciences, Human Ecology, and Industrial and Labor Relations students submit applications to their college for forwarding to Cornell Abroad; Agriculture and Life Sciences, Architecture, Art, and Planning, Engineering, and Hotel Administration students submit applications directly to Cornell Abroad. Cornell Abroad reviews all applications and forwards them to programs and universities. *All students who wish to receive academic credit for study abroad must apply through Cornell Abroad and their undergraduate college.*

The application *deadline* for study abroad in the fall 2007 semester and the 2007–2008 academic year is February 15, 2007, for all programs *except* Oxford and Cambridge, for which the deadline to study at those universities for the full year in 2007–2008 is November 1, 2006. Many universities and programs admit on a rolling basis before and after these dates. Students planning to study abroad in the spring semester should initiate the application process during the preceding spring. Early application may improve your chances of admission. In all cases, it is a good idea to check with Cornell Abroad.

#### **Registration, Credit Transfer, and Grades**

Students who apply through Cornell Abroad to programs approved by their colleges, as outlined above, remain registered at Cornell during study abroad. They are eligible for financial aid and receive full academic credit for pre-approved courses of study completed with satisfactory grades. Students enroll for a full load of courses abroad, according to the standards of the institution or program overseas, and normally receive 30 credits per year, or 12 to 20 credits per semester. The colleges review course work taken abroad and make the final decisions concerning credit transfer and distribution. When study abroad credit has been transferred, the *transcript* will indicate the names of the courses taken, the grades received, and the total credits earned for each semester. *The foreign grades are not translated into the Cornell/American grading system, nor are they averaged into the Cornell grade point average.*

#### **Foreign Language Requirements**

Study abroad programs in non-English-speaking countries that offer direct enrollment in universities generally require the equivalent of at least two years of college-level language study. Students should make firm plans for any requisite language courses early in their freshman year. English-language study abroad programs are increasingly available in non-English-speaking countries—for example, Belgium, Denmark, Egypt, France, Hong Kong, Hungary, Israel, Italy, Japan, Korea, Netherlands, People's Republic of China, and Sweden. Cornell students who participate in programs in a non-English-speaking country with English-language course work are

required to take at least one language course as part of their program of study and are strongly encouraged to take more. Students are advised to consult with their college study abroad advisors about relevant language preparation, and students in the College of Arts and Sciences should note that they are required to have studied the host country language, if taught at Cornell, before study abroad.

### Housing Arrangements

Study abroad programs generally provide housing in the homes of local residents, in halls of residence for university students, or in rental apartments. Cornell Abroad will advise students of the arrangements that are available and most appropriate to their individual needs.

### Costs

Students studying abroad in Cornell-managed programs pay a fixed Cornell Abroad tuition per semester, which covers tuition, housing during term (except in U.K. universities), orientation, program-sponsored trips and events, and administrative and financial aid costs, including emergency medical evacuation and repatriation coverage. It may include other items (e.g., meals, commuter passes) depending on the program. Students pay other costs (e.g., airfare and personal expenses) directly. Different fee levels for Cornell programs reflect the relative costs of operation.

Pending approval by the Board of Trustees, in 2006–2007 the Cornell Abroad tuition for students participating in the Berlin Consortium for German Studies, the Cornell Nepal Study Program, EDUCO (Emory, Duke, and Cornell in Paris), the Michigan–Cornell–Penn Program in Seville is \$19,400.

For Denmark's International Studies Program (DIS), the Cornell Abroad tuition is \$19,120 per semester, and for the Kyoto Center for Japanese Studies (KCJS), the tuition is \$26,000 per semester. For the Bologna Cooperative Studies Program (BCSP) the tuition is \$15,000 per semester for academic-year students and \$17,450 for spring-only participants.

Students studying in all other programs in 2006–2007 pay the tuition and other costs charged by their programs and a Cornell International Program Tuition of \$4,440 per semester. The International Program Tuition covers the direct and indirect costs of study abroad to the university, including financial aid for all study abroad students. Students studying in the United Kingdom and Israel on direct enrollment programs at British and Israeli universities pay a Cornell International Program tuition of \$4,800. This higher amount covers the cost of on-site support services provided by Cornell Abroad.

### Financial Aid

Students who are accepted for study abroad during the academic year or semester, having applied through Cornell Abroad, are eligible for two semesters of financial aid, consistent with general university aid policy; this applies to all programs, whether run directly by Cornell or not. Students who have transferred into Cornell with 60 or more credit hours are not likely to receive aid for study abroad assuming they would thereby need more than eight semesters to earn the undergraduate

degree. Some programs abroad offer need-based and merit-based scholarships and there are also external aid sources.

### Security Abroad and Related Issues

The decision to study in a particular region of the world must be made by each student and his or her family in light of their own interpretation of current events. The director, associate director, and staff of Cornell Abroad stay in regular contact with representatives abroad and receive information regarding rapidly changing political situations worldwide through the U.S. Department of State Office of Citizens Emergency Services and other agencies. As long as the State Department does not restrict travel by U.S. citizens, Cornell Abroad does not normally recommend limitations on student plans for study abroad. Cornell Abroad will do everything possible to notify students immediately that they should defer plans when official travel restrictions are issued. Nothing is as important as student security and well-being.

Responsibility for a decision to withdraw from a program or return home early rests with the individual and his or her family. There can be no guarantee of credit for students who withdraw from programs sponsored by colleges and universities other than Cornell; they are advised to inquire about those institutions' policies regarding the completion of academic work and the potential financial implications of a premature departure. In the event of a disrupted semester, refunds of tuition and fees, and the appropriate number of credits to be awarded, will be reviewed by Cornell and affiliated institutions on a case-by-case basis. Most institutions sponsoring study abroad programs strive to facilitate student completion of academic programs even under unusual circumstances and have tuition refund policies based on prorated formulas.

### Sources of Information and Advice Concerning Study Abroad

Cornell Abroad (300 Caldwell Hall): Richard Gaulton, Ph.D., director; Kristen Grace, Ph.D., associate director; Libby Okihito, student services coordinator; Kathy Lynch, financial services coordinator. The Cornell Abroad library contains an extensive collection of university catalogs and study abroad program brochures, files of course syllabi and evaluations, books, videotapes and CDs, and some information on travel, summer study, and work abroad. Comprehensive information is provided on the Cornell Abroad web site, which incorporates links to universities, programs, and resources worldwide as well as a database of cost estimates. In the early weeks of every semester, students and faculty and staff members discuss programs in a series of information meetings announced in the *Cornell Daily Sun* and on the Cornell Abroad web site ([www.cuabroad.cornell.edu](http://www.cuabroad.cornell.edu)). The director and associate director are available at Cornell Abroad for individual advising.

### College Study Abroad Advisors

*Agriculture and Life Sciences:* Tamara Durham, 140 Roberts Hall; *Architecture, Art, and Planning:* Jayne LeGro, B-1 West Sibley Hall; *Arts and Sciences:* Dean Pat Wasyliv, 55 Goldwin Smith Hall; *Engineering:* Dan Maloney Hahn, 167 Olin Hall; *Hotel Administration:* Amber Cohen, 180 Statler

Hall; *Human Ecology:* Paul Fisher, 172 Martha Van Rensselaer Hall; *Industrial and Labor Relations:* Kevin Harris, 101 Ives Hall.

### CORNELL IN WASHINGTON PROGRAM

M101 McGraw Hall  
255-4090  
[ciw.cornell.edu](http://ciw.cornell.edu)

Cornell in Washington is a program that offers students from all colleges in the university an opportunity to earn full academic credit for a semester of study in Washington, D.C. The aim of the program is to give students a chance to take advantage of the rich resources of the national capital. Washington, as the center of much of the nation's political energy, is an ideal place to study American public policy and the institutions and processes through which it is formulated and implemented. At the same time, Washington's rich collection of libraries, museums, theaters, and art galleries offers an opportunity to explore American history, literature, art, and the full range of the American humanistic tradition. Washington's vast high-technology sector, concentrated in both telecommunications and biotechnology, creates endless opportunities for the study of recent developments and future prospects in those arenas, as well. Cornell in Washington students enroll in one of two core courses—Studies in Public Policy or Studies in the American Experience—take one or two elective courses, conduct individual research projects, and choose externships in government agencies, research institutes, non-profit organizations, and private professional firms and businesses.

The program is housed at the Cornell Center, 2148 O Street, NW, Washington, DC 20037. The academic and administrative space is located on the first floor and 27 residential units for approximately 60 students are on the upper floors.

The Cornell in Washington program is open to qualified juniors and seniors from all colleges, schools, and divisions of the university. Students enroll in one core course, which involves a major research project often carried out in conjunction with an externship. Students also select one or two other seminars from such fields as government, history, economics, history of art, and social policy. All seminars are taught by Cornell faculty and carry appropriate credit toward fulfillment of major, distribution, and other academic requirements. In addition, students work as externs with congressional committee offices, executive-branch agencies, interest groups, arts and research institutions, and other organizations involved in public policy and American culture.

### Tuition

Students are registered as full-time students, earn Cornell credit, pay full tuition, and remain eligible for financial aid.

### Housing

Apartments are rented at the Cornell Center. All are fully furnished (except for dishes, cookware, towels, and bedding) and reasonably priced by both Washington and Cornell standards. Two students are assigned to each efficiency and three to each one-bedroom apartment. Students are discouraged from



bringing automobiles. The public transportation system, consisting of both bus and subway service, is extensive and convenient to the center, and street parking is not permissible.

## Applications

Application forms are available from the Cornell in Washington program office at M101 McGraw Hall. Students may also apply at [ciw.cornell.edu](http://ciw.cornell.edu). Applications should be submitted the semester before participation.

## Information

The Cornell in Washington program web site is located at [ciw.cornell.edu](http://ciw.cornell.edu). Regular information meetings are held on campus in early October and March. These meetings are advertised in the *Cornell Daily Sun* and on campus bulletin boards. Additional information concerning externships, courses, housing, and other features of the program may be obtained at either the Cornell in Washington program office at M101 McGraw Hall, 607-255-4090, or in Washington at the Cornell Center, 2148 O Street, NW, Washington, DC 20037, 202-466-2184.

## CORNELL INSTITUTE FOR PUBLIC AFFAIRS

294 Caldwell Hall  
255-8018 (tel.)  
255-5240 (fax)  
[cipa@cornell.edu](mailto:cipa@cornell.edu)  
[www.cipa.cornell.edu](http://www.cipa.cornell.edu)

The Cornell Institute for Public Affairs (CIPA) offers a university-wide two-year program of graduate professional studies leading to the master of public administration (M.P.A.) degree. CIPA prepares leaders for government, for nonprofit organizations, and for institutions in the private sector that interact with both.

CIPA fellows (graduate students) have the opportunity to study public policy and program management from a cross-disciplinary perspective. Students gain an understanding of the political and administrative processes through which issues, problems, and policies are formulated; the economic and fiscal basis for government action in a market economy; and the analytical tools for assessing policy implications. They study the behavior of both public and private organizations and their management. They also develop sensitivity to the moral and ethical dimensions of policy issues.

## Faculty Members

The depth and flexibility of the program is reflected in the growing number of affiliated faculty members. CIPA is not confined within a single school or college, but spans the entire university. More than 100 field faculty members, representing 25 departments, welcome CIPA fellows into their courses and serve on professional report/thesis committees. About 30 members of this group, known as the program faculty, teach courses taken most frequently by CIPA fellows. Within this group, members of the core faculty provide instruction in the foundation courses. Core faculty members include David B. Lewis, CIPA director, City and Regional Planning; Nancy Chau, Applied Economics and Management; Neema Kudva, City and Regional Planning; (Daniel) Peter Loucks, Civil and Environmental

Engineering; Theodore J. Lowi, the John L. Senior Professor of American Institutions in the Department of Government; Kathryn S. March, Anthropology; Christine Ranney, Applied Economics and Management; Norman Uphoff, Government; and Jerome Ziegler, Department of Policy Analysis and Management.

## M.P.A. Program Flexibility

The two-year master of public administration (M.P.A.) degree program consists of 16 courses; CIPA fellows typically take four courses per semester for four semesters. Although the M.P.A. program offers a basic structure for study, each CIPA fellow works closely with a faculty advisor to design an individualized program based on his or her specific area of interest. Courses may be taken through the program in any department or college in the university.

## Advising

Upon entering the M.P.A. program, each fellow is assigned a program advisor based on his or her area of interest. These advisors are drawn from the CIPA core faculty. They assist fellows in designing their individual program of study and selecting their courses. The assignment of advisors is meant to assist new students in getting a strong start with their studies. Once familiar with the resources available, students are welcome to ask another core faculty member to be their program advisor.

Toward the end of their first year, when they select their professional report/thesis topic, CIPA fellows choose a report/thesis advisor from among the more than 100 faculty members in the field of public affairs. The advisor guides the fellow in research and writing.

## Foundation Course Work

To develop a foundation of basic concepts and capabilities for the study of public policy, CIPA fellows take three courses in each of the following three subject areas:

- Administration, Politics, and Public Policy
- Economics and Public Finance
- Quantitative Analysis

At least one of the three courses in each subject area must be a core foundation course—a course taught by a CIPA core faculty member.

## Concentration Course Work

Concentration course work enables fellows to focus on a specific area of public policy study. Students choose their courses of study—domestic or international—from the following options:

- Environmental Policy
- Finance and Fiscal Policy
- Government, Politics, and Policy Studies
- Human Rights and Social Justice
- International Development Studies
- Public and Nonprofit Management
- Science and Technology Policy
- Social Policy

Fellows select a concentration during the latter half of the first year of course work.

## Internships and/or Off-Campus Study Options

CIPA fellows are expected to engage in public-affairs work related to their respective areas of concentration during the summer between their first and second years of study. The objective is to gain pragmatic professional experience that will complement a student's formal academic study. CIPA's assistant director for professional development provides assistance to fellows in finding placements that match their interests, expertise, and professional goals. Appropriate internships are available in public policy- or public affairs-related organizations in both the public and private sector. Examples of placements include the following:

- Deloitte and Touche
- Goldman Sachs
- Government Accountability Office
- the United Nations
- the United States Agency for International Development
- the United States Department of State
- the United States Congress and Senate
- the World Bank
- state, local, and urban municipal governments
- nongovernmental organizations and think tanks worldwide
- private sector consulting firms

CIPA fellows also have the opportunity to gain professional experience off-campus, while taking a semester of courses for credit, through the following three programs:

- Rome Program
- Cornell in Washington
- Cornell in Nepal Study Program.

## Professional Writing Requirement

As a culmination of studies in the M.P.A. program, each fellow develops and submits either a professional report or thesis. Typically, the report or thesis grows out of a fellow's specific area of concentration and often incorporates work done during the summer internship or an off-campus study program. Both the CIPA professional report and the thesis require the student to synthesize and apply his or her education to formulate a solution to a policy problem. The thesis places a greater emphasis on problem definition and literature review, while the professional report emphasizes feasibility, practitioner accessibility, and adapting a student's writing to the professional culture and standard practices of the client organization. The level of work expected for the M.P.A. thesis or professional report is equivalent to one or two semester-long courses.

## Professional Student Activities

CIPA fellows gain practical skills by organizing, managing, and participating in a variety of professional development activities. These provide fellows with opportunities to share work experience with other fellows, and to meet practitioners and distinguished faculty members in the field of public affairs. Fellows participate in one or more of the following activities for at least two semesters. These initiatives include:

- **Colloquium and Conference Committee:** This student group sets the agenda for the weekly Colloquium Series and makes arrangements for the chosen guest lecturers to come to campus.
- **Point of View (POV):** The CIPA Public Affairs television program, POV is part talk show and part debate show. Fellows work in all aspects of TV production and presentation, gaining invaluable experience for the media exposure they will encounter as public-policy professionals.
- **The Current:** CIPA fellows publish a journal of student policy research. Working on *The Current* offers a firsthand view of the rigors of publishing academic work, and also provides a foundation in professional writing and editing—necessary skills for preparing reports and position papers, and publishing research findings.
- **CIPA Public Service Exchange:** A unique service learning partnership with nonprofit and government agencies, providing fellows with the opportunity to engage in the supervised practice of public policy.

### Complementary Degrees

CIPA fellows may elect to combine their M.P.A. program with study for a complementary degree such as a J.D. from the Cornell Law School, an M.B.A. from the Graduate School of Management, an M.M.I.I. from the Hotel School, or an M.R.P. in the field of City and Regional Planning. Admission to the complementary degree program is independent from admission into CIPA.

### Accelerated Master's Program

An accelerated program for Cornell undergraduates allows advanced students to apply to CIPA in their junior year, begin CIPA-related course work in their senior year, and complete the M.P.A. in just one year beyond their undergraduate studies.

### Residence Requirement

Fellows are required to spend four semesters of study in residence to complete the M.P.A. Those who enroll in the Cornell Accelerated Master's Program can earn the equivalent of two semesters in residence during their senior year.

### Admission

The CIPA program seeks diversity in its student body, drawing from a pool of applicants who have studied in a wide range of disciplines. No specific background or undergraduate major is required, although individuals with previous work experience in policy making or implementation are strongly encouraged to apply. Admission to CIPA is selective.

Decisions are based on:

- potential for public-policy leadership as evidenced by professional work; community, extracurricular, or other relevant experience
- an evaluation of the applicant's overall academic record
- GRE scores
- letters of recommendation
- an extensive written statement of purpose

Applicants for whom English is a second language will need to achieve a minimal TOEFL score of 250 (computer based) or 600 (paper based).

Although CIPA has a policy of rolling admission, applications should be submitted by the end of January to be considered for financial aid. For an application or for more information, contact the Cornell Institute for Public Affairs, 294 Caldwell Hall (tel: 255-8018; fax: 255-5240; [cipa@cornell.edu](mailto:cipa@cornell.edu); [www.cipa.cornell.edu](http://www.cipa.cornell.edu)).

### Financial Aid

CIPA provides some funding to more than 80 percent of its students. The institute itself, however, is unable to provide full support for any individual student. Fellows often win support from Fulbright, Truman, World Bank, and other programs. In addition, Cornell offers numerous assistantship and employment opportunities for graduate students. Applicants are encouraged to explore all available sources of external funding, including grants that may be provided by current employers. Decisions on institute funding are determined on a rolling basis following admission decisions.

## CORNELL PLANTATIONS

One Plantations Road  
255-2400  
[plantations@cornell.edu](mailto:plantations@cornell.edu)  
[www.plantations.cornell.edu](http://www.plantations.cornell.edu)

### Introduction

Cornell Plantations is Cornell University's arboretum, botanic garden, natural areas, and many on-campus gardens—places of exceptional beauty, diversity, and learning opportunities. Areas managed include over 4,000 acres of natural areas on and off campus in addition to the 150 acres in the F. R. Newman Arboretum and the 50 acres of botanical gardens in and around central campus.

Cornell Plantations provides unique outdoor laboratories and plant collections for Cornell's academic programs and research in disciplines such as ecology and evolutionary biology, landscape architecture, ornamental horticulture, and bioengineering. While many of Cornell Plantations' resources are on or near campus, several thousand acres in and around Tompkins County preserve quality examples of native vegetation and rare plants and animals. The lands include bogs, fens, glens, swamps, wet and dry forests, vernal ponds, and meadows. Arrangements to use these natural areas for classes and research can be made by calling Cornell Plantations. Cornell Plantations has something for everyone! We're also the only places that non-horticultural students and faculty members visit for classes ranging from art, literature, and women's issues, to nutrition.

### Credit Courses

Cornell Plantations offers three for-credit courses: HORT 480 Plantations Fall Lecture Series, HORT 485 Public Garden Management, and HORT 640 New Directions in Public Horticulture. HORT 480 is a 1-credit S-U lecture series offered each fall. HORT 485 is a 3-credit course offered alternate spring semesters. HORT 640 is a 1-credit S-U discussion course offered alternate spring

semesters. Cornell Plantations also offers noncredit classes and workshops such as botanical illustration, arts and crafts, gardening techniques, and ecology walks; visit [www.plantations.cornell.edu](http://www.plantations.cornell.edu), or call 255-2400 for more information.

### Internships

Cornell Plantations' internship program is just for you, the Cornell University student! Since the 1990s, more than 80 university students have been working side by side with Plantations' knowledgeable staff, learning and having fun. A number of positions in various areas are available each year, beginning after finals in May. All positions strive to build on classroom learning through hands-on work, encouraging students' interests in horticulture and the natural world.

### Master's Program

Cornell Plantations' master of professional studies program offers fully funded fellowships in public garden leadership. Visit our web site for program details.

### Planning a Visit

To discover all that is Cornell Plantations, visit [www.plantations.cornell.edu](http://www.plantations.cornell.edu) or pick up a visitor's map or a copy of the *Cornell Plantations Path Guide* at the Garden Gift Shop in the Lewis Education Center just below Tower Road. The *Path Guide* and accompanying video are also available at the Cornell Store.

## PROGRAM ON ETHICS AND PUBLIC LIFE

240 Goldwin Smith Hall  
255-8515

The critical issues of public life are inescapably ethical issues. In the economy, we face questions of equity and justice and questions about the relation between prosperity, the environment, and the quality of individual lives. In constitutional law, we confront dilemmas about civil rights, freedom of speech, privacy, and abortion. In politics and government, we wrestle with questions about campaigning, character, and compromise. And in international affairs, we encounter the complexities of war and peace, human rights, multilateral aid, and climate change.

The university-wide Program on Ethics and Public Life (EPL) is Cornell's initiative in the systematic study of the ethical dimension of specific public issues. EPL grew out of a conviction that these questions need something more than abstract philosophical discussion. In addition to the general study of values and principles that goes on in theoretical ethics, universities need to foster ways of thinking about the complex, uncertain, and urgent problems of the real world, ways of thinking that are realistic without sacrificing their ethical character.

EPL seeks to enhance and facilitate the discussion of ethical issues by students whose central educational interests lie elsewhere, but whose work and lives will nevertheless confront them with dilemmas and responsibilities for which a university education should prepare them. EPL aims to enrich existing departments with courses that

are intellectually and practically fruitful at the same time. It offers a concentration in Law and Society (see separate listing under "Special Programs and Interdisciplinary Studies").

For information regarding content or availability of EPL core/related courses, contact the academic department listed.

#### EPL Core Courses

PHIL 194/GOVT 294 Global Thinking  
PHIL 242 Social and Political Philosophy  
PHIL 246/B&SOC 206/S&TS 206 Ethics and the Environment  
PHIL 247 Ethics and Public Life  
PHIL 342 Law, Society, and Morality  
GOVT 691/PHIL 691 Normative Elements of International Relations

#### Related Courses

AN SC 414 Ethics and Animal Science  
ENGRG 360/S&TS 360 Ethical and Social Issues in Engineering  
ILRCB 482 Ethics at Work  
ILRCB 488 Liberty and Justice for All  
NAV S 402 Leadership and Ethics  
NBA 671 Business Ethics  
NTRES 332 Introduction to Ethics and Environment  
NTRES 433 Applied Environmental Philosophy  
PAM 567 Health Policy  
PHIL 145 Contemporary Moral Issues  
PHIL 193 Inequality, Diversity, and Justice  
PHIL 241 Ethics  
PHIL 245 Ethics and Health Care  
PHIL 341 Ethical Theory  
PHIL 344 History of Ethics: Ancient and Medieval  
PHIL 345 History of Ethics: Modern  
PHIL 346 Modern Political Philosophy  
PHIL 447 Contemporary Ethical Theory  
PHIL 641 Ethics and Value Theory

Michele M. Moody-Adams, Wyn and William Y. Hutchinson Professor of Ethics and Public Life, and professor of philosophy; Burke Hendrix, assistant professor of government and assistant professor of ethics and public life; Henry Shue, professor of ethics and public life and professor of philosophy.

## PROGRAM IN REAL ESTATE

114 West Sibley Hall  
255-7110

The two-year master of professional studies in real estate (M.P.S./RE) degree program is an interdisciplinary program that combines courses from nearly every college at Cornell University. The degree is designed for aspiring real estate professionals who are in the initial or early stages of their careers. Two entities provide support for the degree program. The Program in Real Estate exists at Cornell University to serve as the integrating organizational unit for financial management and administration of academic and industry-related real estate activities on and off campus. The field of real estate is a committee of graduate faculty members selected from several different colleges that is directly involved in and responsible for the design, delivery, and administration of the real estate curriculum.

The professional study of real estate is concerned with design, development, finance, law, management, marketing, transactions, and many other aspects of the real estate

business. Real estate professionals also contribute an understanding of the long-range social, political, ethical, and environmental implications of decisions about real estate. The 62 credit hours of course work needed to earn the degree provide a comprehensive and lasting foundation for professional careers in real estate.

Students take core courses in principles of real estate, the real estate development process, real estate finance and investments, managerial finance, residential development, real estate law, construction planning and operations, design in real estate development, and real estate marketing and management, along with a weekly industry seminar. Elective courses are taken in a chosen area of concentration and to fulfill a leadership and management distribution requirement. Many concentration options are possible and may be structured from the hundreds of related courses taught at Cornell University (e.g., development, finance, investments, real estate consulting, sustainable development, property and asset management, real estate marketing and market analysis, or international real estate concentrations). Students complete real-world, semester-long project workshops during their second and fourth semesters.

## Admissions

Applicants to the Program in Real Estate must have completed a bachelor's degree with a good academic record. Applicants must submit a résumé plus two letters of recommendation either from faculty members familiar with the applicant's academic work, or if appropriate, professional recommendations based on work experience. Competitive scores for the GMAT are required. Extensive and relevant work experience will receive favorable consideration. International students for whom English is a second language will need to achieve a minimum TOEFL score of 250 (computer based) or 600 (paper based). There is no work experience required for admission; however, it is strongly preferred that applicants have at least some industry-related work experience, with three to five years' experience typical. Applications are reviewed on a rolling basis. To be considered for financial aid, applications must be received by January 15. Otherwise, please submit complete application by March 1. Wait list applications will be accepted until June 1. For more information, contact the graduate field coordinator at 255-7110, or [real\\_estate@cornell.edu](mailto:real_estate@cornell.edu).

## SCIENCE OF EARTH SYSTEMS: AN INTERCOLLEGE MAJOR

During the past several decades, with the increasing concern about air and water pollution, nuclear waste disposal, the ozone hole, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The Science of Earth Systems (SES) major emphasizes the rigorous and objective study of the Earth system as one of the outstanding intellectual challenges of modern science and as the necessary foundation for the future management of our home planet. In this program, Cornell's strengths across a broad range of earth and environmental sciences have been coalesced to provide students with the tools to engage in what will be the primary challenge of the 21st century.

Graduates of Cornell's SES program are well prepared for several career and advanced study options:

- Graduate studies leading to the M.S. and/or Ph.D. in any of the earth science subdisciplines (e.g., atmospheric science, geology/geophysics, biogeochemistry, hydrology, oceanography).
- Employment in environmentally oriented careers in both the private and public sector at the B.S. or B.A. level such as environmental consulting and science writing.
- Graduate degree in environmental law or policy. These fields value students with an understanding of the science behind legal and policy decisions.
- Advanced degree in teaching, for example, earth science at the middle or high school level.
- Medical school. The emphasis on basic sciences in the SES curriculum makes the SES major a suitable springboard for a career in medicine.

The SES major is available for students in the College of Agriculture and Life Sciences and the College of Arts and Sciences. In the College of Engineering, the SES curriculum comprises the Geological Sciences major. The SES major has its home in the Department of Earth and Atmospheric Sciences and includes collaboration with several departments across the university.

## The SES Curriculum

The SES curriculum provides strong preparation in mathematics, physics, chemistry, and biology during the freshman and sophomore years. In the junior and senior years, students take a set of common SES core courses and an additional set of advanced disciplinary or interdisciplinary courses that build on the basic sequences.

The requirements for the major are as follows:

1. Basic Math and Sciences
  - a. MATH 111-112, or MATH 191-192
  - b. PHYS 207-208, or PHYS 112-213
  - c. CHEM 207-208 (or CHEM 211-257)
  - d. BIO G 101/103 and 102/104 (or 105-106) or BIO G 109 and 110
2. Required introductory course: EAS 220 The Earth System
3. Science of Earth Systems Core Courses

The core courses emphasize the interconnectedness of the Earth system. These courses are founded on the most modern views of the planet as an interactive and ever-changing system, and each crosses the traditional boundaries of disciplinary science. Three courses selected from the following four core courses are required for the major:



- EAS 301 Evolution of the Earth System  
 EAS 303/NTRES 303 Introduction to Biogeochemistry  
 EAS 304 Interior of the Earth  
 EAS 305/ASTRO 331 Climate Dynamics

#### 4. Concentration Courses

Four intermediate to advanced-level courses (300 level and up) are selected that build on the core courses and have prerequisites among the "Basic Math and Sciences" courses listed above. These concentration courses build depth and provide the student with a specific expertise in some facet of earth system science. The concentration should be chosen during the junior year or before in consultation with an SES advisor whose interests match those of the student. Note: Additional basic math and science courses may be required to complete the concentration courses; the specific courses will depend on the student's choice of concentration.

#### 5. Field/observational/laboratory experience

Exposure to the basic observations of earth science, whether directly in the field, or indirectly by various techniques of remote sensing, or in the laboratory, is necessary to understand fully the chosen area of concentration in the major. Means of satisfying this requirement generally include 3 credits of course work. Possibilities include:

Hawaii Environmental Semester program; courses given by the Shoals Marine Laboratory;

EAS 250 Meteorological Observations and Instruments;

EAS 352 Synoptic Meteorology I;

EAS 417 Field Mapping in Argentina;

EAS 437 Geophysical Field Methods;

EAS 491 and/or 492 Undergraduate Research, total 3 credits with appropriate choice of project;

Field courses taught by another college or university (3-credit minimum)

#### Cornell Field Program in Earth and Environmental Systems: Semester in Hawaii

Cornell University offers a spring-semester program of environmental and Earth systems study on the Big Island of Hawaii. The Hawaiian Islands are an outstanding natural laboratory where students can explore a variety of ecosystems, examine their development over time, witness human influences on plant and animal communities, and experience geologic processes such as active volcanism and seismicity. Students spend most of their time in the field, gaining hands-on experience probing the interaction between earth, ocean, atmosphere, and biosphere. This is an ideal opportunity to apply fundamental concepts of geology, chemistry, and biology in a real-world setting. Students enrolled in the Environmental Semester Program will complete 17 credit hours of course work during the spring semester. For Cornell students majoring in Science of Earth Systems, EAS 240, EAS 322, and EAS 351 satisfy degree requirements for the major.

For more information contact Professor Bryan Isacks, Department of Earth and Atmospheric Science, bli1@cornell.edu, and visit [www.eas.cornell.edu/eas/](http://www.eas.cornell.edu/eas/).

## DEPARTMENT OF STATISTICAL SCIENCE

301 Malott Hall  
 255-8066

M. T. Wells, chair (301 Malott Hall, 255-4388); R. L. Strawderman, director of graduate studies; J. A. Bunge, director of professional programs; T. Apanosovich, T. Berger, J. Booth, C. Bustamante, T. DiCiccio, R. Durrett, E. Dynkin, T. Fine, X. Guo, Y. Hong, J. T. G. Hwang, H. Kesten, N. Kiefer, G. Lawler, R. Nielsen, M. Nussbaum, P. Protter, S. Resnick, D. Ruppert, G. Samorodnitsky, S. J. Schwager (undergraduate coordinator), B. Turnbull, P. Velleman, A. Vidyashankar, T. Vogelsang.

The university-wide Department of Statistical Science at Cornell coordinates activities in statistics and probability at the undergraduate, graduate, and research levels.

Students interested in graduate study in statistics and probability can apply to the graduate field of statistics or to one of the other graduate fields of study that offer related course work. Students in the field of statistics plan their graduate programs with the assistance of their special committee. For detailed information on opportunities for graduate study, students should contact the director of graduate studies, 301 Malott Hall.

The department offers an undergraduate major and minor in biometry and statistics through the Department of Biological Statistics and Computational Biology (BSCB) in the College of Agriculture and Life Sciences. It also offers a minor in Engineering Statistics through [the Department of] Operations Research and Industrial Engineering in the College of Engineering. Undergraduate majors and certificate programs are currently under development for other colleges. For information, contact the undergraduate coordinator (301 Malott Hall, 255-8066). Statistics courses offered by the departments listed below will fill distribution requirements in many of the colleges.

A statistical consulting service is offered by the faculty of BSCB. There is no charge to members of the Cornell community for using the Statistical Consulting Service. It provides guidance to researchers in a broad variety of fields on designing experiments, collecting and analyzing data, and drawing appropriate conclusions from the results of their studies. Statistical computing consulting is also available through the Office of Statistical Consulting, B21 Savage Hall, 255-1926.

The department is organized into four units: Biological Statistics, Engineering Statistics, Mathematical Statistics and Probability, and Social Statistics. The areas covered include agricultural statistics, biostatistics, economic and social statistics, epidemiology, manufacturing statistics, quality control and reliability, probability theory, sampling theory, statistical computing, statistical design, statistical theory, and stochastic processes and their applications.

#### Course Designations

The following course identifiers are used to designate the courses offered by the separate units: Biological Statistics and Computational Biology (CALB), STBTRY; Engineering Statistics Unit (ENGR), STENGR; Mathematical Statistics Unit (ARTS), STMATH; Social Statistics Unit (ILR and ARTS), STSOC. To enroll in one of

the courses, see the listing for the appropriate college.

Descriptions of undergraduate and graduate courses are listed below.

## Department of Statistical Science

### ST 201(2010) Introductory Statistics

This is an introduction to the basic concepts of probability, statistics and data analysis. Descriptive methods, normal theory models, and inferential procedures are considered. Topics include basic statistical designs, an introduction to probability, estimation, confidence intervals, tests of significance for a single population mean and proportion, the difference in two population means and proportions, ANOVA, multiple linear regression, contingency tables, and logistic regression.

### ST 501-502(5010-5020) Applied Statistical Analysis

Two-semester core course for students in master of professional studies (M.P.S.) degree program in applied statistics in Department of Statistical Science.

Prerequisite: enrollment in M.P.S. program. Consists of a series of modules on various topics in applied statistics. Some modules include guest lectures from practitioners. Parallel with the course, students complete a yearlong, in-depth data analysis project.

### ST 501(5010) Applied Statistical Analysis

Letter grades only.

Topics include, but are not limited to: statistical computing systems, statistical software packages, data management, statistical graphics, and simulation methods and algorithms.

### ST 502(5020) Applied Statistical Analysis

Letter grades only.

Topics include, but are not limited to: sample surveys and questionnaire design, data sources, experimental design, and data mining.

### ST 600(6000) Statistics Seminar

Fall and spring, 1 credit. Pre- or corequisite: BTRY 409 or permission of instructor. S-U grades only.

## Biological Statistics Unit

STBTRY 301 Biological Statistics I (enroll in BTRY 301)

STBTRY 302 Biological Statistics II (enroll in BTRY 302)

STBTRY 310 Statistical Sampling (enroll in BTRY 310)

STBTRY 382 Introduction to Statistical Genomics and Bioinformatics (enroll in BTRY 382)

STBTRY 408 Theory and Probability (enroll in BTRY 408)

STBTRY 409 Theory of Statistics (enroll in BTRY 409)

STBTRY 482 Statistical Genomics (enroll in BTRY 482)

STBTRY 494 Undergraduate Special Topics in Biometry and Statistics (enroll in BTRY 494)

STBTRY 495 Statistical Consulting (enroll in BTRY 495)

STBTRY 497 Undergraduate Individual Study in Biometry and Statistics (enroll in BTRY 497)

STBTRY 498 Undergraduate Supervised Teaching (enroll in BTRY 498)

STBTRY 499 Undergraduate Research (enroll in BTRY 499)

- STBTRY 601 Statistical Methods I (enroll in BTRY 601)  
 STBTRY 602 Statistical Methods II (enroll in BTRY 602)  
 [STBTRY 603 Statistical Methods III (enroll in BTRY 603)]  
 STBTRY 604 Statistical Methods IV: Applied Design (enroll in BTRY 604)  
 [STBTRY 652 Computationally Intensive Statistical Inference]  
 [STBTRY 672 Topics in Environmental Statistics (BTRY 672)]  
 STBTRY 682 Statistical Genomics (enroll in BTRY 682)  
 STBTRY 694 Graduate Special Topics in Survival Analysis (enroll in BTRY 694)  
 STBTRY 697 Individual Graduate Study in Biometry and Statistics (enroll in BTRY 697)  
 [STBTRY 717 Linear and Generalized Linear Models (enroll in BTRY 717)]  
 STBTRY 795 Statistical Consulting (enroll in BTRY 795)  
 STBTRY 798 Graduate Supervised Teaching (enroll in BTRY 798)

### Engineering Statistics Unit

- STENGR 310 Introduction to Probability and Random Signals (enroll in ECE 310)  
 STENGR 360 Engineering Probability and Statistics II (enroll in OR&IE 360)  
 STENGR 361 Introductory Engineering Stochastic Processes I (enroll in OR&IE 361)  
 STENGR 411 Random Signals in Communications and Signal Processing (enroll in ECE 411)  
 STENGR 436 A Mathematical Examination of Fair Representation (enroll in OR&IE 436)  
 STENGR 467 Telecommunication Systems I (enroll in ECE 467)  
 STENGR 473 Operations Research Tools for Financial Engineering (enroll in OR&IE 473)  
 STENGR 474 Statistical Data Mining (enroll in OR&IE 474)  
 STENGR 476 Applied Linear Statistical Models (enroll in OR&IE 476)  
 STENGR 512 Fundamental Information Theory (enroll in ECE 562)  
 [STENGR 517 Feedforward Neural Networks (enroll in ECE 577)]  
 STENGR 523 Introductory Engineering Stochastic Processes I (enroll in OR&IE 523)  
 STENGR 560 Engineering Probability and Statistics II (enroll in OR&IE 560)  
 STENGR 561 Queuing Theory and Its Applications (enroll in OR&IE 561)  
 STENGR 580 Simulation Modeling and Analysis (enroll in OR&IE 580)  
 STENGR 650 Applied Stochastic Processes (enroll in OR&IE 650)  
 STENGR 651 Probability (enroll in OR&IE 651)  
 STENGR 665 Storage Data Communication Models (enroll in OR&IE 665)  
 STENGR 670 Statistical Principles (enroll in OR&IE 670)  
 STENGR 674 Statistical Learning Theory for Data Mining (enroll in OR&IE 674)  
 STENGR 768 Selected Topics in Applied Probability (enroll in OR&IE 768)  
 STENGR 778 Selected Topics in Applied Statistics (enroll in OR&IE 778)

### Mathematical Statistics and Probability Unit

- STMATH 171 Statistical Theory and Application in the Real World (enroll in MATH 171)  
 STMATH 311 Introduction to Analysis (enroll in MATH 311)

- STMATH 471 Basic Probability (enroll in MATH 471)  
 STMATH 472 Statistics (enroll in MATH 472)  
 STMATH 621 Measure Theory and Lebesgue Integration (enroll in MATH 621)  
 STMATH 671-672 Probability Theory (enroll in MATH 671-672)  
 STMATH 674 Introduction to Mathematical Statistics (enroll in MATH 674)  
 STMATH 771-772 Seminar in Probability and Statistics (enroll in MATH 771-772)  
 STMATH 777-778 Stochastic Processes (enroll in MATH 777-778)

### Social Statistics Unit

- STSOC 210 Statistical Reasoning I (enroll in ILRST 210)  
 STSOC 211 Statistical Reasoning II (enroll in ILRST 211)  
 STSOC 310 Statistical Sampling (enroll in ILRST 310)  
 STSOC 312 Applied Regression Methods (enroll in ILRST 312)  
 STSOC 319 Introduction to Statistics and Probability (enroll in ECON 319)  
 STSOC 320 Introduction to Econometrics II (enroll in ECON 320)  
 STSOC 321 Applied Econometrics II (enroll in ECON 321)  
 STSOC 411 Statistical Analysis of Qualitative Data (enroll in ILRST 411)  
 STSOC 499 Directed Studies (undergraduate) (enroll in ILRST 499)  
 STSOC 510 Statistical Methods for the Social Sciences I (enroll in ILRST 510)  
 STSOC 511 Statistical Methods for the Social Sciences II (enroll in ILRST 511)  
 STSOC 630 Econometrics II (enroll in ECON 620)  
 STSOC 639 Econometrics I (enroll in ECON 619)  
 STSOC 721 Time Series Econometrics (enroll in ECON 721)  
 STSOC 722 Semi/Nonparametric Econometrics (enroll in ECON 722)  
 STSOC 730 Advanced Topics in Econometrics II (enroll in ECON 720)  
 [STSOC 731 Time Series Econometrics (enroll in ECON 721)]  
 STSOC 739 Advanced Topics in Economics I (enroll in ECON 719)  
 STSOC 799 Directed Studies (Graduate) (enroll in ILRST 799)

### Related Courses in Other Departments

- AEM 410 Business Statistics  
 AEM 411 Introduction to Econometrics  
 AEM 417 Decision Models for Small and Large Business  
 AEM 710 Econometrics I  
 AEM 713 Quantitative Methods I  
 [BTRY 421 Matrix Computations]  
 [BTRY 726 Problems and Perspectives in Computational Molecular Biology]  
 CEE 594 Engineering Management Methods II: Managing Uncertain Systems  
 CEE 621 Water-Resources Systems II: Stochastic Hydrology  
 CHEM 794 Quantum Mechanics  
 CHEM 796 Statistical Mechanics

- COM S 522 Computational Tools and Methods for Finance  
 COM S 624 Numerical Solution of Differential Equations  
 COM S 626 Computational Molecular Biology  
 CRP 321 Introduction to Quantitative Methods for the Analysis of Public Policy  
 CRP 632 Methods of Regional Sciences and Planning I  
 D SOC 619 Research Design II  
 ECON 321 Applied Econometrics  
 GOVT 602 Field Seminar in Political Methodology  
 GOVT 605 Comparative Methods  
 H ADM 371 Hospitality Quantitative Analysis  
 HD 401 Empirical Research  
 NS 637 Epidemiology of Nutrition  
 NS 639 Epidemiology Seminar  
 NS 641 Applied Regression  
 OR&IE 674 Statistical Learning Theory for Data Mining  
 OR&IE 468/568 Financial Engineering with Stochastic Calculus I  
 OR&IE 469/569 Financial Engineering with Stochastic Calculus II  
 OR&IE 576 Regression  
 OR&IE 464/566 Extreme Value Analysis with Applications to Finance and Data Communication  
 OR&IE 677 Sequential Methods in Statistics  
 PAM 215 Research Methods  
 PAM 230 Introduction to Policy Analysis  
 PAM 423 Risk Management and Policy  
 PHYS 316 Modern Physics I  
 PHYS 562 Statistical Physics  
 PHYS 574 Quantum Mechanics II  
 PSYCH 472 Multiple Regression  
 PSYCH 473 General Linear Model  
 SOC 502 Basic Problems in Sociology II  
 SOC 506 Research Methods in Sociology II  
 T&AM 310 Advanced Engineering Analysis I  
 T&AM 311 Advanced Engineering Analysis II  
 VETPM 664 Introduction to Epidemiology  
 VETPM 665 Study Design  
 VETPM 666 Advanced Methods in Epidemiology

## Business and Preprofessional Study

### UNDERGRADUATE BUSINESS STUDY

Cornell offers an accredited general undergraduate business degree program as well as world-renowned business-related programs in five other colleges and schools. Because the choices are so broad, students are encouraged to explore the offerings carefully to identify the program that best matches their business career goals. (Graduate study is available in the Johnson Graduate School of Management as well as in graduate fields associated with each of the undergraduate options.)

**Applied Economics and Management** The Department of Applied Economics and Management (AEM) in the College of Agriculture and Life Sciences is home to Cornell's general undergraduate business degree. Accredited by AACSB International—The Association to Advance Collegiate Schools of Business, AEM's undergraduate business program offers courses that prepare students for careers in finance, marketing, management, and business strategy. Students also may participate in AEM's specialized programs focusing on entrepreneurship, agribusiness, and food industry management. Courses reflect the program's analytical, applied economics focus ([business.aem.cornell.edu](http://business.aem.cornell.edu)).

**Arts and Sciences** Many of the liberal arts majors offered by the College of Arts and Sciences provide students with a background for a successful business career. In particular are majors in economics, mathematics, sociology, and psychology. Economics focuses on the production, distribution, and consumption of goods and services; monetary systems; and economic theories. Students interested in the human dimensions of business can choose sociology or psychology. Mathematics majors can choose concentrations in computer science, operations research, or economics to prepare for careers in areas such as actuarial science or finance ([www.arts.cornell.edu](http://www.arts.cornell.edu)).

**Engineering** Many of today's business managers hold engineering degrees. Each of the College of Engineering's 15 major fields prepares students for business careers. Operations research and engineering is the most business-oriented engineering field, preparing graduates for careers in areas such as investment banking and process engineering. Engineering students in any field can take a business-oriented minor in areas such as industrial systems and information science technology, and operations research and management science ([www.engineering.cornell.edu](http://www.engineering.cornell.edu)).

**Hotel Administration** The School of Hotel Administration, the world's leading hospitality management program, prepares students for management and entrepreneurial careers in businesses such as hotels, resorts, restaurants, amusement parks, sports arenas, cruise lines, and airlines. The school offers a rigorous business curriculum with courses in finance and real estate; hospitality facilities and operations; marketing, tourism, strategy, and information systems; and organizational management, communication, and law. The school's 150-room conference hotel gives

students the opportunity to apply what they learn in a real-world business ([www.hotelschool.cornell.edu](http://www.hotelschool.cornell.edu)).

**Human Ecology** The College of Human Ecology offers three business-oriented majors. The textiles and apparel major prepares students for careers in the fashion industry, for example, as a retail executive or merchandise buyer. Students majoring in facility planning and management study interior design, management, environmental psychology, and real estate to pursue careers as facility planners and consultants. The policy analysis and management major offers concentrations focusing on health, consumers, and family and social welfare, and its graduates pursue careers as nonprofit managers, consumer advocates, and policy researchers ([www.human.cornell.edu](http://www.human.cornell.edu)).

**Industrial and Labor Relations** The School of Industrial and Labor Relations (ILR) focuses on the "people" side of business. Its professional-level curriculum provides a strong social science foundation in organizational behavior, human resource management, labor law, labor economics, history, and statistics. Students can then develop special interests in management, dispute resolution, negotiation, employee relations, labor unions, collective bargaining, public policy, and international labor issues. Most ILR graduates begin careers in areas such as management, consulting, and public policy, but about one-third go directly to law school ([www.ilr.cornell.edu](http://www.ilr.cornell.edu)).

### Related Areas

**Entrepreneurship and Personal Enterprise Program** This university-wide program is open to all Cornell students interested in eventually starting their own businesses or working for venture capital firms. A series of almost 50 linked entrepreneurship-related courses are offered by the above six colleges and schools as well as by the Johnson Graduate School of Management, the Law School, and the College of Veterinary Medicine ([epe.cornell.edu](http://epe.cornell.edu)).

**International Programs** Several additional programs allow business students to focus on a particular geographic area. Concentrations are offered in Latin American Studies, Modern European Studies, China and Asia-Pacific Studies, Asian Studies, Near Eastern Studies, South Asian Studies, and African Studies (all in the College of Arts and Sciences). The College of Agriculture and Life Sciences offers an interdepartmental program in international agriculture.

### COMBINED DEGREE PROGRAMS

Highly qualified undergraduates may co-register with the Johnson Graduate School of Management during their senior year, thereby earning their M.B.A. degree in less than the usual time. Students in all Cornell undergraduate colleges may explore this option. The College of Engineering allows qualified students to earn a B.S., M.B.A., and M. Eng. degree in six years. Admission to these combined degree programs is limited to particularly promising applicants. Careful planning is required for successful integration of the course work.

### PRELAW STUDY

Law schools do not prescribe any particular prelaw program, nor do they require any specific undergraduate courses as do medical schools. Law touches nearly every phase of human activity, and there is practically no subject that cannot be considered of value to the lawyer. Therefore, no undergraduate course of study is totally inappropriate. Students contemplating legal careers should be guided by certain principles, however, when selecting college courses.

1. Interest encourages scholarship, and students will derive the greatest benefit from those studies that stimulate their interest.
2. Of first importance to the lawyer is the ability to express thoughts clearly and cogently in both speech and writing. First-year writing seminars, required of nearly all Cornell first-year students, are designed to develop these skills. English literature and composition, and communication courses, also serve this purpose. Logic and mathematics develop exactness of thought. Also of value are economics, history, government, and sociology, because of their close relation to law and their influence on its development and ethics, and philosophy, because of the influence of philosophic reasoning on legal reasoning and jurisprudence. Psychology and human development lead to an understanding of human nature and mental behavior. Some knowledge of the principles of accounting and of the sciences such as chemistry, physics, biology, and engineering is recommended and will prove of practical value to the lawyer in general practice in the modern world.
3. Cultural subjects, though they may have no direct bearing on law or a legal career, will expand students' interests; help cultivate a wider appreciation of literature, art, and music; and make better-educated and well-rounded persons.
4. Certain subjects are especially useful in specialized legal careers. For some, a broad scientific background—for example, in agriculture, chemistry, physics, or engineering—when coupled with training in law, may furnish qualifications necessary for specialized work with the government, for counseling certain types of businesses, or for a career as a patent lawyer. A business background may be helpful for those planning to specialize in corporate or tax practice. Students who anticipate practice involving labor law and legislation might consider undergraduate study in the School of Industrial and Labor Relations. Whatever course of study is chosen, the important goals are to acquire perspective, social awareness, and a critical cast of mind; to develop the ability to think logically and analytically; and to express thoughts clearly and forcefully. These are the crucial tools for a sound legal education and a successful career.

The presence of the Cornell Law School on campus provides the opportunity for a limited number of highly qualified undergraduates registered in the College of Arts and Sciences at the university to apply and be admitted to the Law School. At the time of entry they

must have completed 105 of the 120 credits required for the bachelor of arts degree, including 92 credits of course work in the College of Arts and Sciences.

It may be possible for exceptionally well-qualified students in other Cornell undergraduate colleges to arrange to enter the Law School after three years. In addition, members of the Cornell Law School faculty sometimes offer undergraduate courses such as *The Nature, Functions, and Limits of Law*, which are open to all undergraduates.

## PREMEDICAL STUDY

Medical and dental schools, while not requiring or recommending any particular major course of study, do require that particular undergraduate courses be completed. These courses usually include general chemistry and organic chemistry, biology, and physics, and all must be taken with a lab. A year of English composition (or a first-year writing seminar) is also required. In addition, many medical schools require or recommend mathematics and at least one advanced biological science course, such as biochemistry, genetics, embryology, histology, or physiology.

There is no major that is the best for those considering medical or dental school, and students are therefore encouraged to pursue their own intellectual interests. Students are more likely to succeed at, and benefit from, subjects that interest and stimulate them, and there is no evidence that medical colleges give special consideration to any particular undergraduate training beyond completion of the required courses. In the past, successful Cornell applicants to medical and dental schools have come from the Colleges of Arts and Sciences, Agriculture and Life Sciences, Human Ecology, and Engineering. The appropriate choice depends to a great extent on the student's other interests.

## PREVETERINARY STUDY

There is no specific preveterinary program at Cornell, and students interested in veterinary medicine as a career should select a major for study that fits their interests while at the same time meeting the entrance requirements for veterinary college as listed below. Most preveterinary students at Cornell are enrolled in the College of Agriculture and Life Sciences, which offers several applied science majors, including animal science, that can lead to related careers if the student does not go to veterinary college. Some enter other divisions of the university, especially the College of Arts and Sciences, because of secondary interests or the desire for a broad liberal arts curriculum.

The college-level prerequisite courses for admission to the College of Veterinary Medicine at Cornell are English composition, biology or zoology, physics, inorganic chemistry, organic chemistry, biochemistry, and microbiology. All science courses must include a laboratory. These requirements, necessary for admission to the College of Veterinary Medicine at Cornell, may vary at other veterinary colleges.

For information on additional preparation, including work experience and necessary examinations, students should consult the brochure, *Admissions Information*, obtained by writing to the Office of DVM Admissions, College of Veterinary Medicine, Cornell University, S2-009 Schurman Hall, Ithaca, NY 14853-6401. Information on the Guaranteed Admissions Program is available from the same address.

Qualified students in the College of Agriculture and Life Sciences may apply for acceptance in a double-registration program arranged between Cornell University and the College of Veterinary Medicine at Cornell. This program allows registered students to save one year in pursuit of the bachelor's and D.V.M. degrees. Further information about this program is available from the Office of Multicultural and Diversity Programs, College of Agriculture and Life Sciences, 140 Roberts Hall, Ithaca, NY 14853.

## COLLEGE OF AGRICULTURE AND LIFE SCIENCES

### INTRODUCTION

#### College Focus

The College of Agriculture and Life Sciences offers men and women broad-based educational programs to provide them with technical, management, and leadership skills in four primary areas of focus. These areas were developed in response to the global challenges of the 21st century. They are fluid, overlapping, and interdependent and represent agriculture and life sciences at its broadest and most dynamic meaning. These four areas are:

- Land-grant, or agricultural sciences
- Applied social sciences
- Environmental sciences
- New life sciences

Faculty members challenge students with educational programs that promote problem-solving, basic and applied research, extension, and outreach. The programs are geared to the discovery and dissemination of knowledge for the purpose of advancing agriculture and food systems, health and nutrition, food security, biological sciences, education, communication, natural resources and environmental quality, and community, urban and rural development throughout New York State, the nation, and the world.

#### Administration

Susan A. Henry, dean

William E. Fry, senior associate dean

vacant, associate dean for financial affairs

Mary Lou Doyle, assistant dean for human resources

Michael P. Riley, associate dean for alumni affairs, development, and communications

Donald R. Viands, associate dean and director of academic programs

Mark W. Wysocki, associate director of academic programs

Jeffrey J. Doyle, director of undergraduate biology

Michael P. Hoffmann, associate dean and director of the Cornell University Agricultural Experiment Station

Susan J. Riha, director for sponsored research in the senior associate dean's office

Helene R. Dillard, associate dean and director of cooperative extension

Christopher B. Watkins, associate director of cooperative extension

Glenn J. Applebee, associate director of cooperative extension

Daniel J. Decker, director of CALS land grant affairs, senior advisor to the dean

W. Ronnie Coffman, director of international programs

James E. Haldeman, associate director of international programs

Terry W. Tucker, associate director of international programs

Alice Pell, director of Cornell International Institute for Food, Agriculture, and Development

#### Department Chairs

Animal science: Alan W. Bell, 149 Morrison Hall

Applied economics and management: William H. Lesser, 154 Warren Hall

Biological and environmental engineering: Michael F. Walter, 104 Riley-Robb Hall

Biological statistics and computational biology: Martin T. Wells, 435 Warren Hall

Communication: Geri K. Gay, 339 Kennedy Hall

Crop and soil sciences: Stephen D. DeGloria, 232 Emerson Hall

Development sociology: Max Pfeffer, 133A Warren Hall

Earth and atmospheric sciences: Teresa E. Jordan, 2116 Snee Hall; Stephen J. Colucci, co-chair, 1116 Bradfield Hall

Ecology and evolutionary biology: Richard G. Harrison, E345 Corson Hall

Education: Rosemary S. Caffarella, 435 Kennedy Hall

Entomology: Jan P. Nyrop, 2130 Comstock Hall

Food science: Joseph H. Hotchkiss, 119 Stocking Hall

Horticulture: Marvin P. Pritts, 134A Plant Science Building

Landscape architecture: Peter J. Trowbridge, 446 Kennedy Hall

Microbiology: William C. Ghiorse, B75C Wing Hall

Molecular biology and genetics: Charles F. Aquadro, 235 Biotechnology Building

Natural resources: Barbara A. Knuth, 117 Fernow Hall

Neurobiology and behavior: Thomas D. Seeley, W301 S. G. Mudd Hall

Plant breeding and genetics: Mark E. Sorrells, 241 Emerson Hall

Plant pathology: George W. Hudler, 334 Plant Science Building

Statistical sciences: Bruce W. Turnbull, 227 Rhodes Hall

#### Student Services

##### Office of Academic Programs

The College of Agriculture and Life Sciences (CALS) provides a variety of services for students, faculty and alumni. The hub of these services is the Office of Academic Programs in Roberts Hall, including the director, associate director, the Admissions Office, the Career Development Office, the Counseling and

Advising Office, the Multicultural and Diversity Office, and the Registrar's Office. Although most of the student services are in the Office of Academic Programs, significant efforts are located across the college in the Office of Undergraduate Biology and in various departments. Faculty members in the College of Agriculture and Life Sciences consider advising to be an important and integral part of the undergraduate program. Each student enrolled in the college is assigned to a faculty advisor in his or her major field of study for assistance and guidance in developing a program of study, and to enhance the student's academic experience.

The Counseling and Advising Office coordinates the faculty advising program, serves as the college's central undergraduate advising office, coordinates the college international exchange programs, and offers personal counseling. Academic advising is available for students who are interested in international study, need to file petitions to waive college academic regulations, have disability concerns, are experiencing academic difficulties, or have requests for tutoring. The staff coordinates new student orientation, award ceremonies, commencement activities, and the activities of Ho-Nun-De-Kah, the college's honor society. Students seek counseling and advising on a variety of issues including academic problems, course problems and college procedures, graduation requirements, personal and family problems, stress management, and time management. Two counselors provide short-term counseling with an expertise in college policies and guidelines. Counseling is framed as appropriate to each student's academic circumstances. The staff is available on a walk-in basis, as well as by appointment in 140 Roberts Hall. Visit [www.cals.cornell.edu/advising](http://www.cals.cornell.edu/advising). Counseling and Advising staff: Lisa Ryan, Bonnie Shelley, Pamela Torelli, Tamara Durham.

The Office of Multicultural and Diversity Programs serves to monitor, support, and influence policy on behalf of all underrepresented students within the College of Agriculture and Life Sciences. This population is defined as encompassing, but not limited to, all African American, Latin American, Asian American, and Native American students. Its constituency includes students, faculty, and the general public. In the past academic year this represented approximately 20 percent of the college's undergraduate population. Additionally, the office is charged with monitoring and programming for the Educational Opportunity Program (EOP) and Prehealth Collegiate Science and Technology Entry Program (CSTEP). EOP and CSTEP are state-supported programs intended to assist New York State students who meet economic and academic criteria set by the college, State Programs Office, and New York State Board of Regents. For further information, please contact Catherine Thompson in 140 Roberts Hall.



Within the university, the Office of Multicultural and Diversity Programs is charged with acting as the college liaison with the central Office of Minority Education Affairs, Learning Strategies Center, and the State Programs Office. Other university connections include the University Career Center and the Office of Financial Aid regarding concerns of the underrepresented student population. The director provides support for the CALS Diversity Committee. The director together with peer advisors carries out the duties of the office. The staff acts as a major advocacy group, as well as an information and referral center.

Given the college's policy on nonexclusionary programming, the Office of Multicultural and Diversity Programs is also responsible for some functions which serve the college's entire population. At present, that includes general college diversity activities, serving as the college prehealth advisor and providing ongoing support at all levels for the Office of Counseling and Advising.

The CALS Registrar's Office ensures the accuracy, confidentiality, and reliability of student records and serves as an important link between the university's and college's policies and procedures and the student. The Registrar's Office maintains student records and reviews degree progress on a semester basis, maintains the Dean's List, evaluates and applies non-Cornell credit (transfer credit, study abroad credit, and advanced placement credit), provides registration and enrollment information, consults individually with students on graduation requirements, and schedules all CALS courses. Specific information can be found at [www.cals.cornell.edu/cals/current/registrar/index.cfm](http://www.cals.cornell.edu/cals/current/registrar/index.cfm).

The CALS Registrar's Office holds walk-in hours to assist students with any registrar-related issue. Walk-in hours are Tuesdays from 9:00 to 11:00 A.M. and Wednesdays from 2:00 to 4:00 P.M. in 140 Roberts Hall. No appointment is necessary during these times. Registrar's Office staff: Melanie Holland, Torrey Jacobs, Amy Paolangel, Elisa Rafferty.

The Office of Career Development offers a variety of helpful services to all students and alumni of the college. Career development includes self-assessment, career exploration, decision making, and transition to employment or further study. Services are designed to assist students and alumni with those activities and to help them develop the career planning and job search skills they will find useful as their career paths progress and change.

The Career Library contains an extensive collection of current and useful material, including career information books, extensive internship files, employer directories, and job listings. Alumni Career Link is a database of more than 400 college alumni who have offered to help students and alumni with their career development in a variety of ways. Job search talks on topics such as résumé writing, cover letter writing, and interview skills are presented throughout the semester and are available on videotape. An active on-campus recruiting program brings more than 50 employers to campus each year to interview students for full-time and summer jobs. Additionally, the office provides information on hundreds of internships.

The office, in conjunction with a network of college faculty and staff members, assists

students throughout their undergraduate years and beyond. For further information, students should contact Amy Benedict-Augustine, Laurie Gillespie, Sheri Mahaney, Sharon Radcliffe, or Jo-Lynn Buchanan in 177 Roberts Hall.

The CALS Admissions Office is responsible for admitting and enrolling a talented and diverse class of students each year. The process and outcome must reflect and support the college mission and help to meet college and institutional enrollment goals. This includes freshman, transfer, and intra-university transfer student processes. The office hosts on-campus and off-campus information sessions for prospective students, evaluates and makes decisions on more than 4,000 applications each year, and coordinates Cornell Days for admitted students each April. The Admissions Office staff advises and supports the CALS Ambassador program. The office is located in 177 Roberts Hall. Staff members include Ann LaFave, Cathy Sheils, Tara Bubble, Jared Rivers, Lorie Fessenden, and Heather Orkin.

Financial aid is administered through the university office in Day Hall. Endowment funds and annual donations in the college provide supplemental aid for students who are eligible for financial aid. Information about these college grants is available from the Office of Academic Programs in 140 Roberts Hall for students who have their financial aid package established through the university office in Day Hall. Grants are processed through the university's Office of Financial Aid.

## Students

Undergraduate enrollment is approximately 3,100, with about 56 percent in the upper division. Each year about 850 students are graduated, while 645 freshmen and 250 new transfer students are enrolled. College faculty members serve as chairs of the Special Committees of roughly 1,000 graduate students.

## Admission

The CALS Admissions Office selects applicants who are academically well prepared and appear most likely to benefit from the college's various curricula.

While most students come from New York State, about 42 percent come from other parts of the United States or abroad. Slightly more than half of the undergraduates are women. Approximately 24 percent are self-identified as members of minority ethnic groups.

The CALS Admissions Office is in 177 Roberts Hall (255-2036; [www.cals.cornell.edu/admissions/](http://www.cals.cornell.edu/admissions/)).

## Transfer Students

All accepted transfer credit must be from an accredited college or university. Transfer credit is awarded on a case-by-case basis based on review of official transcripts. Additional course information may be required. Contact the CALS Registrar's Office for information. A maximum of 60 non-Cornell credits may be transferred.

Approximately 30 percent of CALS undergraduate students are transfers who have completed part of their collegiate work at community colleges, agricultural and technical colleges, or four-year institutions. Many of them hold an associate's degree. Detailed

information on transfer admission is available from the CALS Admissions Office.

## Intra-University Transfer

A Cornell student in good standing may apply for an intra-university transfer to pursue an academic program unavailable in their current college. Guidelines are available in the CALS Admissions Office. The procedure involves attending an information session, meeting with a faculty member in the proposed area of study, and submitting an application and letter of interest.

Consideration is given to students who have demonstrated an interest in their proposed new field of study by taking appropriate prerequisite courses. Academic achievement is also considered. Freshmen are not admitted—students need to spend two semesters in their home college before applying. In certain cases, a student may be referred to the Internal Transfer Division (ITD) to study for one semester before entering the college. A second semester in ITD is considered only in unusual circumstances. During this trial semester, the student must achieve a predetermined average (usually 2.7) and take approved courses to assure acceptance.

## Special Students

A limited number of nondegree candidates who want to take courses in the college are admitted each year. Applicants should submit the standard Cornell transfer application, a résumé of their work experience, and a list of the courses in which they are interested. For more information and guidelines, students should contact the CALS Admissions Office.

## Off-Campus Students

Programs in which students study off campus but enroll for Cornell credit include SEA semester, Semester in Environmental Science with the Marine Biology Laboratory, field study in Human Ecology or Industrial and Labor Relations, Albany programs, Cornell in Washington, student teaching, IPM internship, and clinical microbiology internship. **Students intending to receive Cornell credit for work done off campus should inform the college registrar at the time of enrolling for courses to ensure that proper registration will occur.**

## Facilities

The College of Agriculture and Life Sciences is located on the upper campus, up the hill from the central area of Cornell University, on land that was once part of the Ezra Cornell family farm.

Buildings around the area commonly known as the Ag Quad house classrooms, offices, and laboratories. Flanking them are the greenhouses, gardens, and research facilities. Nearby orchards, barns, field plots, forests, and streams extend as far as the Animal Science Teaching Research Center at Harford and the New York State Agricultural Experiment Station at Geneva.

Roberts Hall serves as headquarters for the administrative units, including offices of the deans and directors of academic programs, Cornell University Agricultural Experiment Station, and cooperative extension. Included in the Office of Academic Programs are the director and associate director, the Admissions Office, the Career Development Office, the Counseling and Advising Office, the Office of

Multicultural and Diversity Programs, and the Registrar's Office.

Mann Library, with its extensive collections of materials in the agricultural and life sciences, is at the east end of the Ag Quad. The student lounge and service center, known as the Alfalfa Room, and many of the college classrooms are in Warren Hall. Public computer facilities are available in Warren Hall, Riley-Robb Hall, and Mann Library.

## DEGREE PROGRAMS

The College of Agriculture and Life Sciences offers programs leading to the degrees bachelor of science, master of science, and doctor of philosophy. Professional degrees include the master of professional studies and the master of arts in teaching. Some registered professional licensing and certification programs are also available.

Each curriculum in the college creditable toward a degree is registered with the New York State Education Department.

### Bachelor of Science Degree

Departments in the College of Agriculture and Life Sciences sponsor study for the B.S. degree in 24 major programs. To qualify for the degree, students must fulfill requirements established by the faculty of the college and administered through the Office of Academic Programs. Students are admitted into a single major but afterwards may pursue and graduate with two or more majors within the College of Agriculture and Life Sciences. Students need an advisor in each major. Course requirements for double majors may overlap. The Counseling and Advising Office (140 Roberts Hall) and department representatives have a form for students to complete to officially recognize the double major. The following units offer major fields of study for undergraduates. A faculty advising coordinator is listed for each unit. Students should consult with the faculty coordinator regarding requirements and opportunities for concentrations in the major.

### Majors

Agricultural science: Antonio DiTommaso, 903 Bradfield Hall, ad97@cornell.edu

Agriculture science education: William Camp, 416 Kennedy Hall, wgc4@cornell.edu

Animal science: W. Bruce Currie, 434 Morrison Hall, wbc1@cornell.edu

Applied economics and management: Dale Grossman, 205 Warren Hall, dag14@cornell.edu

Atmospheric science: Mark Wysocki, 1114 Bradfield Hall, mww3@cornell.edu

Biological engineering: James Bartsch, 314 Riley-Robb Hall, jab35@cornell.edu

Biological sciences: Jeffrey Doyle, 216 Stimson Hall, jjd5@cornell.edu; Bonnie Comella, 216 Stimson Hall, bec3@cornell.edu

Biology and society: Brian Chabot, E309A Corson Hall, bfc1@cornell.edu

Biometry and statistics: Steven Schwager, 424 Warren Hall, sjs5@cornell.edu

Communication: Brian Earle, 328 Kennedy Hall, boe1@cornell.edu

Crop and soil sciences: Gary Fick, 507 Bradfield Hall, gwf2@cornell.edu

Development sociology: Tom Hirschl, 333 Warren Hall, tah4@cornell.edu

Entomology: John Losey, 4126 Comstock Hall, jel27@cornell.edu

Environmental engineering: James Bartsch, 314 Riley-Robb Hall, jab35@cornell.edu

Food science: Janice Brown, 107 Stocking Hall, jmb14@cornell.edu

Information science: Lindsay Marzano, 303 Upson Hall, lindsay@cis.cornell.edu

Interdisciplinary studies: Lisa Ryan, 140 Roberts Hall, lar4@cornell.edu

International agriculture and rural development: Terry Tucker, 33 Warren Hall, twt2@cornell.edu

Landscape architecture: Peter Trowbridge, 440 Kennedy Hall, pjt4@cornell.edu

Natural resources: Tim Fahey, 12 Fernow Hall, tfj5@cornell.edu

Nutritional sciences: J. Thomas Brenna, B38 Savage Hall, jtb4@cornell.edu

Plant sciences (plant biology; plant genetics and breeding; horticulture, plant pathology/protection): Peter Davies, 255 Plant Sciences Bldg., pjd2@cornell.edu—August–December 2006; Ian Merwin, 118 Plant Sciences Bldg., im13@cornell.edu—January–July 2007

Science of earth systems: Bryan Isacks, 3110 Snee Hall, bli1@cornell.edu

Science of natural and environmental systems: Tim Fahey, 12 Fernow Hall, tfj5@cornell.edu

### Minors

Students in the College of Agriculture and Life Sciences may pursue one or more minor fields of study. Minor fields of study do not require an academic advisor, but each minor field has a contact person who will provide information and verify on the application to graduate that the student will successfully complete the requirements of the minor by graduation. Students may complete as many minors as they wish; the requirements of minors may overlap. Minors are described along with the majors later in the CALS section of this catalog. Not all majors or departments offer minors. Minors available in CALS can be found on the CALS counseling and advising web site (cals.cornell.edu/cals/current/advising/options/doubmaj.cfm). For minors outside of CALS, please consult with the specific department.

### Early Enrollment in Cornell Graduate Programs

The College of Veterinary Medicine may accept students who are then permitted to double-register in their seventh and/or eighth semester and complete requirements for the bachelor of science degree in the College of Agriculture and Life Sciences. Students should consult with the college registrar, 140 Roberts Hall, to file an application for dual-enrollment and to ensure that degree requirements have been fulfilled.

Students who have been offered admission to the S. C. Johnson Graduate School of Management may take management courses in their senior year if approved by their college faculty advisor as part of their

undergraduate program. These courses count toward the endowed college credits (maximum 55 without additional tuition charge). Students may consult with the college registrar, 140 Roberts Hall, to verify degree requirements and endowed credits earned.

**The Department of Landscape Architecture** offers a first professional degree curriculum in landscape architecture at both undergraduate (BSLA) and graduate levels (MLA I), as well as a second professional graduate degree program (MLA II). The curricula for both the undergraduate and graduate programs are accredited by the Landscape Architecture Accreditation Board (LAAB). The graduate program is cosponsored by the Department of Landscape Architecture in the College of Agriculture and Life Sciences and by the College of Architecture, Art, and Planning.

### Graduate Fields of Study

Graduate study is organized by fields that generally coincide with the academic departments but may draw faculty from several disciplines in the various colleges of the university. The following graduate fields have primary affiliation in Agriculture and Life Sciences. Current directors of graduate studies are also listed. For more information on graduate programs, please refer to the Graduate Bulletin, or www.gradschool.cornell.edu/. Information following this list refers to undergraduate studies.

Agriculture and life sciences [M.P.S. (agr.)]: Don Viands, 151 Roberts Hall, drv3@cornell.edu

Agricultural economics: David Lee, 248 Warren Hall, drl5@cornell.edu

Animal breeding: John Pollak, B-47 Morrison Hall, ejp6@cornell.edu

Animal science: Richard Quaas, B-47 Morrison Hall, rlq1@cornell.edu

Atmospheric sciences: Dan Wilks, 1113 Bradfield Hall, dsw5@cornell.edu

Biochemistry, molecular, and cell biology: Volker Vogt, 358 Biotechnology Bldg., vmv1@cornell.edu

Biological and environmental engineering: Dan Aneshansley, 306 Riley-Robb Hall, dja4@cornell.edu

Biometry: Marty Wells, 435 Warren Hall, mtw1@cornell.edu

Communication: Bruce Lewenstein, 321 Kennedy Hall, bv11@cornell.edu

Development sociology: fall, Joe Francis, 235 Warren Hall, jdf2@cornell.edu; spring, Parfait Eloundou-Enyegue, 318 Warren Hall, pme7@cornell.edu

Ecology and evolutionary biology: Harry Greene, E251 Corson Hall, hwg5@cornell.edu

Education [also M.A.T.]: John Supple, 421 Kennedy Hall, jws28@cornell.edu

Entomology: Jeffrey Scott, 6134 Comstock Hall, jgs5@cornell.edu

Environmental toxicology: Andrew Yen, Stocking Hall, ay13@cornell.edu

Food science and technology: Harry Lawless, 106 Stocking Hall, htl1@cornell.edu

Genetics and development: staff, 107 Biotechnology Bldg., dmc18@cornell.edu

Horticulture: Nina Bassuk, 33 Plant Science Building, nlb2@cornell.edu

International agriculture and rural development [M.P.S. (agr.)]: Steven Kyle, 249 Warren Hall, sck5@cornell.edu

International development: Norman Uphoff, 31 Warren Hall, ntu1@cornell.edu

Landscape architecture [M.L.A.]: Dan Krall, 440 Kennedy Hall, dwk5@cornell.edu

M.P.S. agriculture with Peace Corps option (offered by most agriculture fields with M.P.S. programs): Jim Haldeman, 36 Warren Hall, or see director of graduate studies for chosen field, jeh5@cornell.edu

Microbiology: Stephen Winans, 360A Wing Hall, scw2@cornell.edu

Natural resources: Marianne Krasny, 16 Fernow Hall, mek2@cornell.edu

Neurobiology and behavior: David Deitcher, W125 Mudd Hall, dld14@cornell.edu

Nutritional sciences: Christine Olson, 376 MVR Hall, cmo3@cornell.edu

Physiology: Mark Roberson, T6-008a Vet Research Tower, msr14@cornell.edu

Plant biology: Thomas Owens, 217 Plant Science Bldg., tgo2@cornell.edu; Robert Turgeon, 256 Plant Science Bldg., ert2@cornell.edu

Plant breeding: Lisa Earle, 514 Bradfield Hall, ede3@cornell.edu

Plant pathology: Michael Milgroom, 216 Bradfield Hall, mgm5@cornell.edu

Plant protection [M.P.S. (agr.)]: William Reissig, Barton Laboratory, Geneva Campus, whr1@cornell.edu

Soil and crop sciences: Janice Thies, 719 Bradfield Hall, jet25@cornell.edu

Statistics: Robert Strawderman, 437 Warren Hall, jet 25@cornell.edu

Zoology: John Hermanson, T5002A Vet Research Tower, jwh6@cornell.edu

## OPPORTUNITIES IN RESEARCH

### Undergraduate Research

A multitude of opportunities to be engaged in research exists across the College of Agriculture and Life Sciences and the university.

Students may be able to work on a faculty member's research project for pay. Opportunities can be explored by contacting individual faculty members; departmental offices; the CALS Career Development Office, in 177 Roberts Hall; or Cornell Career Services, in 103 Barnes Hall. Another option is to receive credit through a 499-level course within a department by conducting your own research project under a faculty mentor. More than 600 students each year conduct research for credit. Upperclass students usually have the course background to engage in research, but freshmen and sophomores also may be equipped to do some types of research. Off-campus research experiences are also available for pay or as internships.

The following web sites provide information about research and internships:

#### CALS Career Development Office:

[www.cals.cornell.edu/cals/current/career/index.cfm](http://www.cals.cornell.edu/cals/current/career/index.cfm)

#### CALS Undergraduate Research Opportunities:

[www.cals.cornell.edu/cals/current/student-research/undergrad/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/undergrad/index.cfm) (information on how to explore research opportunities)

#### CALS Research Honors Program:

[www.cals.cornell.edu/cals/current/student-research/honors/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/honors/index.cfm)

#### CALS Undergraduate and Graduate Student Grants Proposal Development:

[www.cals.cornell.edu/cals/current/student-research/grants/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/grants/index.cfm)

#### CALS Undergraduate Minority Research:

[www.cals.cornell.edu/cals/current/student-research/minority/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/minority/index.cfm)

#### CALS Internship Guidelines:

[www.cals.cornell.edu/cals/current/student-research/internship/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/internship/index.cfm)

#### Undergraduate Research @ Cornell:

[www.research.cornell.edu/undergrad/](http://www.research.cornell.edu/undergrad/)

#### Cornell Undergraduate Research Board:

[www.research.cornell.edu/curb/](http://www.research.cornell.edu/curb/) (student organization to promote and facilitate undergraduate research)

#### Biological Sciences:

[www.biology.cornell.edu/](http://www.biology.cornell.edu/)

### Research Honors Program

The Research Honors Program provides students with a special opportunity to work with a faculty mentor to experience the research process. Successful completion of this program requires a thesis written in the style of a master's thesis or professional journal article in that area of research. Original honors research may be published in a professional journal. Students are required to send an electronic version of their thesis title, abstract, student's name, and the research advisor's name to Ann Gantner, amg28@cornell.edu, by the end of the spring semester. In addition to copies of the entire thesis requested by the program area, one copy is required by the Office of Academic Programs (140 Roberts Hall). This copy is made available in Mann Library. Students may volunteer to publish their theses in the Internet-First University Press if it does not interfere with other plans, such as patenting or publishing in another journal. During the summer of each year, the *CALS Research Honors Abstracts* is published as a compilation of abstracts of the honors theses.

The bachelor of science degree with "distinction in research" is conferred upon those students who, in addition to having completed the requirements for the B.S. degree, have satisfactorily completed the honors program in their area of major interest and have been recommended for the degree by the honors committee of that area.

Research may be done under the appropriate program area: animal sciences, biological sciences, biology & society, entomology, information science, landscape studies, natural resources, nutritional sciences, physical sciences, plant sciences, and social sciences. Each program area has its own requirements in addition to the college requirements. After reviewing the requirements of each program area (below), students' questions may be directed toward the appropriate program area chair.

Consult "Undergraduate Research Opportunities" on the web ([cals.cornell.edu/CALSUndergraduate\\_Research\\_Opportunities.cfm](http://cals.cornell.edu/CALSUndergraduate_Research_Opportunities.cfm)) for information about identifying a research topic, conferring with a faculty member, and undergraduate funding opportunities.

### Honors Program Requirements

An undergraduate wishing to enroll in the honors program must have completed at least 55 credits, at least 30 of those 55 at Cornell. In addition, the student must have attained a cumulative Cornell GPA of at least 3.0 (unless otherwise noted by a particular program) at the time of entry.

Interested students must make written application to the CALS Registrar's Office no later than the end of the sixth week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member during the second semester of their junior year (or earlier if required by the program area). Earlier application deadlines to program area committees are noted in the sections below. For most of the program areas, an application form is available from the college registrar in 140 Roberts Hall. The application form also can be printed from the web at [www.cals.cornell.edu/cals/current/student-research/honors/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/honors/index.cfm). Applications for biological sciences students can be picked up at 200 Stimson Hall, and for biology & society students at 306 Rockefeller Hall.

Before the completed application is returned to the college registrar, signatures of approval are required in the following order: faculty research mentor, academic advisor, and the research honors program area chair. After the college registrar verifies the student's GPA, the student will be officially enrolled in the honors program. Additional requirements for application and completion of the program are described under each particular program area.

Academic credit also may be earned by enrolling in an appropriate independent research course (required by some program areas). When applying for admission to the program, the student may, if appropriate, submit a budget and a modest request for funds (up to \$350) to cover some of the costs incurred in doing the research. If approved, the funding will be transferred from an account in the CALS Office of Academic Programs to a departmental account of the student's research advisor to support the student's research. This funding is not to be used as a student salary. Additional funding opportunities are described at [cals.cornell.edu/CALSUndergraduate\\_Research\\_Opportunities.cfm](http://cals.cornell.edu/CALSUndergraduate_Research_Opportunities.cfm).

Unless otherwise indicated in the following program area descriptions, the research report in the form of a thesis or journal article should be submitted to the research program committee no later than four weeks before the end of classes of the semester in which the student expects to graduate. Students in the College of Agriculture and Life Sciences wishing to participate in the Research Honors Program must be accepted in one of the program areas approved by the faculty. Students are not eligible for distinction in research by participating in a program offered by another college or administrative unit.



The research honors committee for each program area recommends to the college registrar those students who qualify for honors. Only those who maintain a GPA of at least 3.0 will be graduated with "distinction in research."

At or near the completion of their research, students are required to give an oral presentation or poster session during any event. Some departments have seminar series when presentations may be given. The Cornell Undergraduate Research Board (CURB) Forum is another venue for presentations.

For more information, go to [www.cals.cornell.edu/cals/current/student-research/honors/index.cfm](http://www.cals.cornell.edu/cals/current/student-research/honors/index.cfm).

The following are the honors program areas:

### Animal Sciences

Faculty committee: S. M. Quirk, chair; Y. R. Boisclair, J. R. Giles, J. Gavalchin, P. A. Johnson, T. R. Overton

The objective of the animal sciences research honors program is to provide outstanding undergraduates with the opportunity to pursue supervised independent research and to develop an awareness of the scientific process. It is expected that the research will require significant effort and creative input by the student in its design and execution and in the reporting of the results.

Those students with majors in animal sciences who are interested in doing a research project should consult with their faculty advisors by their junior year. All students are expected to meet the college requirements in qualifying for the program and to complete the following:

- Identify a potential research honors project sponsor (i.e., a faculty member working in the animal sciences) and secure that faculty member's commitment to sponsor the student in the research project. This should be accomplished by the second semester of the junior year. Students are encouraged to implement some research during the junior year and/or summer before the senior year.
- Register for AN SC 499 Undergraduate Research.
- Participate in AN SC 402 Seminar in Animal Sciences, during the spring semester and report on and discuss the project and results.
- Submit a written thesis to the Animal Sciences Research Honors Committee by the scheduled deadline. Specific information regarding deadlines, format, and organization for the thesis will be provided.
- Meet with the Animal Sciences Research Honors Committee for a short oral defense of the thesis following a review of the thesis by the student's sponsor and the research committee.

Details pertaining to the specific requirements of the program can be obtained from the administrative office of the Department of Animal Science, 149 Morrison Hall.

### Biological Sciences

Students interested in the Research Honors Program in the biological sciences should consult with their faculty advisors and with

potential faculty research sponsors early in their junior year. See "Independent Research and Honors Program" in the Biological Sciences section of this catalog for complete details. Information on faculty research, applications, and program requirements may be obtained from the Office of Undergraduate Biology, 216 Stimson Hall.

### Biology & Society

Faculty committee: D. Pimentel, chair

The Research Honors Program in Biology & Society is designed to provide independent research opportunities for academically talented undergraduate students in biology & society. Students who enroll in this program are expected, with faculty guidance, to do independent study and research dealing with issues in Biology & Society. Students participating in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career.

Biology & Society students are considered for entry into the research honors program at the end of the second semester of the junior year. Application forms for the program are available in the Biology & Society office, 306 Rockefeller Hall. To qualify for the Biology & Society Research Honors Program, a student must have an overall Cornell cumulative GPA of at least 3.3, have formulated a research topic, and have found a project supervisor (with a Cornell academic appointment) and a Biology & Society faculty member willing to serve as his or her advisor. The director of undergraduate studies will appoint a third reader of the completed research thesis. Applications will be reviewed by a committee headed by the director of undergraduate studies, who will notify students directly of the outcome. Students will be permitted to register for the research honors program only by permission of the biology & society program. Students must enroll for two semesters for 8 credits each in B&SOC 499, Honors Project I and II. More information on the honors program is available in the Biology & Society office, 306 Rockefeller Hall (255-6047).

### Important Deadlines

Note: If the following dates fall on a weekend, the deadline is the preceding Friday.

- Last week of second semester of the junior year: Application for honors program submitted to 306 Rockefeller Hall.
- April 14: Thesis completed in a form satisfactory for evaluation and submitted to the three readers.
- April 28: Thesis defense accomplished.
- May 12: One bound copy of completed and defended thesis submitted to director of undergraduate studies.

### Entomology

Faculty committee: B. Lazzaro, chair

**The Program.** A research honors program in entomology may be pursued by any qualified student in the College of Agriculture and Life Sciences. The student need not be specializing in entomology. Insects, because of their variety, small size, and easy availability, are convenient subjects for studying a wide array of problems dealing with living systems.

Short life cycles, unique physiologies and developmental patterns, and species with easily managed colony requirements and a wide range of behavioral traits provide the raw material for research honors study. Cornell's diverse faculty interests and extensive collections and library in entomology are also major assets if a student selects entomology as the area for research honors study.

Research honors students have the option of earning academic credit by enrolling in ENTOM 497 Independent Study during any semester while working toward a research honors thesis. Credits and grade option for satisfying requirements of ENTOM 497 should be discussed with the thesis advisor (following page.)

Note: Enrolling in independent study is not a requirement for graduating with distinction in research honors in entomology.

**Sequence of Requirements** The Entomology Research Honors Committee requires that an undergraduate who is interested in embarking on a research honors project proceed with the following steps:

1. Discuss the matter with his or her academic advisor, preferably in the junior year. This schedule makes it possible to carefully plan a research project and implement some research during the junior year and/or summer before the senior year.
2. Select an appropriate faculty member in the Department of Entomology who can serve as a supervisor to oversee the honors research. This need not be the student's academic advisor. The academic advisor will be of assistance in determining which faculty entomologist has expertise most compatible with the interests of the student.
3. Prepare a brief, tentative plan for the project for discussion and approval of the honors project supervisor. The plan should include a statement of objectives or hypotheses, proposed methods for testing hypotheses, needs for laboratory space or shared equipment, and a budget outlining financial support needed for travel and supplies.
4. Submit a completed application and proposal (approved by the honors project supervisor and the chair of the Entomology Research Honors Committee) no later than the end of the sixth week of the first semester of the senior year. Earlier submission is encouraged. Applications are available and should be submitted to the CALS registrar, 140 Roberts Hall. These applications include an opportunity to request a modest amount of funding from the CALS honors program. These funds are distributed only one time per year (in late fall).
5. Submit a brief progress report, approved by the project supervisor, to the Entomology Research Honors Committee by mid-term of the semester in which the student will complete his or her graduation requirements.
6. Present a formal seminar reporting the significant findings of the research to the Department of Entomology (as a Jugatae seminar) in the last semester of the senior year.

7. Submit two copies of the final honors thesis (as approved by the thesis supervisor) to the chair of the Entomology Research Honors Committee no later than two weeks before the last day of classes in the semester in which the student anticipates graduation. The thesis will be reviewed by the faculty honors project supervisor and one other referee selected by the chair of the honors committee.
8. Referees will return the thesis to the student one week before the last day of classes. If reviewers indicate that changes must be made, the revised thesis should be submitted to the Entomology Research Honors Committee chair no later than the last day of classes. Referees should include a recommendation to the Entomology Research Honors Committee chair regarding acceptability of the honors thesis. The approved honors theses will be bound and housed in the Entomology Library in Comstock Hall.

The complete text of this section can be found at: [www.entomology.cornell.edu/Undergrad/EntomHonors.shtml](http://www.entomology.cornell.edu/Undergrad/EntomHonors.shtml).

### Information Science

Students should follow the CALS social sciences guidelines to obtain research honors in information science.

### Landscape Studies

Faculty committee: P. J. Trowbridge, chair

The research honors program in landscape studies offers outstanding undergraduates in CALS the opportunity to work with a member of the landscape architecture faculty to pursue supervised independent research in design, the cultural landscape, landscape archaeology, environmental design, and community-based planning and design. The student need not be a major in the landscape architecture professional design curriculum. The subject matter and nature of the research experience may be quite varied. Students participating should find the experience intellectually stimulating and rewarding, whether or not they intend to pursue a research career. The guidance and supervision of a faculty member with substantial interest and expertise in the subject is essential to the success of the project. It is expected that the research will require significant effort and creative input by the student in its design and execution and in reporting the results.

Students who consider this option should be aware that honors research is undertaken above and beyond any of the requirements for graduation in the major of landscape architecture. It involves a number of deadlines and a considerable time commitment. Before signing on for research honors, students need to consult with their academic advisor to make sure that honors research projects will not interfere with other academic or professional objectives, such as job applications, preparation of portfolios, or application to graduate school. These may need to be deferred until the thesis is complete. Students are responsible for meeting deadlines and being prepared for presentations and other meetings.

Although honors research credits for spring semester junior year and both semesters senior year are designated a letter grade, individual mentors may choose the R grade for work in progress until the project has

been fully completed. Grade is determined by each student's mentor. The designation of "distinction in research" on the diploma is awarded at the recommendation of the faculty advisor and other referees to the honors committee chair. An outline of activities for both years is given below.

The Landscape Studies Research Honors Committee requires that an undergraduate who is interested in embarking on a research honors project proceed with the following steps:

1. Junior year: Identify a potential research honors project sponsor and secure that faculty member's commitment to sponsor the student in the research project. This should be accomplished early in the second semester of the junior year and be finalized by the end of the spring semester. Pre-register during the spring for the research honors program (LA 499).
2. Work with a faculty advisor to identify and formulate a research problem. If the faculty advisor is not in the Department of Landscape Architecture, select a co-advisor from the department to ensure that the research is consistent with the field.
3. Submit a completed application and proposal (approved by the honors project supervisor and the chair of the research honors committee) no later than the end of the fourth week of the first semester of the senior year. Earlier submissions are encouraged. These will be reviewed by ad hoc committee members, and successful thesis proposals will be submitted to the college honors committee by the sixth week.
4. Carry out an independent research effort that is original and separate from the work of others who may be investigating similar subjects.
5. Submit an outline of the thesis to the chair of the committee by the end of January for a May graduation.
6. Submit a draft to the readers by April 15. Describe and summarize the work within the range of formats used in the master's thesis program or professional journals in design or research. This version will be reviewed by the faculty supervisor and two *ad hoc* reviewers, and the student will be able to incorporate the committee's comments and suggestions into the final version, which will be due the last day of classes. Referees prepare a recommendation to the honors committee chair regarding the acceptability of the honors thesis.
7. Give two oral presentations to the group of other honors research students and invited faculty members. Both presentations are during the student's senior year.
8. Send two bound copies of the completed and defended thesis to the honors committee chair by May 13. These copies are in addition to the unbound copy required for Mann Library. A 250-word abstract must be provided electronically to the CALS Office of Academic Programs and must appear at the front of the thesis (see "CALS Requirements for Honors Thesis").

### Natural Resources

Faculty director: J. B. Yavitt, chair

The research honors program in natural resources involves original, independent research that generates novel findings in applied ecology and resource policy and management. Students learn how to design and carry out research under the direct supervision and guidance of a faculty member or senior research associate in the department. Most students in the program begin their research before the start of the senior year, often in the summer after their junior year. Students may enroll and receive credit in independent study (NTRES 494) during their honors research. The research findings are presented in a written thesis that is reviewed by two experts in the field. Many theses have been published in leading journals in the disciplinary area of the research. Although the format is not prescribed, the thesis usually consists of a short introduction, relevant materials and methods, a concise presentation of the meaningful data, a discussion, and the student's interpretation of the conclusions. Students also give an oral presentation of their research findings in a special symposium hosted by the department in early May.

Students should adhere to the following schedule.

#### Junior Year

1. File an informal application with the program director. The application includes a project description and advisor information.

#### Senior Year

1. Sixth week of fall semester: Submit formal application.
2. March 30: Thesis should be close to completion.
3. April 13: Submit two copies of the thesis to the program director for *ad hoc* reviews.
4. April 29: Pick up *ad hoc* reviewers' comments from the program director.
5. May 13: Submit two copies of the final thesis: one for the college, one for the program director.
6. Week of May 24: Students are notified.

### Nutritional Sciences

Faculty committee: J. T. Brenna, C. Bisogni

The research honors program in the Division of Nutritional Sciences is a structured experience that involves (1) taking a course in research (NS 398), (2) conducting a research project through which the student becomes intellectually engaged in the whole research process, (3) completing a written thesis that reports the research, and (4) giving an oral presentation of the project at the undergraduate honors symposium. Students must maintain a minimum grade point average to graduate with honors in research.

The research honors program is an excellent opportunity for students who are highly interested in research and wish to commit substantial time and intellectual energy to a project that will span at least four semesters of their undergraduate experience. Honors students experience the excitement of designing a project to generate new knowledge on a topic that interests them and reporting the project findings. By working

with faculty mentors and other researchers, they develop skills in research methods and data analysis. Students also learn that research projects are labor intensive and that writing research reports, such as the honors thesis, is a vital, but time-consuming, aspect of the research process. This intensive research experience is not suitable for all students, and those who wish a less intensive research experience may conduct research with a faculty member under-NS 401.

Students interested in the program should take NS 398 as early in their program as possible. Students may review program requirements at the NS 398 web site or contact the program directors. Acceptance into the research honors program occurs when the student (1) is accepted into a faculty member's research program and (2) submits a research proposal abstract that is approved by the directors of the research honors program.

Students interested in the program typically spend the spring sophomore semester and fall junior semester exploring honors project opportunities with prospective faculty mentors. Students are responsible for contacting faculty members and applying to their research programs, although some guidance in this process will be provided in NS 398. By the fall of the junior year, the student is expected to have identified their faculty member and be working with him/her on a proposal abstract, which is due early in the spring junior semester.

Students receive academic credit for work on their honors project under NS 499. The 6 required credits may be taken over several semesters. How much time is spent on the project each semester will be the decision of the student and the faculty mentor. For each three to four hours of work per week, the faculty mentor usually will assign one hour of academic credit. This applies to the preparation of the research plan and necessary library research (usually completed during the junior year) as well as the carrying out of the research itself and preparation of the thesis.

The research honors project is the major component of the research honors program. It should be well defined and sufficiently circumscribed to give the student the opportunity to develop the research plan, execute the research, and write an acceptable thesis within the limited time available to students carrying full academic loads. Typically, the project is designed early in the junior year and conducted in the spring junior semester and fall senior semester. Students may arrange with their faculty mentor to work on the project during the summer. The spring senior semester is usually devoted to writing the thesis (at least 25 pages). The student works with the faculty mentor to prepare a draft of the thesis, which is submitted before spring break to a second faculty member for evaluation. When comments are received from the reader, the student must revise the thesis to meet the criteria for acceptance. The student presents the thesis at the Honors Student Symposium at the end of the semester.

## Physical Sciences

Faculty committee: A. T. DeGaetano, chair; S. J. Mulvaney, C. D. Bustamante

The research honors program in physical sciences provides outstanding students with an opportunity to do independent research under the supervision of a faculty member in the Departments of Biological and Environmental Engineering, Food Science, Earth and Atmospheric Sciences, or Biological Statistics and Computational Biology.

In addition to meeting the requirements of the college, the student is expected to:

1. Identify a thesis advisor and thesis topic before the end of the junior year.
2. Work with the thesis advisor to prepare a budget and application form (due by the sixth week of senior year).
3. Enroll in the program for a minimum of two semesters.
4. Enroll in the appropriate departmental undergraduate research course for a total of at least 6 credits.
5. Submit an outline of the thesis to the chair of the committee by the end of January (for a May graduation).
6. Submit a draft of the thesis to the thesis advisor with sufficient lead-time for a revision to be prepared.
7. Submit three copies of the thesis and names of recommended reviewers to the chair of the honors committee by four weeks before the end of classes in the semester in which graduation is expected.

There is no required format, but the thesis is usually written in the form of a research journal article or a master's thesis.

Further details of the program can be obtained from the chair of the Physical Sciences Research Honors Committee.

## Plant Sciences

Faculty committee: R. L. Obendorf, chair; I. A. Merwin, E. B. Nelson, F. S. Rossi, A. DiTommaso, M. E. Smith-Einarson

Students perform independent scientific research under the guidance of faculty members in the fields of horticultural, agronomic, and soil sciences; plant biology; plant genetics and breeding; and plant pathology. For admission to the program, students must meet college requirements and submit to the Plant Sciences Research Honors Committee a project proposal (two to three pages) that includes a title; a brief background of the problem (justification and literature review); a clear statement of objective(s) and hypotheses to be tested; methodology and experimental plan, necessary space, equipment and supplies; and a project budget. The proposal must be accompanied by a letter from the faculty supervisor stating that he or she has approved the project plan and that its completion within the remainder of the student's undergraduate tenure is feasible.

A brief progress report will be made to the committee usually during the third week of the spring semester. Research presentations are recommended (e.g., Cornell Undergraduate Research Board Spring Forum, department seminars, professional meetings).

Successful completion of the research honors program requires acceptance by the honors

committee of two copies of a research report. The report should be written in the format of a research publication in the appropriate scientific field. The acceptable report must have been reviewed and corrected according to the recommendations of the research supervisor before the report is submitted to the honors committee. The report must be received by the honors committee at least two weeks before the last day of classes of the semester in which the degree is sought and must be accompanied by a letter from the research supervisor evaluating the research and, if appropriate, recommending graduation with distinction in research.

The research honors committee will review the report within one week and may accept it or return it to the student with specific recommendations for revisions. A suitably revised version must be submitted to the committee before the second day of the examination period. When the committee accepts an honors report, the chair will recommend to the associate dean and director of academic programs and to the college registrar that the student be graduated with distinction in research. One copy of the accepted report will be returned to the student with review comments from the committee.

Additional guidelines may be found at [www.css.cornell.edu/Programs/PlantSciHon/](http://www.css.cornell.edu/Programs/PlantSciHon/).

## Social Sciences

Faculty committee: J. D. Francis, N. Chau, S. C. Piliero

Research projects in this program area include applied economics and management, communication, development sociology, education, and information science. Students are accepted into the social sciences research honors program of the College of Agriculture and Life Sciences after meeting all the college criteria described above, after evaluation of the student's written application, and on approval of a detailed thesis proposal. The application and proposal are due to the program area chair no later than the third week of the first semester of the senior year. Each student is encouraged to begin working on this proposal with a prospective faculty thesis advisor during the junior year. The purpose of the proposal is twofold. First, it formalizes a plan of study and establishes a set of expectations between the student and his or her faculty advisor. Second, the honors committee reviews the proposal to determine whether it is consistent with honors thesis requirements and to make suggestions for improvement.

The proposal should be 5 to 10 typed, double-spaced pages and include the following:

1. **Research Topic:** State the problem to be studied or the topic of interest. Review the basic literature and the background of the problem or topic; include a more extensive bibliography to be consulted.
2. **Research Questions/Empirical Hypotheses:** Specify the proposed questions to be answered or hypotheses to be tested empirically via collection of data and a mode of analysis accepted in the social sciences.
3. **Research Methods:** Discuss the models to be constructed (if any), sampling

procedures, data collection procedures (including measurement instruments and survey or experimental designs, if appropriate), and proposed methods of analysis.

4. **Expected Significance:** State what new knowledge or information is likely to be forthcoming and why it is important. State any practical applications expected as a result of the research.

Faculty advisors must be members of the graduate faculty. Exceptions may be granted for persons with special expertise who are deemed capable of thesis supervision; exceptions may be granted pending petition to the Social Science Honors Committee. Students should register for honors credit directed by the faculty research honors project advisor.

Distinction in research is awarded upon approval of the research honors thesis by the Social Science Research Honors Committee. The research should deal with a substantive issue in one of the fields in the social sciences. Both the results of the research and the methodology (or the logical argument by which the results were achieved) must be reported. Reviews of the literature, practical conclusions or applications, or broad characterizations of an area of inquiry may constitute part of the research report but are not themselves sufficient to count as research.

Honors theses should be written according to the form of any standard journal within the appropriate field. We recommend the submission of the thesis draft to the student's research advisor by the beginning of the month two months before graduation, for revision suggestions. Two copies of the thesis must be submitted to the chair of the social science committee no later than the middle of the second-to-last month before graduation (i.e., April or November). A supporting letter from the faculty member supervising the work also must be submitted. The thesis will be independently reviewed and further revisions may be required before the thesis is accepted. Final approval of the thesis requires a majority vote of the honors committee.

## OFF-CAMPUS OPPORTUNITIES

Study off campus is of two types: (1) credit may be earned at another institution and transferred to Cornell, or (2) credit may be earned in Cornell courses that require off-campus activity.

Students who plan to enroll in courses at another institution in the United States during the regular academic year must petition for a leave of absence; students *cannot* be enrolled at both another institution and Cornell during the regular academic year. Courses should be selected in consultation with the faculty advisor. Please also see transfer credit policies under non-Cornell credit policies. Information about enrolling at another institution outside of the United States can be found under "Study Abroad."

## Albany Programs

Study off campus in Albany, the New York State capital, provides a unique opportunity to combine career interests with academic and legislative concerns. Two formalized opportunities are available. The Assembly

Intern Program is offered in the spring semester and provides placement with a staff member of the New York State Assembly. The Senate Assistants Program also occurs during the spring semester and has placements with New York State senators and selected staff. Each program has an academic component as well. Check the individual folders in the internship files in the CALS Career Development Office, 177 Roberts Hall.

Applications are collected and processed by the CALS Career Development Office, 177 Roberts Hall, in the semester before assignments. Those accepted should plan a program of study in consultation with their faculty advisor. At least 12 credits must be carried to meet the full-time residency requirement. To receive academic credit for the Assembly Intern Program, students enroll in ALS 392. To receive academic credit for the Senate Assistants Program, students enroll in ALS 400. Information and applications are available in the CALS Career Development Office, 177 Roberts Hall.

## Cornell in Washington

The Cornell in Washington program offers students from all colleges in the university an opportunity to earn full academic credit for a semester in Washington, D.C. Students take courses from Cornell faculty members, conduct individual research projects, and work as externs. Students take part in a public policy or humanities seminar, serve as externs in federal agencies, congressional offices, or nongovernmental organizations, and carry out individual research projects under the supervision of Cornell faculty members. The required externships and all course enrollments are arranged through, and approved by, the Cornell in Washington program. Students in the College of Agriculture and Life Sciences must register for ALS 500 and cannot receive credit for the externship experience alone. For further information, see p. 21, inquire at M101 McGraw Hall, 255-4090, or visit [ciw.cornell.edu](http://ciw.cornell.edu).

## Marine Biological Laboratory's (MBL) Semester in Environmental Science

The Marine Biological Laboratory's (MBL) Semester in Environmental Science is a semester-long program held each fall in Woods Hole, Massachusetts. This is a multi-university and college program run by the staff of the Ecosystems Center of the MBL. Approximately 15-20 students interact intensively with the world-class research staff of the Ecosystems Center in a mixture of classroom, laboratory, and field-research activities. The major foci of the program are on biogeochemistry, ecosystem science, and the impacts of land use and global change on the environment. Students spend about 20 hours each week conducting intensive, hands-on field and lab work in coastal forests, freshwater ponds, and estuaries, and complete an independent research project as part of the curriculum. The MBL is one of the oldest (founded in 1888) and most distinguished biological field stations in North America. Cornell credit for up to 16 credits is offered. More information on the program can be obtained from the Cornell faculty liaison (Prof. Bob Howarth, E309 Corson Hall, 255-6175) or from the director of the program (Dr. Ken Foreman, MBL Ecosystems Center, 508-289-7777; <http://courses.mbl.edu/SES/>).

## SEA Semester

The Sea Education Association is a nonprofit educational institution offering ocean-focused academic programs and the opportunity to live, work, and study at sea. Science, the humanities, and practical seamanship are integrated in small, personal classes. The 17-credit program is 12 weeks in length. Six weeks are spent in Woods Hole, and the following six weeks are spent on either one of SEA's two sailing vessels: the *SSV Robert Seamounts* or the *SSV Corwith Cramer*. For more information, contact the Cornell Marine Programs office, G14 Stimson Hall (255-3717) or visit [www.sea.edu](http://www.sea.edu). CALS students should file an intent to study off campus form with the college registrar as early as possible to ensure proper registration and enrollment in courses.

## Shoals Marine Laboratory (SML)

The Shoals Marine Laboratory, run cooperatively by Cornell University and the University of New Hampshire, is a seasonal field station located on 95-acre Appledore Island off the coast of Portsmouth, N.H., in the Gulf of Maine. SML offers undergraduates and other interested adults a unique opportunity to study marine science in a setting noted for its biota, geology, and history. Please refer to "Courses in Marine Science," in the section on the Office of Undergraduate Biology, for a list of courses offered.

For more information, contact the Shoals Marine Laboratory office, G14 Stimson Hall, 255-3717, or visit [www.sml.cornell.edu](http://www.sml.cornell.edu).

## Internships

Several departments in the college offer supervised internships for academic credit. Internships may be granted for pay and/or credit with a limit of up to 3 credits per internship and no more than 6 credits total allowed for internships consisting of off-campus work experiences that do not have the continued presence of a Cornell faculty member. The number of credits awarded should reflect the amount of knowledge gained per internship and/or following the CALS guidelines for assigning credits. The 6-credit allotment includes transfer credit and credit from other internships in other colleges at Cornell. The 6-credit limit does not apply to secondary, post-secondary, and Cooperative Extension teaching internships in the Department of Education. The awarding of credit will not be allowed in cases where a student brings to the college or to a professor a description of a past experience and requests credit. Note that a maximum of 15 (prorated for transfer students) of the 120 credits required for the degree may be taken in internships, independent study courses, and undergraduate teaching or research. For internships not governed by an established internship course, the student must enroll in a 497-level course for the number of credits assigned.

To ensure a fair and manageable system to deal with internships, the College of Agriculture and Life Sciences has set forth guidelines to serve as minimum requirements for a student to receive internship credit.

1. Credit will be assigned or accepted only in cases in which a Cornell faculty member is directly involved in determining both the course content and in evaluating the student's work.



2. The internship should be purposeful, provide opportunities for reflection, present a continual challenge to the student, and incorporate active learning, with the student an active participant in all stages of the experience from planning to evaluation.
3. Before a student begins the internship, a learning contract needs to be written between the Cornell faculty internship advisor on campus, the supervisor at the location, and the student. This contract should state the conditions of the work assignments, supervisor, learning goals, number of credits, and methods of evaluation of the work. A contract form can be obtained from the college Registrar's Office, or departments may have their own.
4. Students should further develop the internship experience based on the college Experiential Learning Criteria, which can be found on the web at [cals.cornell.edu/cals/teaching/elr/](http://cals.cornell.edu/cals/teaching/elr/)
5. Students need to keep their faculty internship advisor updated on the progress of the internship while away from campus.

Arrangements should be made with the offering department for assignment of a faculty mentor for planning the program of work, and for evaluating student performance. Individual departments may add more requirements to the internship based on specific needs such as time constraints, faculty workloads, and the relationship of the internship to the goals of the department. The specific terms of the contract should be recorded, using the independent study, research, teaching, and internship form, available in the Registrar's Office in 140 Roberts Hall.

## Study Abroad

Each year about 200 CALS undergraduates spend an academic year or semester studying abroad. Whether attending a large university in Australia, a smaller campus in Sweden, or a technical school in Singapore, CALS students have a variety of international study options available to them. They can choose from:

- a CALS exchange program in Austria, Australia, Brazil, Denmark, Mexico, Netherlands, New Zealand, Singapore, Sweden, Switzerland, or the United Kingdom;
- a study abroad program through the Cornell Abroad office;
- an international study tour as part of a CALS course, or a summer program designed especially for CALS students.

CALS exchange programs are unique agreements created with other prestigious universities around the world. CALS students participating in an exchange program pay only their Cornell tuition, with no additional administrative fees. To learn more about the exchange programs, please visit: [www.cals.cornell.edu/cals/current/abroad-exchange/index.cfm](http://www.cals.cornell.edu/cals/current/abroad-exchange/index.cfm) or e-mail exchange coordinator Bonnie Shelley, [brs9@cornell.edu](mailto:brs9@cornell.edu).

Study abroad opportunities offered through the Cornell Abroad office are vast, ranging from a traditional university in London to field study in Africa. For information about specific programs, costs and more, visit their office in

300 Caldwell Hall or go to [www.cuabroad.cornell.edu/](http://www.cuabroad.cornell.edu/).

Whether on a CALS exchange or going through Cornell Abroad, all CALS students interested in studying abroad must receive approval from their faculty advisor and meet with the college study abroad advisor to review the college policies and to receive college approval. College policies can be viewed at: [www.cals.cornell.edu/cals/current/abroad-exchange/going-abroad/policies.cfm](http://www.cals.cornell.edu/cals/current/abroad-exchange/going-abroad/policies.cfm).

Study abroad advising hours are held in 140 Roberts Hall on Tuesdays and Thursdays, 9:00 A.M. to 12:00 P.M. and Wednesdays 1:00 to 3:00 P.M.

## Ithaca College and Wells College Exchange Programs

The Cornell University-Ithaca College Exchange Program is a reciprocal arrangement between Cornell University and Ithaca College that allows matriculated full-time students with prior approval and within stated stipulations, to cross-register at the other institution. No additional tuition is charged except in the case of undergraduate students enrolled during any one semester for a total of more than 18 credits (Cornell and Ithaca College combined). Those students are subject to additional tuition charges on a per-credit basis. This arrangement is available during the fall and spring semesters only, and is contingent upon space availability. A maximum of 12 credits may be taken through this program.

Cornell University also has a reciprocal arrangement with Wells College in Aurora, N.Y. For further information, contact the Cornell School of Continuing Education office, B20 Day Hall, 255-4987, or on the web at [www.sce.cornell.edu/exmu/](http://www.sce.cornell.edu/exmu/).

## GRADUATION REQUIREMENTS FOR THE BACHELOR OF SCIENCE

### Graduation Requirements

#### 1. Credit requirements

A. Minimum total credits: 120 academic credits are required for graduation.

#### Important Exceptions:

- Review or supplemental courses (e.g., 00-level courses) increase the number of credits required for graduation by the number of credits in the course. These credits *do* count toward the minimum 120 credits required for full-time status.
  - Repeated courses increase the number of credits required for graduation by the number of credits in the course. These credits *do* count toward the minimum 120 credits required for full-time status.
  - Physical education courses do not count toward 120 credits for graduation.
- B. Minimum credits at Cornell: 60 academic credits must be completed at Cornell.
  - C. Maximum non-Cornell credits: 60 non-Cornell credits (AP, CLEP, CASE, transfer, Cornell Abroad, and exchange credits) can be applied toward degree requirements.
  - D. Minimum credits from College of Agriculture and Life Sciences: 55 CALS credits are required for graduation.

CALS credits include all courses from departments within CALS, and courses offered in the Biological Sciences, Earth and Atmospheric Sciences, Information Science, and Nutritional Sciences Departments.

- E. Maximum credits from endowed colleges: 55 endowed credits can be completed without incurring excess tuition charges. Endowed credits include all courses from departments in the College of Arts and Sciences, Architecture, Art, and Planning, Engineering, the Hotel School, the Johnson School of Graduate Management, and the Law School. Courses completed during the summer and winter sessions do not count against the 55 endowed credit limit.
- F. Minimum letter-graded credits: 100 (prorated for transfer students).
- G. Maximum credits earned through independent study, research, teaching assistantships, and/or internships: 15 credits of "unstructured" course work can be applied toward graduation requirements (prorated for transfer students).

#### 2. Physical Education Requirement

- A. Pass two PE courses with a satisfactory grade.  
Exception: External transfer students are credited with one course of physical education for each semester previously enrolled full-time (12 or more credits) at another college.
- B. Pass a required swim test, administered during orientation. External transfer students who are exempt from PE are exempt from the swim test.
- C. Students are expected to complete the physical education requirement in their first two semesters at Cornell.

#### 3. Residency Requirements

- A. Eight semesters of full-time study are expected. Transfer students are credited with one semester in residence for each 15 credits earned at another institution.
- B. Internal transfer students must be enrolled in CALS for at least two semesters, not including residency in the Internal Transfer Division.
- C. The final semester before graduation must be completed at Cornell as a full-time student in good academic standing.
- D. Students in the ninth and final semester may apply for prorated tuition. The eligibility criteria are listed below. The student will be charged the full administrative fee and student service charge, plus one-fifteenth of the remaining full tuition per credit hour.

All of the following conditions must be met in order for a student to be considered for prorated tuition:

1. The prorated semester is the ninth and final semester of study.
2. The student is in good academic standing with the college and the major.
3. Maximum of 11 credit hours of coursework are allowed under prorated tuition. Students cannot exceed the number of credits approved or full tuition will be charged, and no refund will be

allowed if fewer credits than applied for are completed.

4. Approval of the student's faculty advisor, the college registrar, and the university registrar is required for all requests. Note that approval is conditional until grades are finalized at the end of the semester immediately preceding the prorated semester. Should those grades indicate that more than the requested number of prorated tuition credits are required for graduation, prorated tuition will be adjusted accordingly.
5. Students applying to be prorated in the fall semester are encouraged to submit the application by May 1. The final deadline is June 1. Students applying to be prorated in the spring semester are encouraged to submit the application by December. The final deadline is January.

Please be advised that prorated tuition may impact the student's financial aid, student loans, scholarships, non-Cornell health insurance programs, athletic eligibility, or other considerations. It is the responsibility of the student to resolve and rectify these situations prior to submitting this petition.

#### 4. Grade-Point Average (GPA) Requirements

Minimum cumulative GPA: 2.00 or above must be maintained. The cumulative GPA includes all grades earned at Cornell.

Exception: For students who matriculated prior to fall 2001, the minimum cumulative GPA is 1.70.

#### 5. Schedule Requirements

- A. Students are expected to enroll in at least one CALS course each semester until 55 CALS credits have been earned.
- B. Freshmen may not enroll in more than 18 credits, not including physical education.
- C. Freshmen are limited to one S/U course per semester.
- D. PE does not count toward the 12 credit minimum required for full-time status.

#### 6. Distribution Requirements

The purpose of the distribution requirement is to provide a broad educational background and to ensure a minimum level of competency in particular skills. Through study of the physical and life sciences, students develop their understanding and appreciation of the physical sciences, enhance their quantitative reasoning skills, and gain an appreciation of the variability of living organisms. The social sciences and humanities give students perspective on the structure and values of the society in which we live, and prepare them to make decisions on ethical issues that will affect their work and role in society. Written and oral expression is designed to help students become competent and confident in the use of oral and written communication to express themselves and their ideas.

Please note: Credits received for independent study, field, teaching, research, work experience, and internships cannot be used to fulfill the distribution requirement. Courses judged to be review or supplemental in the

discipline, such as MATH 109 and 00-level courses, will not be counted in the distribution areas.

**Physical and Life Sciences.** 18 credits in at least three disciplines of which 6 credits must be introductory biology and 3 credits in chemistry or physics.

Introductory Biology: BIO G 101-104, 105-106, 107-108, 109-110

CHEM

PHYS

#### Other Physical/Life Sciences

AN SC 100, 110, 112, 215, 221, 280, 300, 301

AEM 210

ASTRO

BEE 454, 458, 459

Biological Sciences (any course EXCEPT BIO G 200, 209, 299, 498, 499, & BIONB 431, BIOSM 204)

BTRY/Statistics

CHEM

CSS 190, 260, 311, 312, 314, 315, 317, 366, 415, 455, 483

EAS (EXCEPT 121, 150, 420)

EDUC 115

ENTOM 201, 210, 212, 215, 241, 260, 277, 315, 325, 344, 369, 370, 455, 463

FD SC 200

HORT 220, 243, 317, 400, 426, 440, 445, 449, 455, 460

IARD 414

ILRST 210, 212, 310

Mathematics—(See CALS requirements for graduation.)

NS 115, 122, 222, 262, 320 (300), 331, 332, 341, 347, 361, 431, 441, 452

NTRES 101, 210, 310, 313, 314, 322, 323, 326, 413, 420

PAM 210

PHYS

PL BR 201, 225, 401, 402, 403, 404

PL PA 201, 301, 309, 319, 401

SNES 101 (ALS 115)

**Social Sciences and Humanities.** Students must complete four courses of 3 or more credits each from the following six categories of courses in the humanities and social sciences.

- At least one course must be completed from three different categories.
- No more than two courses in the same department will be counted toward the distribution requirement.

Categories:

- Cultural Analysis (CA)
- Historical Analysis (HA)
- Knowledge, Cognition, and Moral Reasoning (KCM)
- Literature and the Arts (LA)
- Social and Behavioral Analysis (SBA)
- Foreign Language (FL)

Detailed descriptions follow.

Social Sciences and Humanities: Category Descriptions

#### Cultural Analysis (CA)

These courses study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion), expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community), power and politics (states, colonialism, inequality).

#### Historical Analysis (HA)

These courses interpret continuities and changes—political, social, economic, diplomatic, religious, intellectual, artistic, scientific—through time. The focus may be on groups of people, dominant or subordinate, a specific country or region, an event, a process, or a time period.

#### Knowledge, Cognition, and Moral Reasoning (KCM)

These courses investigate the bases of human knowledge in its broadest sense, ranging from cognitive faculties shared by humans and animals such as perception, to abstract reasoning, to the ability to form and justify moral judgments. Courses investigating the sources, structure, and limits of cognition may use the methodologies of science, cognitive psychology, linguistics, or philosophy. Courses focusing on moral reasoning explore ways of reflecting on ethical questions that concern the nature of justice, the good life, or human values in general.

#### Literature and the Arts (LA)

These courses explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge, and creative imagination.

#### Social and Behavioral Analysis (SBA)

These courses examine human life in its social context through the use of social scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g., in friendship, love, conflict) to larger social organizations (e.g., the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g., discrimination, inequality, prejudice, stigmas, conflict resolution).

#### Foreign Language (FL)

These courses are taught by the following departments: Africana Studies and Research Center (AS&RC – language only), Asian Studies (BENGL, BURM, CHIN, HINDI, INDO, JAPAN, KHMER, KOREA, SANSK, TAG,



THAI, and VIET), Classics (CLASS—language only), German Studies (GERST—language only, DUTCH, and SWED), Linguistics (LING—languages only), Near Eastern Studies (NES—languages only), Romance Studies (CATAL, FRROM, ITALA, PORT, QUECH, and SPANR), and Russian Studies (RUSSA, HUNGR, POLSH, SEBCR, and UKRAN).

#### Diversity (D)

Although not a requirement, the college recommends that students take at least one diversity course.

**Written and Oral Expression.** 9 credits total, of which at least 6 must be in written expression, selected from the following:

#### Oral Expression

COMM 201, 203

ENTOM 335

#### Written Expression

First-Year Writing Seminars

Sophomore Seminars

AEM 200

COMM 131 (117), 260, 263, 350, 352

ENGL 280, 281, 288, 289, 382-385, 388, 389

FD SC 230

LA 215

NS 105, 230

#### 7. Mathematics Requirement

Faculty legislation requires minimum competency in mathematics to complete a degree in the College of Agriculture and Life Sciences. As a measure of competency in mathematics, all entering undergraduates, including those with advanced placement or transfer credit in calculus, must take the college math proficiency exam (administered during orientation). The following students are exempt from the CALS Math Placement Exam: (a) internal transfer students who already have passed one mathematics course listed below under Group II, section 1, and (b) entering biological and environmental engineering (BEE) students who take the placement exam in the College of Engineering.

The CALS exam score determines the college math graduation requirement, and provides placement information. Cut-off scores divide students into three groups, each with specific graduation requirements.

#### Mathematics requirements and placement suggestions:

**Group I:** Students in this group are considered proficient in math for college graduation requirements. If further math is needed for the major, placement score *suggests* calculus skill level (e.g., MATH 111).

**Group II:** Placement score *suggests* pre-calculus skill level, and students in this group must satisfy one of the following:

1. Successfully complete an approved mathematics course at Cornell. EDUC 115 is recommended.

#### Approved Courses:

- Math: EDUC 115, any mathematics course (except MATH 100, 103 and 109).
- Statistics: MATH 171; AEM 210; BTRY 301/NTRES 313; ILRST 211, 310, 311, 312; ENGRD 270; PAM 210. (Also BTRY 100,

101, 102, 201 and 261, and ILRST 210 formerly offered)

2. Successfully complete or have completed an approved calculus course at another college or university with a final grade of B- or better.
3. Receive AP credit for calculus (4 or 5 on Math AB or BC) or statistics.

**Group III:** Students in Group III on the CALS math placement exam must successfully complete an approved non-statistics mathematics course at Cornell.

#### Approved Courses:

- EDUC 115, any mathematics course (except MATH 100, 103, 109 and 171).

Transfer and AP math credit (up to 6) will be recorded in Physical and Life Sciences of the college distribution requirements. Additional transfer credit in math will be recorded as general electives. BEE students typically receive fewer AP credits than other CALS students with the same scores. BEE students also may receive AP credits based on the Engineering math placement exam.

*Please note: changes to the Mathematics Requirement are pending approval of the Faculty Senate.*

#### Non-Cornell Credit Policies

1. Non-Cornell credit includes:

- advanced placement credit (see p. 7 for further details);
- credit earned at an accredited college or university;
- credit earned through the Ithaca College and Wells College Exchange Programs
- credit earned through a Cornell Abroad or CALS exchange program.

2. Non-Cornell credit is accepted by CALS when:

- the credits are earned at an accredited institution;
- the credits do not duplicate course work already completed at Cornell;
- the credits are earned before matriculating into CALS or during the summer or winter session or through Cornell Abroad or an approved exchange program;
- the credits have not been applied toward high school graduation requirements (except for AP exam credit, see p. 8);
- the grade earned is "C-" or better; and
- an official transcript is sent directly to the CALS Registrar's Office from the college/university where the credits were completed.

*Please note: Cornell University does not accept credit for courses sponsored by colleges but taught in high schools to high school students, even if the college provides a transcript for such work. Students who have taken such courses may, however, earn credit by taking an appropriate examination as described on pp. 8-10 of this catalog.*

3. A student may apply a maximum of 60 non-Cornell credits toward his or her graduation requirements.

- If more than 60 non-Cornell credits have been completed, the CALS Registrar's Office will work with the student to determine which credits best fulfill CALS graduation requirements.

- Cornell Abroad (not CALS exchange) credits are limited to 15 credits per semester, 30 per academic year.

4. Non-Cornell credits are recorded on the graduation summary and can be applied toward CALS credits, distribution requirements, and major requirements.

- Non-Cornell courses that are similar to courses offered in CALS are recorded as CALS credits on the graduation summary and count toward the minimum of 55 CALS credits required for graduation.

- Non-Cornell courses that are equivalent to Cornell courses which fulfill distribution requirements are recorded under the appropriate distribution area on the graduation summary.

- Non-Cornell courses that are equivalent to endowed courses can be applied toward distribution requirements or general electives; however, these credits do not count against the maximum of 55 endowed credit hours.

- If a course has no comparable course at Cornell, the Registrar staff will determine how the credit should be applied.

- Faculty advisors determine how non-Cornell credit will be applied toward major requirements; the CALS Registrar's Office determines how non-Cornell credit will be applied toward CALS graduation requirements.

5. Students who have already matriculated into CALS and are planning to take courses at another institution should complete a transfer credit pre-approval form before completing the course work. Pre-approval forms are available in the CALS Registrar's Office in 140 Roberts Hall. Please note that students *cannot* be enrolled in courses at both Cornell and another institution during the regular academic year, unless the student is participating in an approved exchange program.

#### Graduation Procedures

1. The progress of each student toward meeting the degree requirements is recorded each semester in the CALS Registrar's Office on a graduation summary form. Students can review their graduation summary online at <https://dust.cals.cornell.edu>.

2. Students who have been in residence for eight semesters and who have met the graduation requirements will be graduated. Students are expected to attend for the full eight semesters even if they have completed the graduation requirements in fewer semesters. A student who wishes to either graduate early or delay graduation must complete an additional application with the CALS Registrar's Office.

3. Application to graduate. In the first semester of their senior year, students must complete and file an application to graduate with the CALS Registrar's Office.

#### Deadlines to File the Application to Graduate:

January graduates: September 15

May graduates: October 15

Failure to meet these deadlines could result in a student's name being omitted from the commencement program and/or a diploma not being available for pick-up on commencement Sunday.

**Student Responsibilities:** It is the student's responsibility to complete the application to graduate, obtain signatures from faculty advisor(s), and then schedule an appointment to file the application with the CALS Registrar's Office.

**Faculty Advisor Responsibilities:** It is the faculty advisor's responsibility to inform seniors of any courses still needed to fulfill major and/or minor requirements and to list those courses on the application to graduate. Faculty advisors must sign the application to graduate before the student meets with the CALS Registrar's Office. If a student is completing more than one major and/or a minor, the signatures of all faculty advisors are required.

**CALS Registrar's Office Responsibilities:** It is the responsibility of the CALS Registrar's Office to inform seniors of any credits needed to fulfill the CALS graduation requirements and to list those credits on the application to graduate. The Registrar's Office will sign the application to graduate and provide both the student and faculty advisor with copies of the signed application. The student should retain a record of the application.

**Commencement Information:** Commencement information will be provided to all graduating seniors directly by the Commencement Office. Information is also available at [www.commencement.cornell.edu/](http://www.commencement.cornell.edu/)

## ACADEMIC POLICIES AND PROCEDURES

### Registration

All students must register with the university at the beginning of each semester. In order to be considered a registered student by the university, a student must:

- complete course enrollment according to individual college requirements;
- settle all financial accounts, including current semester tuition;
- clear any holds, whether these are from the Bursar's Office, Gannett Health Center, the judicial administrator, or the dean of your college;
- satisfy New York State health requirements.

Students can check their registration status using Just the Facts. The first screen in Just the Facts will indicate whether you are registered and will list any holds that need to be cleared, including the correct office to visit to have the holds removed.

### Course Enrollment

Students will receive course enrollment information from the university registrar. After planning a schedule of courses in consultation with their faculty advisor, students pre-enroll by computer.

To enroll in courses that involve independent study, teaching, or research, a student must file an independent study form, available in the CALS Registrar's Office, 140 Roberts Hall. Students who will be studying off campus should notify the Registrar's Office to ensure that proper registration will occur.

### Repeated Courses

Students may enroll again for a course in which they received a grade of F in a previous semester. Both grades will be recorded and calculated as part of their GPA. If a student retakes a course in which a passing grade was earned, both grades will be recorded and calculated as part of their GPA. However, repeating a course increases the number of credits required for graduation by the number of credits in the course.

### Incompletes

Students must *not* enroll again for a course in which they received an incomplete. Instead, work for that course should be completed without further enrollment. The instructor files a manual grade form with the college registrar when a grade has been assigned. An incomplete not made up by the end of two successive semesters of residence reverts to a failure. In the case of a graduating senior, incompletes revert to failures at the time of graduation.

### Enrollment Changes

A student is held responsible for and receives a grade for those courses in which he or she enrolls unless the student officially changes such enrollment. All changes in courses or credit, grading options, or sections must be made by the student using the online add/drop through "Just the Facts" or the official course drop and add form at the Registrar's Office, 140 Roberts Hall. Approval of the faculty advisor may be required to change course enrollment. Department or course instructor approval may be required for select courses.

Students may add courses and change grading options or credit hours where applicable during the first three weeks of the semester, and may drop courses until the end of the seventh week.

### Academic Integrity Policy

The College of Agriculture and Life Sciences faculty, students, and administration support and abide by the university Code of Academic Integrity. Its principle is that absolute integrity is expected of every student in all academic undertakings: students must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or be a party to another student's failure to maintain academic integrity.

The maintenance of an atmosphere of academic honor and the fulfillment of the provisions of the code are the responsibility of the students and the faculty. Therefore, all students and faculty members shall refrain from any action that would violate the basic principles of this code.

1. Students assume responsibility for the content and integrity of their submitted work, such as papers, examinations, or reports.
2. Students are guilty of violating the code if they
  - knowingly represent the work of others as their own.
  - use or obtain unauthorized assistance in any academic work.
  - give fraudulent assistance to another student.
  - fabricate data in support of laboratory or field work.
  - forge a signature to certify completion or approval.
  - submit the same work for two different courses without advance permission.
  - knowingly deprive other students of library resources, laboratory equipment, computer programs, or similar aids.
  - in any other manner violate the principle of absolute integrity.
3. Faculty members assume responsibility to make clear to students and teaching assistants specific regulations that apply to scholarly work in a discipline.
4. Faculty members fulfill their responsibility to
  - maintain in all class, laboratory, and examination activities an atmosphere conducive to academic integrity and honor.
  - make clear the conditions under which examinations are to be given.
  - make clear the consequences of violating any aspects of the code.
  - provide opportunities for students to discuss the content of courses with each other and help each other to master that content and distinguish those activities from course assignments that are meant to test what students can do independently.
  - state explicitly the procedures for use of materials taken from published sources and the methods appropriate to a discipline by which students must cite the source of such materials.
  - approve in advance, in consultation with other faculty members, which work submitted by a student and used by a faculty member to determine a grade in a course may be submitted by that student in a different course.
  - monitor the work and maintain such records as will support the crucial underpinning of all guidelines: the students' submitted work must be their own and no one else's.

Cornell's Code of Academic Integrity spells out how individuals who have allegedly violated Cornell standards for academic integrity are to be confronted and, if found to be in violation of those standards, sanctioned. The code provides informal resolution of most perceived violations through a primary hearing between the faculty member, the student involved, and an independent witness. If necessary, a hearing before a hearing board follows.

The Academic Integrity Hearing Board for the College of Agriculture and Life Sciences consists of three elected faculty members, three elected student members, a chair appointed by the dean, and the director of counseling and advising, who serves as a nonvoting record keeper. Professor Dale Grossman is the current chair.

Individuals who observe or are aware of an alleged violation of the code should report the incident to the faculty member in charge of a course or to the chair of the hearing board. General information and details on procedures for suspected violations or hearings are available from the Counseling and Advising Office, 140 Roberts Hall.

## Academic Honors

The college encourages high academic achievement and recognizes outstanding students in several ways:

1. **Dean's List.** Each semester, students are recognized for academic excellence by inclusion on the Dean's List. Eligibility for the Dean's List in the College of Agriculture and Life Sciences is determined by the following criteria:
  - a. a minimum course load for the semester of 12 letter-graded credits;
  - b. completion of at least one CALS course;
  - c. achievement of a semester GPA of at least 3.50; and
  - d. achievement of an S grade, or a C- or better grade in each course (including physical education), with no Incompletes. Dean's List will be granted retroactively if students meet all the requirements after successful course completion to make up INC grades.
2. **Bachelor of Science with Honors**
  - a. Students receiving a cumulative GPA of 4.00 or greater (based on the cumulative Cornell GPA) will graduate "summa cum laude."
  - b. Students receiving a cumulative GPA of greater than or equal to 3.75 and less than 4.00 (based on the cumulative Cornell GPA) will graduate "magna cum laude."
  - c. Students receiving a cumulative GPA of greater than or equal to 3.50 and less than 3.75 (based on the cumulative Cornell GPA) will graduate "cum laude."
3. **Bachelor of Science with Distinction in Research.** Students will graduate with a bachelor of science degree with distinction in research when, in addition to having completed all the graduation requirements, they have satisfactorily completed the research honors program in their area of interest and have been recommended for the degree by the honors committee of that area. Special requirements are given in the section on the Research Honors Program.
4. **Ho-Nun-De-Kah,** founded in 1929, is the undergraduate honor society of the College of Agriculture and Life Sciences. Members are recruited from the top 20 percent of the senior class and top 15 percent of the junior class. In keeping with the ideals of encouraging scholarship, leadership, and citizenship, members provide free tutoring and a

variety of service activities to both the college and the community.

5. **Golden Key** is an international honor society that recognizes and encourages scholastic achievement and excellence in all undergraduate fields of study. Juniors and seniors in the top 15 percent of their class are invited to membership. Visit Golden Key's web site at [www.rso.cornell.edu/gkihs/](http://www.rso.cornell.edu/gkihs/).

## Academic Standing

At the end of each semester, the Committee on Academic Achievement and Petitions reviews the records of those students who in any respect are failing to meet the academic requirements of the college or who persistently fail to attend classes. For students not making satisfactory progress, the committee takes appropriate action, including, but not limited to, issuing warnings, placing students on probation, granting students leaves of absence, advising students to withdraw, or suspending or expelling students.

Specifically, the committee considers as possible cause for action failure to attend and participate in courses on a regular basis or, at the end of any semester, failure to attain one or more of the following:

- semester GPA of at least 2.00\*
- cumulative GPA of at least 2.00\*
- satisfactory completion of 12 or more credits per semester
- reasonable progress toward completion of major and distribution requirements

In general terms, regular participation in course work with academic loads at a level sufficient to assure graduation within eight semesters and grades averaging C (2.00) or higher are prima facie evidence of satisfactory progress and good academic standing.

\*For those students matriculating 8/01 or later. Requirements are 1.70 for those who matriculated before 8/01.

## Petitions Procedures

The Committee on Academic Achievement and Petitions is a college committee of six faculty and two student members. On behalf of the faculty, the committee

- reviews, at the end of each semester and at other times as shall seem appropriate to the committee, the progress of students toward meeting graduation requirements.
- receives and acts on petitions from individual students asking for exceptions from particular academic regulations or requirements of the college, or for reconsideration of action previously taken by the committee.
- acts on readmission requests from persons whose previous enrollment was terminated by the committee.
- notifies the petitioner in writing of the action taken by the committee.

A petition for exemption from a college academic requirement or missed deadline may be filed by any student who has grounds for exemption. A petition is usually prepared with the assistance of a student's faculty advisor, whose signature is required. The advisor's recommendation is helpful to the committee.

The committee reviews the written petition and determines whether there is evidence of mitigating and unforeseen circumstances beyond the control of the student that would warrant an exemption or other action.

Students wishing to withdraw from a course after the end of the seventh week must petition. Requests for course changes are approved only when the members of the committee are convinced that unusual circumstances are clearly beyond the control of the student. The committee assumes that students should have been able to make decisions about course content, total workload, and scheduling prior to stated deadlines. A grade of W (for "withdrawal") is recorded on the transcript if a petition to drop a course is approved after the end of the seventh week of classes, and if an approved drop results in fewer than 12 credits.

Forms are available in the Counseling and Advising Office, 140 Roberts Hall. Counselors are available to assist with the process.

## Leave of Absence

A student taking a break from studies in a future semester or who finds it necessary to leave the university before the end of a semester should submit a written petition for a leave of absence. Such action serves as appropriate notification to university offices and corrects the student's transcript.

An approved leave is considered a voluntary interruption in study and holds the student's place in the college without requiring reapplication to the university. Voluntary leaves are issued in two ways: unrestricted for students in good academic standing (no restrictions placed on length of leave, or activities pursued, and simple notification by student of intent to return), and restricted (length of leave and activities pursued may be specified, and a petition to return must be approved by the Committee on Academic Achievement and Petitions).

Information and petition forms are available in the Counseling and Advising Office, 140 Roberts Hall.

## Withdrawal

A student who wishes to leave the university permanently should file a petition for withdrawal. Such petitions are approved if the student is in good academic standing. Students who have withdrawn and who later decide to return must apply to the CALS Admissions Office.

## MAJOR FIELDS OF STUDY

The college curriculum consists of 24 major program areas that reflect the departmental academic effort in the college. Faculty curriculum committees in each area identify a sequence of courses appropriate to all students studying in that field. Courses of study are designed to provide systematic development of basic skills and concepts as well as critical thinking. Opportunity for concentration in an area of particular interest is usually available.

Programs are planned with considerable flexibility, allowing students to prepare for careers, graduate work, professional opportunities, and the responsibilities of

educated citizens. Course requirements in each program area are different, but all students must meet the minimum distribution requirements of the college.

### Agricultural Science

Many students wish to pursue a general education in agriculture to prepare for careers that require knowledge of food systems and natural resources, such as production and marketing of foods (animals and plants) and ornamental plants, agricultural education in secondary schools, cooperative extension, food systems, and crop consultants. The agricultural science program is designed to allow students to work with their advisor in developing a curriculum that best fits the needs of each individual student. In this program, students can gain a broad exposure to the agricultural courses across the college. The program is very flexible and allows students to develop a general course of study and to select one or two areas of concentration.

All students are required to take the core courses. Concentrations requiring at least 12 credits are available in animal science, applied economics and management, education and communication, and plant sciences/agronomy.

Students will gain practical experience through special projects, extracurricular activities, and/or internships. Opportunities are available in research and outreach experiences, and in summer employment, which enrich the practical experience. Students will engage in group activities and will participate in discussions with faculty and other experts in various sectors of the agricultural industry.

### Animal Sciences

The animal sciences program area offers a coordinated group of courses dealing with the principles of animal breeding, nutrition, physiology, management, and growth biology. Emphasis in subject matter is directed toward domestic animal species, dairy and beef cattle, horses, poultry, pigs, and sheep, while laboratory, companion, and exotic animal species are also included in research and teaching programs. The Department of Animal Science has extensive facilities for animal production and well-equipped laboratories and classrooms, including a teaching barn, in which students can gain practical experience in the care and management of large animals.

The program focuses on the application of science to the efficient production of animals for food, fiber, and pleasure and easily accommodates a variety of interests and goals. Beyond a core of basic courses (suggested minimum, 15 credits) students select production and advanced courses to fulfill an individually tailored program worked out in consultation with their advisors. In this way it is possible to concentrate by species as well as by subject matter (nutrition, physiology, growth biology, breeding, management). For each subject area, supporting courses in other departments are readily available and strongly encouraged. Many science-oriented students elect a program emphasizing supportive preparation in the physical and biological sciences appropriate to graduate, veterinary, or professional study following graduation. Dairy management is a popular program among students who may be preparing to manage a dairy farm or enter a related career. Other students may elect a program oriented

toward economics and business in preparation for a career in the poultry, dairy, meat-animal, horse, feed, or meats industry. These are examples of the flexibility within these programs that can be developed to meet a student's career interest related to animals.

It is recommended that students obtain appropriate fieldwork or animal experience during summers. Several special training opportunities exist for highly motivated students. Juniors and seniors whose academic records warrant it may, by arrangement with individual faculty members, engage in research (either for credit or honors) or assist with teaching (for credit). The Dairy Management Fellows Program offers an equally challenging but different type of experience for a select group of students.

Students declaring a minor in animal science will arrange for a formal academic advisor in animal science at least three semesters before graduating. It is expected that the minor will be satisfied by completing at least 12 credit hours of animal science courses (at least 6 of which must be taken at Cornell), the makeup of which will be determined in consultation with the advisor. For example, it is recommended that students completing the minor will assemble courses (or demonstrate having the equivalent from elsewhere) including some basic and applied biology of animals (anatomy, physiology, nutrition, genetics) along with a selection of intermediate or advanced offerings from the animal science curriculum. Satisfactory completion of minor requirements will be verified by the minor advisor's signature on the petition to graduate.

For information, contact Deloris Bevins in 149 Morrison Hall, [dgb1@cornell.edu](mailto:dgb1@cornell.edu).

### Applied Economics and Management

The Department of Applied Economics and Management (AEM) offers undergraduate programs of study in three broad areas: business, agribusiness, and applied economics.

AEM is home to Cornell's undergraduate general business degree. Here students can immerse themselves in finance, marketing, management, and business strategy courses, as well as take specialized courses in entrepreneurship, food industry management, and agribusiness. This highly selective program is accredited by AACSB International, the accrediting body for general business degree programs.

AEM also includes undergraduate specializations that focus on the economics of agriculture and the environment. All AEM courses stress the application of analytical skills, critical thinking, and economic theory to real-world business and public policy issues.

The six areas of specialization offered in AEM are:

**Business**, one of the largest undergraduate majors at Cornell University, offers students a broad array of courses in the fields of finance, marketing, management, accounting, and entrepreneurship.

**Food industry management** is a specialized business program for students interested in management positions in the retailing, manufacturing, and distribution sectors of the food industry.

**Farm business management and finance** is for students interested in working for firms with ties to farming and agriculture, such as cooperatives, banks, horticultural businesses, and family farms.

**Agribusiness management** students study general business and take courses tailored to agricultural businesses.

**Applied economics** is a broad-based specialization that focuses on such important national and international issues as the economics of policy, markets, production, international trade, and international development.

**Environmental and resource economics** students study the economics of water and air quality, waste management, rural-urban land use, the sustainability of natural resources, energy use, and global climate change.

AEM graduates are actively recruited by elite businesses for positions in finance, marketing, investment banking, and management consulting, as well as by federal and international agencies. Many graduates go on for advanced professional and academic degrees, often after several years in a challenging career position in business or government.

### Minors

Through the Department of Applied Economics and Management, CALS students may complete a minor program of study in five different subject areas—agribusiness, business, environmental and resource economics, farm management, or food industry management. These minors consist of between 18 and 20 credits of required courses. Students should contact the Department of Applied Economics and Management for more detailed information and to enroll in one of these minor programs of study. These minors are not open to students outside of CALS.

### Atmospheric Science

Atmospheric science is the study of the atmosphere and the processes that shape weather and climate. The curriculum emphasizes the scientific study of the behavior of weather and climate, and applications to the important practical problems of weather forecasting and climate prediction. Students develop a fundamental understanding of atmospheric processes and acquire skill and experience in the analysis, interpretation, and forecasting of meteorological events. All students are required to complete a minimum of three semesters of calculus, two semesters of physics, and a semester each of chemistry, computer science, and statistics.

Atmospheric science courses are offered through the Department of Earth and Atmospheric Sciences (EAS). The requirements for the B.S. in atmospheric science through the College of Agriculture and Life Sciences are as follows:

1. Atmospheric science:
  - a. EAS 341, 342, 352, 447, 451
  - b. See tracks listed below for additional required courses
2. Mathematics, statistics, and computer science:
  - a. MATH 111, 112, 213, or equivalent

- b. AEM 210 or equivalent
- c. MATH 222, or MATH 223, or EAS 435
- d. EAS 121/150 or equivalent
- 3. Basic physical sciences:
  - a. PHYS 207, 208, or equivalent
  - b. CHEM 206
- 4. Tracks

Operational required	Education required	Broadcasting required
EAS 250	EAS 131/133	EAS 131/133
EAS 296	EAS 250	EAS 250
EAS 456		EAS 296
EAS 470		EAS 470
		COMM 201
suggested	suggested	suggested
EAS 131/133	Courses in	EAS 268
EAS 268	(ASTRO, EAS)	minor in communication
EAS 331	minor in education	
EAS 435		
Business required	Environmental required	
EAS 131/133	CHEM 207-208	
EAS 268	EAS 334	
	EAS 457	
suggested	suggested	
minor in business	EAS 131/133	
	EAS 250	
	EAS 268	
	EAS 302	
	EAS 331	
	EAS 435	
	EAS 483	

It is recommended that students who are interested in graduate study in atmospheric science should take additional courses in mathematics and physics.

A student may minor in atmospheric science by completing any four of the following EAS courses\*: 131, 250, 268, 331, 334, 341, 342, 352, 435, 447, 451, 456, 457, 470, 651, 652 or 666.

\*(two of the courses must be taken at Cornell.)

Courses satisfying the requirements for a major or minor in atmospheric science may not be taken S-U.

## Biological Sciences

Biology is a popular subject at many universities for a variety of reasons: it is a science that is in an exciting phase of development; it prepares students for careers in challenging and appealing fields such as human and veterinary medicine, environmental sciences, and biotechnology; and it deals with the inherently interesting questions that arise when we try to understand ourselves and the living world around us. Many of the decisions we face today deal with the opportunities and problems that biology has put before us.

The major in biological sciences is available to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. The Office of Undergraduate Biology in 216 Stimson Hall provides student services that are available to students from either college.

The biology major is designed to enable students to acquire the foundations in physical and life sciences necessary to understand modern biology and to pursue advanced studies in a specific area of biology. Programs of study include either general biology or one of the following concentrations: animal physiology, biochemistry, computational biology, ecology and evolutionary biology, genetics and development, insect biology, molecular and cell biology, microbiology, neurobiology and behavior, nutrition, plant biology, and systematics and biotic diversity. Students interested in the marine sciences should consult the Shoals Marine Laboratory office, G14 Stimson Hall, 255-3717, for academic advising. For more details about the biology curriculum see the section in this catalog on biological sciences or visit [www.bio.cornell.edu](http://www.bio.cornell.edu). For details regarding the minor in biological sciences, please refer to the Biological Sciences section of this catalog.

## Biological and Environmental Engineering

The Department of Biological and Environmental Engineering (BEE) offers majors in biological engineering and environmental engineering. BEE faculty and students address three great challenges facing humanity today: ensuring an adequate and safe food supply in an era of expanding world population; protecting and remediating the world's natural resources, including water, soil, air, biodiversity, and energy; and developing engineering systems that monitor, replace, or intervene in the mechanisms of living organisms. The undergraduate engineering majors in the Department of Biological and Environmental Engineering have a unique focus on biological systems and the environment that is realized through a combination of fundamental engineering sciences, biology, engineering applications and design courses, and liberal studies. The program leads to a bachelor of science degree in biological or environmental engineering, which is awarded jointly by the Colleges of Engineering and Agriculture and Life Sciences, and is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology, Inc. (ABET). All students in the jointly administered engineering majors enroll in the College of Engineering and pay endowed tuition their last two semesters.

BEE students take courses in mathematics, statistics, computing, physics, chemistry, basic and advanced biology, fundamental engineering sciences (solid mechanics, thermodynamics, fluid mechanics, and transport processes), engineering applications, and engineering design. They may select upper-level engineering courses in subjects that include bioprocessing, soil and water management, biotechnology applications, bioinstrumentation, engineering aspects of animal physiology, environmental systems analysis, and waste treatment and disposal. Students further strengthen their programs by completing minors or a second engineering

major. Students planning for medical school take additional lab-based courses in biology, biochemistry, and organic chemistry. Throughout the curriculum, emphasis is placed on communication and teamwork skills, and all engineering students complete a capstone design project. Students in the engineering program may pursue minors and options in specialized areas as noted in the engineering section of this publication. **Specific course requirements and other information for the biological engineering major and the environmental engineering major are described in the College of Engineering section of this publication.** Further information is also available at the undergraduate program office in BEE Student Services, 207 Riley-Robb Hall, or at [www.bee.cornell.edu/](http://www.bee.cornell.edu/).

The department also offers two technology programs: biological engineering technology and environmental engineering technology. The technology programs emphasize applied and technical aspects of biological, environmental, physical, and life sciences. These programs incorporate courses in basic biological and physical sciences and mathematics as well as engineering and technology, agriculture, business, social sciences, and liberal studies.

Many engineering and technology undergraduate students participate in honors programs, undergraduate teaching and research, internships, independent study, design teams, and study abroad. Students in the engineering program are also eligible to participate in the Engineering Cooperative Education Program. Students pursuing majors offered in the BEE department should have a strong aptitude for the physical and life sciences and mathematics and an interest in the complex social issues that surround technology.

Career opportunities for engineers and technologists cover the spectrum of self-employment, private industry, public agencies, educational institutions, and graduate programs in engineering and science, as well as the professional fields like medicine, business, and law. In recent years graduates have pursued careers in environmental consulting, biotechnology, pharmaceutical industries, biomedical engineering, management, sustainable technologies, consulting, and international development.

The living world is all around us and within us. The biological revolution continues and it has given rise to a growing demand for engineers and technical people who have studied biology and the environment, who have strong math and science skills, who can communicate effectively, who are sensitive to the needs of people, and who are interested in the challenges facing society. The Department of Biological and Environmental Engineering is educating the next generation of engineers to meet these challenges.

**Specific course requirements for the accredited engineering programs are found in the College of Engineering section of this book.**

Specific course distribution requirements for the academic programs in biological engineering technology and environmental engineering technology include the following:



- |                                     |                |
|-------------------------------------|----------------|
| 1. <i>Basic Subjects</i>            | <i>Credits</i> |
| a. Calculus                         | 8              |
| b. Chemistry                        | 7              |
| c. Physics                          | 8              |
| d. Introductory biological sciences | 6-8            |
| e. Computer programming             | 4              |
| f. Statistics or probability        | 3              |

Liberal Studies Distribution: Must meet CALS liberal studies requirements. Distribution courses are in the following categories.

1. Cultural Analysis (CA)
2. Historical Analysis (HA)
3. Literature and the Arts (LA)
4. Knowledge, Cognition, and Moral Reasoning (KCM)
5. Social Behavior and Analysis (SBA)
6. Foreign Language (Not Literature Courses) (FL)

- |                                                                                                                                               |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----|
| 2. <i>Advanced and Applied Subjects</i>                                                                                                       |    |
| a. Five courses in the biological, environmental, or life sciences                                                                            | 15 |
| b. Five engineering or technology courses at the 300 level or above; including at least 9 credits in biological and environmental engineering | 15 |

- |                                                                                      |     |
|--------------------------------------------------------------------------------------|-----|
| 3. <i>Electives</i>                                                                  |     |
| Additional courses to complete College of Agriculture and Life Sciences requirements |     |
| 4. <i>Total (minimum)</i>                                                            | 120 |

For further details on the biological and environmental engineering and technology majors, see the *BEE Undergraduate Program Handbook*, available at 207 Riley-Robb Hall or at [www.bee.cornell.edu](http://www.bee.cornell.edu). Contact Professor Jim Bartsch at 255-2800, [jah35@cornell.edu](mailto:jah35@cornell.edu), or go to [www.bee.cornell.edu](http://www.bee.cornell.edu) for more information.

## Biology & Society

The Biology & Society program area is designed for students who wish to combine the study of biology with perspectives from the social sciences and humanities. Many of the most critical social issues of our time, from the implications of genetic engineering to the impact of global climate change, have biological processes at their core. At the same time these issues are inherently social, involving complex relationships among people, institutions, laws, and beliefs. The Biology & Society field of study provides the skills and perspectives necessary to confront problems with biological, social, and ethical dimensions. In consultation with a faculty member, students are expected to select their courses in the field to meet their own goals and interests. For a description of the Biology & Society requirements and courses, see "Biology & Society" under the College of Arts and Sciences in this publication or visit [www.sts.cornell.edu](http://www.sts.cornell.edu).

Students who elect Biology & Society as their major field of study graduate from Cornell with well-developed writing and analytical skills and a knowledge base that can lead to employment in a variety of fields. Many graduates have accepted positions as health counselors, writers, or policy

analysts and researchers for government organizations, medical institutions, consumer or environmental groups, or scientific research institutes. Students have found that Biology & Society is also excellent preparation for professional training in medicine, law, and health services administration and for graduate programs in such fields as genetic counseling, nutrition, clinical psychology, public health, environmental studies, anthropology, sociology, and other related fields.

### Admissions

Students in CALS may be admitted provisionally into this field of study when they apply to the college. Full admission depends on completing introductory biology and completing an application. Students transferring into this field of study will need to complete introductory biology and to submit an application during their sophomore year.

The application includes

1. a one- to two-page statement explaining the student's intellectual interests in Biology & Society and why it is consistent with his or her academic goals and interests.
2. a selected theme.
3. a tentative plan of courses fulfilling Biology & Society requirements, including courses taken and those planned.
4. a transcript of work taken at Cornell University and/or elsewhere, current as of the date of application.

The faculty admissions committee reviews applications twice a year, once each during the fall and spring semesters. A faculty advisor is assigned on admittance to the field. Approximately 60 faculty members from four colleges serve as advisors to Biology & Society students. The major program is coordinated for students in all colleges through the Biology & Society Office, 306 Rockefeller Hall, where students can get information, specific course requirements, and application forms. Faculty advisors are available to discuss the Biology & Society requirements.

**Requirements for the program** are listed below. A full description and listings of courses that satisfy the requirements can be obtained in 306 Rockefeller Hall or at [www.sts.cornell.edu](http://www.sts.cornell.edu). See also "Biology & Society" in the College of Arts and Sciences section of this publication.

### Biology & Society requirements:

1. Introductory biology (101-104, 105-106, or 107-108, or a 5 in AP biology)
2. College calculus (one course)
3. Ethics (one course)
4. Two social sciences/humanities foundation courses
5. Three biology foundation courses
6. One biology depth course
7. Statistics (one course)
8. Core course
9. Five theme courses (a coherent group of five courses relevant to the student's special interest in Biology & Society, including a senior seminar that serves as a capstone course for the program).

Students should develop their theme and select their courses in consultation with a

member of the Biology & Society faculty. A list of the faculty is available in 306 Rockefeller Hall. Further information may be obtained at [www.sts.cornell.edu](http://www.sts.cornell.edu).

## Biometry and Statistics

Quantitative prediction and interpretation are increasingly essential components of biological and social sciences. Complex patterns, structures, and interactions raise fundamental and fascinating questions that can be addressed only using formal mathematical, statistical, and computational methods. The wealth of data that can be acquired using modern methodologies to address these questions, in turn, requires substantive quantitative approaches to make possible appropriate analysis and interpretation. Computational power, meanwhile, has increased exponentially providing the means for sophisticated analysis of complex phenomena.

The biometry and statistics major, in the Department of Biological Statistics and Computational Biology, focuses on the application of mathematical and statistical techniques to the sciences. Biometry applies mathematics and statistics to problems with a biological component, as seen in agricultural, environmental, biological, and medical science. Statistics is concerned with quantitative aspects of scientific investigation: design, measurement, summarization of data, and reaching conclusions based on probability statements. Students with ability in mathematics and an interest in its applications will find this a rewarding and challenging major.

The work of an applied statistician or computational biologist can encompass research, teaching, consulting, and computing in almost any combination and in a wide variety of fields of application. Opportunities for employment are abundant in academics, government, and businesses ranging from large corporations to small consulting firms; salaries are usually excellent. Experience gained through summer employment or work as an undergraduate teaching assistant is highly recommended. For further details on the biometry and statistics major/minor, please contact the director of undergraduate studies, Professor Steven J. Schwager (424WN) at [sjs5@cornell.edu](mailto:sjs5@cornell.edu) or go to [www.bsbc.cornell.edu](http://www.bsbc.cornell.edu).

**Requirements for the Major** (beyond the college requirements)

Ten (10) core courses:

BTRY 301 Biological Statistics I or  
BTRY 601 Statistical Methods I  
BTRY 302 Biological Statistics I or  
BTRY 602 Statistical Methods II  
BTRY 408 Theory of Probability  
BTRY 409 Theory of Statistics  
BTRY 495 Statistical Consulting  
MATH 111 and 112 Calculus I and II or  
MATH 121 and 122 Honors Calculus I and II or  
MATH 191 and 192 Calculus I and II for Engineers  
MATH 221 and 222 Linear Algebra and Differential Equations or



MATH 223 and 224 Theoretical Linear Algebra and Calculus or

MATH 293 and 294 Engineering Mathematics or

MATH 213 and 231 Calculus III and Linear Algebra with Applications

COM S 100M Introduction to Computer Programming or

BEE 151 Introduction to Computing

**Statistics concentration:** Students must complete three (3) advanced courses in statistics, computer science, operations research, biology, and/or mathematics courses; below is a sample of such courses (for complete list, go to [www.bscb.cornell.edu/ugrads04/](http://www.bscb.cornell.edu/ugrads04/)):

BTRY 310 Statistical Sampling

BTRY 382 Introduction to Genomics and Bioinformatics

BTRY 604 Applied Experiment Design

ILRST 410 Multivariate Analysis

NTRES 670 Spatial Statistics

COM S 211 Computers and Programming

COM S 426 Computational Biology

OR&IE 361 and 462 Stochastic Processes

OR&IE 473 Empirical Finance

BIOPL 440 Phylogenetic Systematics

AN SC 420 Quantitative Animal Genetics

MATH 311 or 413–414 Introduction to Analysis

MATH 420 Differential Equations and Dynamical Systems

**Statistical genomics concentration:** Students must complete BTRY 382 Introduction to Genomics and Bioinformatics and BIOGD 281 Genetics; in addition, they must complete two (2) courses from the advanced courses previously listed (for complete list go to [www.bscb.cornell.edu/ugrads04/](http://www.bscb.cornell.edu/ugrads04/)). BTRY 482/682 Statistical Genomics, BTRY 483 Quantitative Genomics and Genetics, and BTRY 484 Computational Genomics are highly recommended.

**Supplementary concentration:** Each biometry and statistics major is strongly encouraged to supplement the required courses with a concentration in an area of interest to the student, consisting of a cohesive set of courses chosen by the student. It is the student's responsibility to develop this concentration, with advice from the faculty, particularly the student's faculty advisor. It will be helpful to discuss the selection of courses with the director of undergraduate studies or undergraduate advising coordinator of a department closely linked with the chosen concentration.

### The Minor

A minor in biometry and statistics is available to all undergraduate students in CALS. To complete the program, students must submit a minor program of study form, available in 434 Warren Hall. Each student will retain a copy of the form and will be responsible for planning the minor program of study in conjunction with the advisor in the student's major and a BSCB faculty advisor. Students and advisors in other departments should contact the director of undergraduate studies in the Department of Biological Statistics and

Computational Biology if they have questions about biometry and statistics courses or the minor. The director of undergraduate studies or another BSCB faculty member will supervise and assist each minor in course selection.

### Requirements for the minor

BTRY 301 Biological Statistics I or BTRY 601 Statistical Methods I

BTRY 302 Biological Statistics II or BTRY 602 Statistical Methods II

BTRY 408 Theory and Probability

BTRY 409 Theory of Statistics

MATH 111 Calculus I

MATH 112 Calculus II

MATH 213 Calculus III or MATH 221–222 Linear Algebra and Differential Equations

### One (1) additional statistics elective:

BTRY 310 Statistical Sampling

BTRY 382 Introduction to Genomics and Bioinformatics

BTRY 482 Statistical Genomics

BTRY 483 Quantitative Genomics and Genetics

BTRY 484 Computational Genomics

BTRY 495 Statistical Consulting

BTRY 603 Statistical Methods III

BTRY 604 Applied Experiment Design

BTRY 652 Computational Statistical Inference

BTRY 672 Environmental Statistics

ILRST 410 Multivariate Analysis

ILRST 411 Categorical Data Analysis

ILRST 614 Structural Equations

NTRES 670 Spatial Statistics

A minimum of 31 credits is needed to complete the minor. Only courses for which the student receives a grade of C or better will count toward the minor in biometry and statistics.

### Communication

Communication majors at Cornell study communication in three main areas: science, media, and technology. Students gain a strong core in the theory of communication processes, including attitude, knowledge, and behavior change, public opinion, and information systems. They develop applied oral and written communication skills; they learn how communication systems work in society and in their personal and professional lives; they apply their understanding of communication to solving problems, sustaining the environment, reaching the public with new knowledge, and managing intricate networks of technologies.

Communication majors learn how

- communication influences attitudes, opinions, and behaviors.
- mass media work in our society.
- to use, evaluate, and design communication technologies.
- to apply their understanding of communication to solving problems in science, the environment, government, industry, health, and education.

The communication major is a program with a strong core of contemporary communication knowledge, theory, and practice.

### Required freshman courses

#### Fall semester

COMM 101 Cases in Communication

#### Spring semester

COMM 130 Visual Communication

COMM 131 Writing about Communication

This set of courses provides students with a basic understanding of communication and the communication process.

### Required sophomore courses

COMM 201 Oral Communication

COMM 282 Research Methods in Communication Studies

Two of the Four Focus Area Introductory Courses:

COMM 220 Contemporary Mass Communication

COMM 245 Psychology of Social Computing

COMM 276 Cases in Communication and Social Influence

COMM 285 Communication in the Life Sciences

After completing the courses in the core curriculum, all majors take an additional 18 credits in communication distributed among advanced writing and presentation courses, electives, and focus area requirements. In consultation with their advisers, students concentrate in one of four defined focus areas appropriate to specific educational and career goals.

1. *Communication in the life sciences (CILS):* Students focusing in CILS will investigate how communication influences public understanding of science, environmental, and risk-related issues. While exploring conceptual and theoretical issues, students will learn specific skills for communicating science, environmental, and risk information to a variety of audiences. Possible career paths include public information officer, science writer, environmental educator/outreach specialist, environmental or health-risk communicator, and business, legal and other graduate study.
2. *Communication media studies (CMS):* Students focusing in CMS will investigate the forces that shape media in contemporary society, investigating how what we see and hear comes to be. They will also analyze and understand the psychological, social, and cultural processes that are in turn affected by media, from politics to entertainment to news to the very question of what we understand as real about ourselves and true about the world around us. Students may pursue careers in the media industries, in designing the laws and policies regarding media, in business, legal or other graduate study, or in the service of making media better; most of all, they will be more informed and astute citizens in a highly mediated world.

3. *Communication and information technologies (CIT)*: Students focusing in CIT will explore the social and psychological dimensions of the design, use, and evaluation of communication and information technologies, how people form and manage impressions and relate to each other in cyberspace, the uses of language in online interaction, and how people coordinate work in virtual teams, as well as people's interface and information needs. Possible career paths include information systems designer, research analyst, user interface designers, software designers, usability specialist, technology writer, and business, legal and other graduate study.
4. *Communication and social influence (CSI)*: Students focusing in CSI will use communication principles to analyze issues and situations involving groups, organizations and selected audiences to design, implement, and evaluate appropriate communication programs. Courses stress the positive, ethical, and effective uses of communication in human affairs. This focus area would be appropriate for students interested in using communication to bring about change at the individual and societal level. Possible career paths include public relations, marketing communications, polling, human resources, governmental affairs, and business, legal, and other graduate study.

Detailed information on the distribution of courses is available from the department.

In designing the communication major, the faculty of the department has considered students' need to understand contemporary research-based knowledge about communication as well as their need to be competent communicators in the workplace and in society at large.

Through the Department of Communication, CALS students may **complete a minor program of study in communication or a minor program of study in information science or both.**

The **minor in communication** consists of four required courses: COMM 101, 130, 201 and either 220, 245, 276, or 285; Students also complete three elective courses totaling 9 credit hours, at least two of which must be at the 300-400 level, excluding the advanced writing and presentation courses and COMM 303, 353, 405, 496, and 498.

The minor in information science is a cross-disciplinary program requiring one prerequisite statistics course, two courses from the information systems component area (primarily computer science), two courses from the human-centered systems component area (human-computer interaction and cognitive science), one course from the social systems component area (social, economic, political, and legal issues), and one additional course from any component area. A list of specific courses is available through the Department of Communication.

Students should contact the Department of Communication to enroll in either of these programs of study.

### Crop and Soil Sciences

The Department of Crop and Soil Sciences provides instruction in the subject matter areas

of crop science, soil science, environmental information science, and agronomy. Agronomy integrates the first three subjects. A specialization in crop science is a part of the plant science major. A focus on soil science is possible in two majors, the science of natural and environmental systems (SNES) or the science of earth systems (SES). The SNES major is a biophysical science-based major that addresses the interface of environmental science and human systems involved in environmental management. Within the SNES major, students can concentrate in agroecosystem science, environmental biology, environmental information science, and sustainable development. The SES major places emphasis on the basic disciplines of chemistry, physics, and mathematics. The agronomy area combines crop production and soil management. Students interested in agronomy can major in crop and soil sciences. This major requires 30 credits with 6-12 credits in each of the categories of applied crop science, plant protection, and soil science.

A **minor in crop management** is also available for students with any major at Cornell University. In summary, it requires at least two courses and at least 7 credits in each of crop science (CSS 311, 312, 317, or 414) and plant protection (CSS 315, 444, ENTOM 241, or PL PA 301 or 401) plus at least three courses and at least 12 credits in soil science (CSS 260, 372, 412, 421 or 466). Equivalent transferred courses can be substituted. This minor helps prepare students for the Certified Crop Advisor examination, which provides an important credential for jobs in agriculture and environmental management.

A **minor in soil science** requires 15 credits in soil science, but an additional 12 credits in biological, physical, and earth sciences are recommended to qualify the student for the Civil Service classification as Soil Scientist (GS-0470). In addition to 15 credits in soil science, Civil Service classification as Soil Conservationist (GS-0457) requires 12 credits in natural resources and agriculture and 3 credits in applied plant science. The soil science minor is also available to students with any major at Cornell University and transfer credit can be used to meet requirements. Students wishing to pursue either the crop management or soil science minor should contact the Department of Crop and Soil Sciences (255-5459).

### Development Sociology

Technological, economic, demographic, and environmental changes are social processes. Each has major impacts on individuals, social groups, societies, and the international order. At Cornell, development sociology students study these and other facets of social change in both domestic and international settings. The development sociology major provides an opportunity for in-depth study of the interactions among development processes, environmental and technological contexts, demographic structures and processes, and the institutionalized and grassroots social movements through which people seek change in these dimensions. Courses offered by the department cover topics such as: the impact of changes in agricultural systems on rural development; community and regional development; environmental sociology; rural industrialization and labor markets; technology and social change; the implications

of the genomic revolution for agriculture and communities; the linkages between population dynamics, the environment, and development; the political economy of globalization; women in development; and ethnic competition and stratification. Most courses provide background in both domestic and international aspects of the subject matter. Students can develop a specialization with a domestic, international, or global emphasis by choosing appropriate elective courses. All students learn the theory and methodology of sociology and how to apply both to research and policy in their subject areas.

Majors in development sociology are required to successfully complete seven core courses: introductory sociology (D SOC 101), international development (D SOC 205), population dynamics (D SOC 201), methods (D SOC 213 or 214), theory (D SOC 301), social stratification (D SOC 370), and a course in statistics. Four additional development sociology courses are also required of all majors, at least two of which must be at the 300 level or higher. The elective courses allow students to focus their major on particular themes such as the sociology of development: the social processes linking the environment, population, and development; and more general areas such as ethnic and class stratification, social movements, social policy, and gender and development. In each of these focus areas, students can choose to concentrate on domestic or international situations. Students are encouraged to complement courses in the department with course work in the history and economics of development, area studies, and the policy sciences.

Recognizing that students are concerned with future career opportunities, the development sociology major emphasizes acquisition of skills as well as general knowledge in preparation for jobs or post-graduate study. Accordingly, students are expected to become involved in the application of theory, methodology, and principles and concepts in the analysis of practical problems. Development sociology offers degree programs at both the undergraduate and graduate levels (B.S., M.S., and Ph.D.). The department and graduate field are recognized as top programs in the area. The department is particularly well known for providing instruction in international as well as domestic aspects of community and rural development, environmental sociology, sociology of agriculture, population studies, and the interactions among these dimensions. Development sociology faculty are committed to both quality instruction and cutting-edge research programs.

An undergraduate student minor is required to successfully complete three core courses from Group 1: introductory sociology (D SOC 101), international development (D SOC 205), social indicators (D SOC 213), or social stratification (D SOC 370). A student minor is also required to complete at least one course from Group 2: theory (D SOC 301), statistical evidence (D SOC 302), inequality and development (D SOC 305), social movements (D SOC 311), environment and society (D SOC 324), social stratification (D SOC 370, cannot be used for Group 2 if selected for Group 1), or honors research (D SOC 380). One additional elective (any D SOC course) must be completed if only one course from Group 2 is selected.

Courses taken with an "S-U" option will not apply.

The department maintains strong ties with technical fields in CALS as well as with programs dealing with a range of issues of importance to international and domestic development. These include: the International Agriculture Program, the Biology and Society Program, the Cornell Institute for Social and Economic Research, the Center for the Environment, the Polson Institute for Global Development, the Community and Rural Development Institute, the Gender and Global Change Program, the Bronfenbrenner Life Course Institute, and the Center for International Studies. Nearly half of the department faculty is associated with one or more area studies programs including the Southeast Asia Program, South Asia Program, Latin American Studies Program, East Asia Program, and the Institute for African Development. Department members also maintain working relations with faculty members in the Department of Sociology and social science units located in other colleges at Cornell. Students are encouraged to supplement their development sociology course work by electing courses in these other departments.

### Agricultural Science Education

Building on strong academic disciplines and grounding in sociopolitical, psychological, empirical, and theoretical bases of educational practice, the department has two foci to meet societal demands for teachers of mathematics, science, and agriculture, and for leaders in nonformal educational settings: Learning, Teaching, and Social Policy (LTSP), which includes the Cornell Teacher Education Program (CTE); and Adult and Extension Education (AEE). These two programs of study, largely at the graduate level, prepare leaders who will both engage in professional practice and improve educational processes through research, practice, and scholarship. Our undergraduate program leads to provisional certification in agricultural education. For the latest information on program developments, go to <http://education.cornell.edu>.

### Adult and Extension Education (AEE)

Creating a livable world requires more than just new knowledge and technology; it also requires sustained and expert practice in learning and education. The AEE program provides opportunities for graduate students to investigate participatory educational and organizing practices that link learning to the challenge of facilitating global sustainability. As public universities focus their research, teaching, and extension on domestic and global environmental, political, and social problems, the AEE program focuses on creating opportunities for critical reflection on adult, extension, and international education by connecting action and research. We seek to move beyond procedural questions of "how to do it" to critical institutional questions of who does and who should benefit from our adult, extension, and international educational work. The aim is to engage practitioners and graduate students in critical reflection on practice to create practical theory from and for action.

Participation in the AEE program helps scholars and practitioners prepare for adult and extension educational leadership and

professional roles in domestic and international community-based, nongovernmental, and governmental organizational settings. Areas of expertise and inquiry include: participatory practices in research, community development, and adult education; public scholarship, university extension/outreach, and community organizing in the United States; international adult and extension education; learning in adulthood; educational planning and program development; continuing professional education; staff development; and health issues related to the education of adults.

### Learning, Teaching, and Social Policy

(LTSP). This program is designed to foster the development of educational leaders, researchers, and practitioners who approach issues and challenges in education from multiple perspectives, and seek to construct an integrated knowledge base upon which the practice of teaching, learning, and social policy is based. The impacts of implementation and practice are explored for creating new theories, approaches, and policies to improve teaching, learning, and community life.

Drawing on the dynamic nature of teaching and learning, this program challenges students to create and apply research-based, critically reflective analysis of cognitive, intellectual, personal, social, moral, and institutional dimensions of learning, teaching, and educational policy in a variety of contexts and at multiple governance levels. Students engage in critically reflective practice to address pressing problems and issues in formal and nonformal educational contexts across a variety of national and cultural settings.

The program is philosophically grounded in the perspective that learning and teaching is a lifelong process vital to individual development, the development of democratic communities, and the implementation of democratic values in educational policy and practice. Context, gender, social, and economic diversity underlie the design and implementation of curriculum, teaching and learning theory, and social interactions, and are lenses for examining educational practice, theory, and policy.

Faculty members and graduate students in research programs in Learning, Teaching, and Social Policy (LTSP) engage in research that investigates factors that contribute to scientific and quantitative literacy; curriculum design and evaluation in science, mathematics, and agricultural science; effectiveness of teacher professional development; educational policy in rural schools; and sociomoral development, action, and reflective thought in schools and communities. Our mission is to contribute to an educated, global society of leaders and citizens who are prepared to respond to emerging social, technological, and scientific issues, with ethical and critically reflective judgment.

### The Cornell Teacher Education (CTE)

program is a unique interdisciplinary cohort-based program that certifies teachers for secondary teaching in agriculture, science, and mathematics. Students in the CTE program develop a solid mastery of their content areas and an understanding of the issues in education, and interact with and learn from each other. Undergraduates accepted into the CTE program major in a mathematics, agriculture, or science field in any Cornell

college and complete a minor in education. With a CTE minor and a bachelor's degree you can complete a MAT in one year. CTE teachers are prepared as scholars of teaching and learning, able to help all their students achieve the scientific and quantitative literacy and ethical decision making skills needed for participation in a democracy.

**Effective College Teaching Series.** The Center for Learning and Teaching, under the auspices of the Department of Education, offers a series of courses, both credit and noncredit, for the improvement of teaching at Cornell, designed for Cornell faculty members and graduate students who are either currently teaching or intending to teach. For details, contact the Center for Learning and Teaching, 607-255-6130, or [www.clt.cornell.edu](http://www.clt.cornell.edu).

### Current offerings include:

#### EDUC 548(5480) Effective College Teaching

Spring and one-week summer session. 1-3 credits. For faculty and graduate students who intend to pursue an academic career.

#### EDUC 578(5780) ITADP Cross-Cultural Classroom Dynamics, Language, and Teaching Practicum

Fall and spring. 2 credits. For international graduate students who have, or will have, teaching assistantships.

#### EDUC 579(5790) ITADP Further Training for International Teaching Assistants

Fall and spring. Noncredit course for international teaching assistants who have completed EDUC 578 but need or desire continued work in classroom instructional and communication skills.

### Graduate Teaching Development Workshops

Offered early in each fall and spring semester, this daylong series offers an array of workshops in teaching effectiveness, from teacher-student interactions to developing a teaching portfolio. Noncredit, open to all Cornell faculty members and graduate teaching assistants.

#### EDUC 620(6200) Internship in Education

Fall and spring. 1 credit. Prerequisite: CALS Graduate Student Professional Development Workshop. For CALS graduate teaching assistants or CALS teaching personnel who wish to extend their workshop experience through reflective practice and consultation with an instructional support specialist.

### Entomology

The entomology curriculum provides students with a basic background in biological and natural sciences, with a special emphasis on the study of insects. Majors may pursue graduate studies in entomology or related sciences upon completion of the B.S. degree. Alternatively, students may immediately begin careers in various aspects of basic or applied insect biology, including integrated pest management, insect pathology, environmental assessment, medical or veterinary entomology, insect toxicology, apiculture, insect systematics, or insect ecology. Because of the diversity of career options, the major includes flexibility among the core requirements and electives that can be selected by students in consultation with their advisors.

## Requirements

General Requirements for CALS (see Graduation Requirements for Bachelor of Science) Basic Science and Math Requirements

- One year of college mathematics, may substitute statistics or biometry, but must include one course in calculus
- One semester of physics (may need two depending on future plans)
- CHEM 206–208 or 207–208
- CHEM 257 (organic)
- Introductory biology (101–104 recommended, even if AP credit received)
- BIOGD 281 (genetics) or PL BR 225 (plant genetics)
- BIOEE 278 (Evolutionary Biology)
- Choose one of the following two courses:  
BIOEE 261 (Ecology and the Environment)  
BIOBM 330 or 331 (Principles of Biochemistry)  
(Choice depends on student interest in organismal vs. cellular/molecular aspects of biology)

### Entomology Requirements (15–21 credits)

- ENTOM 212 Insect Biology – 4 cr
- Group A (core courses). Choose two of the following six courses:  
ENTOM 322 Insect Morphology—4 cr  
ENTOM 331 Insect Systematics—4 cr  
ENTOM 333 Larval Insect Biology—3 cr  
ENTOM 400 Insect Development—4 cr  
ENTOM 455 Insect Ecology—4 cr  
ENTOM 483 Insect Physiology—4 cr
- Two additional entomology courses from Groups A or B (see link to Entomology Course Spreadsheet for a complete list of entomology courses, [www.entomology.cornell.edu](http://www.entomology.cornell.edu))

## Food Science

The food science program prepares students for careers in the food industry or research organizations and for graduate study in food science or related disciplines. Food scientists enjoy satisfying careers that help ensure the sustainable availability of a safe, nutritious, affordable, and high-quality food supply for people throughout New York State, the nation, and the world.

Students in the food science program can choose from one of four specialization options in the major: (1) food science; (2) food operations and management; (3) food biotechnology; or (4) enology. The first option meets the curriculum standards set by the Institute of Food Technologists (IFT), the premier professional society for food scientists, allowing students to compete for IFT scholarships and awards. Students choose an option based on their individual interests and career goals.

The first two years of the undergraduate food science program are intended to establish a solid background in the physical and biological sciences, math and statistics, and communication skills. Required courses include chemistry (introductory and organic),

biology, microbiology, calculus, physics, first-year seminar, introductory food science courses, and nutrition. The last two years emphasize the application of these basic sciences and technology to the manufacturing, sensory evaluation, storage, distribution, and safety of foods and food ingredients. Examples of food science core courses include Food Engineering Principles, Physical Principles of Food Manufacturing, Food Safety Assurance, Food Chemistry, Sensory Evaluation of Foods, and Food Microbiology; many elective courses are offered as well. Students choose electives to satisfy both college distribution requirements and their individual interests within the major and beyond.

Students are also strongly encouraged to participate in undergraduate research supervised by a faculty member and/or complete an internship in a food company during their program of study. Most teaching faculty in the department also have active research programs and welcome participation by undergraduate students. Students may receive academic credit or wages for faculty-directed undergraduate research. Several food companies recruit on campus for their internship programs. These internships provide an excellent opportunity for students to gain hands-on experience in their chosen field of interest and to establish contacts for future employment. A modern food processing and development pilot plant, an operational dairy plant, and well-equipped laboratory facilities are available to support the teaching and research needs of undergraduates.

**Enology and Viticulture.** Students with primary interest in viticulture and secondary interest in enology (V/E) can enroll in the plant sciences degree program, with a concentration in horticulture and a specialization in Viticulture. For these students, plant sciences will be their “major,” and their required courses in enology (offered within the Food Science program) will constitute a “minor” in Food Science with a concentration in enology.

Students with primary interest in enology and secondary interest in viticulture (E/V) can “major” in food science (with a concentration in enology) and a “minor” in plant sciences (with a concentration in Horticulture).

Students in either track will take many of the same courses during their two years and must satisfy the core degree-program requirements of their major and minor program, as well as the general requirements of the college. The curriculum will consist of course work in the basic sciences (e.g., chemistry, biology, microbiology) as well as advanced courses in plant and food sciences. In addition, students will be expected to participate in internships at vineyards and/or with wine makers.

The curriculum is designed to provide students with a strong background in the basic sciences, coupled with a thorough understanding of plant and food sciences as applied to viticulture and wine making. Elective courses can be taken in a variety of areas to support and expand the major.

Prospective students should contact the undergraduate coordinators in either the Department of Horticulture (viticulture option) or Food Science (enology option) for specific course requirements.

## Information Science

Information Science (IS) is an interdisciplinary field that studies the design and use of information systems in a social context: the field studies the creation, representation, organization, application, and analysis of information in digital form. The focus of Information Science is on systems and their use, rather than on the computing and communication technologies that underlie and sustain them. Moreover, Information Science examines the social, cultural, economic, historical, legal, and political contexts in which information systems are employed, both to inform the design of such systems and to understand their impact on individuals, social groups, and institutions.

The Information Science major organizes its courses into three area-based tracks:

- **Human-Centered Systems.** This area examines the relationship between humans and information, drawing from human-computer interaction and cognitive science.
- **Information Systems.** This area examines the computer science problems of representing, organizing, storing, manipulating, and accessing digital information.
- **Social Systems.** This area studies the cultural, economic, historical, legal, political, and social contexts in which digital information is a major factor.

Students must complete a set of 11 core courses: one introductory course, four courses in math and statistics, and two courses from each of the three IS areas. Students must also obtain depth in two tracks—a primary and a secondary track—that together best represent their interests. In particular, completion of the major requires four advanced courses from the selected primary track and three advanced courses from the secondary track.

Note: All INFO courses will count as in-college credit.

## Requirements

Core (11 courses)

1. Introductory (one course):  
INFO 130 Introductory Design and Programming for the Web
2. Math and Statistics (four courses):
  - MATH 111 Calculus I
  - one course chosen from: MATH 171 Statistical Theory and Application in the Real World; H ADM 201 Hospitality Quantitative Analysis; AEM 210 Introductory Statistics; PAM 210 Introduction to Statistics; ENGRD 270 Basic Engineering Probability and Statistics; BTRY 301 Statistical Methods I; SOC 301 Evaluating Statistical Evidence; CEE 304 Uncertainty Analysis in Engineering; ILRST 312 Applied Regression Methods; ECON 319 Introduction to Statistics and Probability; PSYCH 350 Statistics and Research Design
  - either MATH 231 Linear Algebra with Applications or MATH 221 Linear Algebra
  - INFO 295 Mathematical Methods for Information Science



3. Human-Centered Systems (two courses):  
INFO 214 Cognitive Psychology  
INFO 245 Psychology of Social Computing
4. Information Systems (two courses):  
COM S 211 Computers and Programming  
INFO 230 Intermediate Design and Programming for the Web
5. Social Systems (two courses):
  - either ECON 301 Microeconomics or ECON 313 Intermediate Microeconomic Theory
  - one course chosen from: INFO 292 Inventing an Information Society; INFO 355 Computers: From the 17th Century to the Dot.com Boom; or INFO 356 Computing Cultures

Where options in the core courses exist, the choice will depend on the student's interests and planned advanced courses for the selected primary and secondary tracks.

### Tracks

Students must complete four advanced courses in their selected primary track and three advanced courses in their selected secondary track. The Human-Centered Systems and Information Systems tracks can be used as primary or secondary tracks. The Social Systems track can be used only as a secondary track.

Courses taken to satisfy the core-course requirements may not be used to fulfill the track requirements.

All courses used toward the major must be taken for a letter grade.

Additional information on Information Science courses can be found below and in the CIS section of *Courses of Study*. Course information for all other courses in the major can be found in the relevant departments (e.g., AEM, COM S, and S&TS).

1. Human-Centered Systems  
PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display\*  
INFO 345 Human-Computer Interaction Design  
PSYCH 347 Psychology of Visual Communications  
PSYCH 380 Social Cognition\*  
PSYCH 413 Information Processing: Conscious and Unconscious  
PSYCH 416 Modeling Perception and Cognition  
INFO 440 Advanced Human-Computer Interaction Design  
INFO 445 Seminar in Computer-Mediated Communication  
INFO 450 Language and Technology  
DEA 470 Applied Ergonomic Methods  
\*Students who take PSYCH 342 may also count its prerequisite, PSYCH 205, toward the Human-Centered Systems primary/secondary track requirements. Similarly, students who take PSYCH 380 may also count PSYCH 280 toward the Human-Centered Systems primary/secondary track requirements. At most, one of PSYCH

205 or 280 can be counted toward the primary/secondary track requirements.

2. Information Systems  
INFO 330 Data-Driven Web Applications  
INFO 372 Explorations in Artificial Intelligence  
COM S 419 Computer Networks  
LING 424 Computational Linguistics  
INFO 430 Information Retrieval  
INFO 431 Web Information Systems  
COM S 432 Introduction to Database Systems  
COM S 465 Computer Graphics I  
COM S 472 Foundations of Artificial Intelligence  
LING 474 Introduction to Natural Language Processing  
OR&IE 474 Statistical Data Mining I  
COM S 478 Machine Learning  
OR&IE 480 Information Technology  
COM S 501 Software Engineering  
COM S 513 System Security  
INFO 530 Architecture of Large-Scale Information Systems  
OR&IE 574 Statistical Data Mining II  
COM S 578 Empirical Methods in Machine Learning and Data Mining
3. Social Systems  
SOC 304 Social Networks and Social Processes  
AEM 322 Technology, Information, and Business Strategy\*  
INFO 349 Media Technologies  
INFO 355 Computers: From the 17th Century to the Dot.com Boom  
INFO 356 Computing Cultures  
ECON 368 Game Theory (formerly ECON 467)\*  
INFO 387 The Automatic Lifestyle: Consumer Culture and Technology  
LAW 410 Limits on and Protection of Creative Expression—Copyright Law and Its Close Neighbors  
S&TS 411 Knowledge, Technology, and Property  
ECON 419 Economic Decisions Under Uncertainty  
INFO 429 Copyright in a Digital Age  
INFO 435 Seminar on Applications of Information Science  
OR&IE 435 Introduction to Game Theory\*  
S&TS 438 Minds, Machines, and Intelligence  
INFO 447 Social and Economic Data  
H ADM 474 Strategic Information Systems\*  
ECON 476/477 Decision Theory I and II  
INFO 515 Culture, Law, and Politics of the Internet

\*Only one of OR&IE 435 and ECON 368 may be taken for IS credit. Only one of AEM 322 and H ADM 474 may be taken for IS credit.

### The Minor

A minor in Information Science is also available to students in AAP (Architecture and Planning students only), Arts and Sciences, CALS, Engineering, Hotel, Human Ecology, and ILR. The minor has been designed to ensure that students have substantial grounding in all three of the human-centered systems, information systems, and social systems areas. Detailed information about the minor can be found in the CIS section of *Courses of Study*. Students are also referred to [www.infosci.cornell.edu/ugrad/concentrations.html](http://www.infosci.cornell.edu/ugrad/concentrations.html) for the most up-to-date description of the concentration and its requirements.

### International Agriculture and Rural Development

International agriculture and rural development provides students with an understanding of the special problems of applying basic knowledge to the processes of agricultural development in low-income countries. The student typically specializes in a particular subject and works with an advisor to plan a program oriented toward international agriculture. The courses in international agriculture and rural development are designed to acquaint students with the socioeconomic factors in agricultural development, the physical and biological nature of tropical crops and animals, and the various world areas for which study programs exist.

### Requirements

In addition to the college distribution requirements, students in international agriculture and rural development must take a minimum of 36 credits toward the major. A minimum of 7 credits in international agriculture and rural development (IARD) are required. The foreign language requirement for the IARD major is identical to that of the College of Arts and Sciences (see p. 422). Students are expected to complete an overseas field experience of a minimum of six weeks. The other courses recommended are drawn from a wide range of disciplines. The objective is to familiarize students with the many facets of agricultural development in low-income countries. Students are encouraged to take additional specialized courses in one of the other program areas of the college.

### International Studies Minor

Preparing for leadership in an increasingly interconnected and dynamic world, CALS undergraduates need knowledge, skills, and attitudes that build "global competencies." The minor for CALS students not majoring in international agriculture and rural development will recognize an international concentration of course work and experiences.

### Requirements

1. Four courses with significant international content, as recommended by students' major departments (two should be from CALS).
2. One semester of IARD 480 Global Seminar.

3. The foreign language requirement for the international studies minor is identical to that of the College of Arts and Sciences (see p. 422).
4. An approved overseas experience (exchange, study abroad program, internship, or faculty-led short course).

For more information, contact the academic programs coordinator in the International Programs Office, 255-3811.

## Landscape Architecture

Landscape architecture focuses on the art of landscape design as an expression of the cultural values and the natural processes of the ambient environment. The program's unique place within the university promotes interaction among the areas of horticulture, environmental science, architecture, and city and regional planning.

The course of study prepares students for the practice of landscape architecture. The curriculum focuses on graphic communication, basic and advanced design methods, landscape history and theory, plant materials, construction and engineering technology, and professional practice. Design studios deal with the integration of cultural and natural systems requirements as applied to specific sites at varying scales. Projects may include garden design, parks design, housing design, historic preservation, environmental rehabilitation, and urban design.

Landscape architecture offers two professional degree alternatives: a four-year bachelor of science degree administered through the College of Agriculture and Life Sciences and a three-year master of landscape architecture degree administered through the Graduate School for those who have a four-year undergraduate degree in another field. Both of these degrees are accredited by the Landscape Architecture Accreditation Board (LAAB) of the American Society of Landscape Architects. The major in each degree is composed of core courses related to professional education in landscape architecture, a concentration in a subject related to the core courses, and free electives.

The department also offers a two-year master of landscape architecture advanced degree program administered through the Graduate School for those with accredited degrees in landscape architecture or architecture. The program entails core courses in the discipline and the development of a concentration in subject matter areas such as landscape history and theory, landscape ecology and urban horticulture, the cultural landscape, site/landscape and art, or urban design.

In addition, an undergraduate minor in cultural landscape studies is available for nonmajors.

## Dual-Degree Options

Graduate students can earn a master of landscape architecture and a master of science (Horticulture) or a master of city and regional planning simultaneously. Students need to be accepted into both fields of study to engage in a dual-degree program and must fulfill requirements of both fields of study. Thesis requirements are generally integrated for dual degrees.

## Study Abroad

The faculty encourages study abroad and has two formally structured programs. The *Denmark International Study* (DIS) program is available primarily to senior undergraduates and third-year graduate students in the fall semester and is administered through Cornell Abroad. The *Rome Program* is made available to undergraduates and graduate students through the College of Architecture, Art, and Planning.

**Bachelor of Science Landscape Architecture Degree Sequence** (Note: Each semester, the studio classes require payment of a supply and field trip fee, and all landscape architecture majors are required to pay an annual technology fee.):

### First Year

<i>Fall Semester</i>	<i>Credits</i>
*LA 141 Grounding in Landscape Architecture	4
†Biological sciences elective	3
†Physical sciences elective	3
†Social sciences or humanities elective	3
†Written or oral expression elective	3
	16

### Spring Semester

*LA 142 Grounding in Landscape Architecture	4
†Biological sciences elective	3
†Social sciences or humanities elective	3
†Written or oral expression elective	3
‡Physical sciences elective	3
	16

### Second Year

#### *Fall Semester*

*LA 491 Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
*LA 201 Medium of the Landscape	5
†Biological sciences elective	3
†Social sciences or humanities elective	3
Historical studies	3
	18

#### *Spring Semester*

*LA 202 Medium of the Landscape	5
*LA 315 Site Engineering I	3
*LA 492 Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
†Written or oral expression elective	3
†Physical sciences elective	3
	18

### Third Year

#### *Fall Semester*

*LA 301 Integrating Theory and Practice	5
*LA 316 Site Engineering II (second seven weeks)	2
**Concentration	3
‡Free electives	4
	14

### Spring Semester

**Concentration	6
*Historical studies	3
*LA 318 Site Construction	5
Electives	2
	16

### Fourth Year

#### *Fall Semester*

*LA 401 Advanced Synthesis: Project Design	5
**Concentration	3
†Social sciences or humanities elective	3
(Optional landscape architecture study abroad semester in Denmark or Rome)	11

#### *Spring Semester*

*LA 402 Integrating Theory and Practice II	5
**Concentration	3
*LA 412 Professional Practice	1
‡Free elective	2
	11

#### *Summary of credit requirements*

*Specialization requirements	58
†Distribution electives	39
‡Free electives	8
**Concentration	15
	120

## Master of Landscape Architecture (M.L.A.) License Qualifying Degree

Requirements of the three-year M.L.A. curriculum include 90 credits, six resident units of satisfactory completion of the core curriculum courses, and a thesis or a capstone studio. (Note: Each semester, the studio classes require payment of a supply and field trip fee, and all landscape architecture majors are required to pay an annual technology fee.)

### First Year

<i>Fall Semester</i>	<i>Credits</i>
*LA 505 Graphic Communication I	3
*LA 501 Composition and Theory	5
*Historical studies	3
*LA 491 Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
	15

#### *Spring Semester*

*LA 502 Composition and Theory	5
*LA 492 Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
**Concentration	2
*LA 615 Site Engineering I	3
*Historical studies	3
	17



**Second Year***Fall Semester*

*LA 601 Integrating Theory and Practice	5
*LA 616 Site Engineering II	2
*Electives	2
**Concentration	6
	15

*Spring Semester*

*LA 602 Integrating Theory and Practice	5
*LA 618 Site Construction	5
*LA 590 Theory Seminar	3
**Concentration	3
	16

**Third Year***Fall Semester*

*LA 701 Urban Design and Planning	5
‡Free elective	2
**Concentration	4
*Historical studies	3
	14

*Spring Semester*

*LA 800 Master's Thesis in Landscape Architecture	9
or *LA 702 Advanced Design Studio	5
*LA 412 Professional Practice	1
‡Free elective(s)	2 or 6
Concentration LA 603	1
	13

*Summary of credit requirements*

*Specialization requirements	64 or 68
**Concentration	16
‡Free electives	6 or 10
	90

**Master of Landscape Architecture Advanced Degree Program.** The two-year master of landscape architecture (M.L.A./A.D.) program serves to broaden and enrich undergraduate education in design by providing an expanded educational experience to those who are technically skilled. Applicants must hold a bachelor's degree in landscape architecture or architecture from an accredited program. The objective of the two-year (M.L.A./A.D.) program is to develop specializations for individuals who may wish to teach, practice, or conduct applied research in landscape architecture.

Students admitted to the two-year M.L.A./A.D. program are required to complete 60 credits of course work as approved by the members of their graduate committee. For landscape architects, this must include at least two advanced studios, a graduate seminar, a concentration, and a thesis. For architects, the curriculum requires three advanced studios, two courses in plants and planting design, two courses in the history of landscape, two courses in site engineering, a seminar in design theory, a course in professional practice, a concentration, and electives.

**Undergraduate Minor for Nonmajors**

Students outside the professional program may choose the undergraduate minor (five courses, 15 credits) in cultural landscape studies to complement their major. A variety of courses consider the cultural landscape as an object, something to be studied for its own sake, and as a subject, as a means to understand society's relationship to natural systems. The study of cultural landscapes also includes perceptions of landscapes, cultural ideas and values, and visible elements. Direct inquiries to Professor A. Hammer, Department of Landscape Architecture, 440 Kennedy Hall.

Courses: choose five for a total of 15 credits

- +LA 140 The Symbols of New York State's Cultural Landscape (3 credits)
- +LA 155 American Indian Cultural Landscapes: Changes in Time (3 credits)
- +LA 360 Pre-Industrial Cities and Towns of North America (3 credits) offered alternate years
- +LA 261 Fieldwork in Urban Archaeology (4 credits)
- +LA 262 Laboratory in Landscape Archaeology (3 credits)
- LA 263 American Indians, Planners, and Public Policy (3 credits), offered alternate years
- +LA 282 Photography and the American Landscape Architecture (3 credits)
- +LA 418 Audio Documentary: History/Sound/Landscape (3 credits)
- +LA 483 Seminar in Landscape Studies (3 credits)
- LA 497 Independent Study (1–5 credits)
- LANAR 524 History of European Landscape Architecture (3 credits)
- LANAR 525 History of American Landscape Architecture (3 credits)
- LA 545 The Parks and Fora of Imperial Rome (3 credits)
- LA 569 Archaeology in Preservation Planning and Design (3 credits)
- LA 580 Landscape Preservation: Theory and Practice (3 credits)
- + Distribution elective

**Natural Resources**

As the number of humans living on the Earth surpassed six billion at the start of the 21st century, knowing how to conserve and manage well the Earth's remaining biological resources and natural environments takes on increasing importance and urgency. The field of natural resources sits squarely at the interface of science and policy, applied to these important conservation and environmental challenges. This is a biologically based major that focuses on the interface of nature (species, populations, communities, and ecosystems) with the human institutions involved in environmental conservation and management. The major's focus on biological resources (e.g., fisheries, wildlife, forests, and wetlands) includes issues of conservation and restoration of scarce species and their habitats, sustainable harvest of species of economic importance, management of invasive species and overabundant species, population dynamics in aquatic and terrestrial environments, ecosystem and watershed management, and

mitigating the effects of human-induced changes on the environment.

The mission of the Department of Natural Resources, home of the major, is "to develop knowledge and facilitate learning to improve society's stewardship of natural resources and the environment." A commitment to undergraduate education is a vital component of that mission. For more information see [www.dnr.cornell.edu](http://www.dnr.cornell.edu). The curriculum emphasizes the biology and ecology of natural systems, as well as the social science/human aspects of conservation challenges. The major allows students flexibility to pursue a variety of paths to understand the scientific, ethical, and societal basis for management and protection of natural resources and environments through the application of ecological principles and knowledge of societal needs.

**The Future for Natural Resources Majors**

Most students entering the major have a strong interest in the natural world and in contributing to greater harmony between humans and the environment. An undergraduate degree in natural resources gives students the concepts and tools needed to participate intelligently and effectively in decisions that determine the future of our environment, either as natural resources professionals or as informed citizens.

Career opportunities in natural resources are diverse. The major prepares students for graduate school or entry-level positions in natural resources and environmental management agencies at local, state, federal, and international levels, or for jobs in the private for-profit (e.g., environmental consulting firms) or nonprofit sectors. Many students ultimately pursue graduate studies in environmentally related fields including the biological, physical, and chemical sciences; forest, wetland, stream, wildlife, or fisheries management; and environmental law and public policy. Graduates often assume leadership positions in government, colleges and universities, national and international conservation organizations, environmental consulting firms, environmental divisions of private industry, and organizations involved in environmental education or communication.

**Curriculum**

Natural resources is a flexible major, and free electives can account for as many as 40 credits out of the total of 120 required for graduation. Students complete a set of courses in biology, ecology, chemistry, mathematics, economics, ethics, and written and oral expression; many of these courses also meet the college's distribution requirements for graduation.

*Freshmen and sophomores* complete a series of four foundation courses in the major: Introduction to the Field of Natural Resources, Environmental Conservation, Introductory Field Biology, and People, Values, and Natural Resources. Juniors complete three core courses: Applied Population Ecology, General Ecology, and Natural Resources Management and Planning. These foundation and core courses introduce the critical environmental and natural-resource issues confronting society, and develop the conceptual and methodological tools that students will use in upper-division courses.

*Juniors and seniors* may specialize in one of three areas of concentration: applied ecology, resource policy and management,

or environmental studies. Through course work in these concentrations, students gain an in-depth understanding of key principles, concepts, and practices. All students also have the flexibility to gain exposure to a wide variety of environment-related courses offered by Natural Resources and other departments throughout Cornell. Many students elect to conduct a research honors thesis.

#### Areas of Concentration within the Major

**Applied ecology** is designed as a foundation for those who wish to pursue careers or advanced study in science-based conservation or management of fish and wildlife populations and their habitats, conservation biology, control of invasive and overabundant species, watershed and landscape management, quantitative population dynamics, resource inventory and information management, global ecology, or applied ecology and biogeochemistry of forests and wetlands. This concentration also may interest students seeking a biologically-based approach to environmental science or global studies. Students who select this concentration typically focus their course work in the areas of species biology and applied ecosystem ecology, including quantitative analysis of fish, wildlife, and plant populations, ecosystems, and landscapes. They complement their course work within the department with courses in other departments, such as Ecology and Evolutionary Biology, Microbiology, Geology, Crop and Soil Science, Atmospheric and Earth Sciences, Animal Sciences, and Plant Biology.

**Resource policy and management** provides a foundation for students who wish to pursue careers or advanced study in the human dimensions or policy aspects of natural resource conservation and management, natural resource and environmental law, environmental policy analysis, or environmental communication. Students who select this concentration typically focus on courses related to the development of environmental policy, management strategies for particular species or ecosystems, natural resource planning, resource economics, or programs in environmental communication and education. They complement their course work within the department with courses in other departments such as Government, Ecology and Evolutionary Biology, Development Sociology, Communications, Applied Economics and Management, City and Regional Planning, and Policy Analysis and Management.

**Environmental studies** is intended for those who wish to pursue a broad and synthetic approach to understanding and participating in (re)structuring the interactions between society and environment. The concentration's emphasis is on developing an ability to think critically about these interactions. Building on a foundation of courses required for the natural resources major, during years 3 and 4, each student will design a cohesive sequence of six upper-division courses with help from their departmental advisor. These six courses should include two courses from each of three categories: (1) natural science; (2) social science and analytic skills, e.g., economics, political economy, logic, computer programming, GIS, statistics; and (3) humanities, e.g., history, philosophy, literature, arts, foreign language. This self-defined environmental theme ensures

development of specific competencies linked to personal and professional ambitions of the individual student. Example themes include environmental law, environmental education, "green" business, sustainable agriculture, and environmental communication. Students are expected to take advantage of internship, independent study, and honors thesis opportunities, as appropriate.

#### Research and Work Opportunities for Undergraduates

The department offers many opportunities for field-oriented studies, independent research, internships, and jobs. These include several field-based courses and access for research at the Arnot Teaching and Research Forest near Ithaca, the Little Moose Field Station in the Adirondacks, the Cornell Biological Field Station on Oneida Lake near Syracuse, and the Hubbard Brook Experimental Forest in New Hampshire, as well as numerous natural areas near campus. Part-time jobs in the research and extension programs of many faculty members offer students opportunities for career-related work experience. A research honors program is available for qualified students.

For a comparison of the natural resources major with other environmental majors, see [www.dnr.cornell.edu/teaching/ugrad/faq/cals\\_env.pdf](http://www.dnr.cornell.edu/teaching/ugrad/faq/cals_env.pdf).

#### Nutritional Sciences

Nutritional sciences draws upon chemistry, biology, and the social sciences to understand complex relationships among human health and well-being, food and lifestyle patterns, food and agricultural systems, and social and institutional environments.

The program in nutritional sciences provides students with strong training in human nutrition in the context of an understanding and appreciation of the agricultural and life sciences. The program responds to the growing and important interrelationships among human nutrition and the agricultural and life sciences. Growing public interest in health and nutrition has placed new demands upon food producers, processors, and retailers. The problems of hunger and malnutrition in the United States and abroad require that nutritionists work with specialists in areas such as agricultural economics, food production, and development sociology. Advances in biotechnology provide researchers with new ways to understand human nutritional requirements and the regulation of human metabolism.

Nutritional sciences majors complete a core set of requirements and choose elective courses in the areas of their particular interest. The core curriculum includes introductory chemistry and biology, organic chemistry, biochemistry, physiology, and mathematics. Students complete five courses in nutritional sciences: NS 115 Nutrition, Health and Society; NS 245 Social Science Perspectives on Food and Nutrition; NS 345 Nutritional and Physicochemical Aspects of Foods; NS 331 Physiological and Biochemical Bases of Nutrition; and NS 332 Methods in Nutritional Sciences. In addition, students select a minimum of three advanced courses in nutritional sciences as well as elective courses in the broad areas of food production and processing, food and agricultural policy,

the life sciences, environment and natural resources, communication, and education.

All majors have faculty advisors in the Division of Nutritional Sciences with whom they meet regularly. Advisors help students plan course schedules and help find opportunities for special study or experiences outside the classroom.

Many students engage in laboratory or field research with a faculty member for academic credit. The research honors program is designed for academically talented students who are interested in research. Honors students conduct independent research projects under the guidance of a faculty member and prepare an honors thesis. Many students participate in field experiences for credit during the academic year or summer. Placements in laboratories, industries, or community agencies are possible.

The major in nutritional sciences can lead to many different career paths. By supplementing the core requirements with courses in different areas, students can prepare for jobs in industry, government, or community agencies in the United States or abroad. The major is excellent preparation for graduate study in a variety of fields.

The Division of Nutritional Sciences is affiliated with both the College of Agriculture and Life Sciences and the College of Human Ecology. Most of the division faculty members work in Savage Hall, Kinzelberg Hall, and Martha Van Rensselaer (MVR) Hall. In addition to housing offices, classrooms, and seminar rooms, these buildings contain research facilities, specialized laboratories, a human metabolic research unit, and computer facilities.

For additional information about the nutritional sciences program, contact the Division of Nutritional Sciences Academic Affairs Office, 335 MVR Hall, 255-4410, [aadns@cornell.edu](mailto:aadns@cornell.edu).

The minor in **nutrition and health** in the College of Agriculture and Life Sciences allows students to choose from courses concerned with economic influences on human nutrition, epidemiology and public health, food quality and food service management, human health and nutrition, nutritional biochemistry, and the psychological and social influences on human nutrition. The minor consists of NS 115 Nutrition, Health, and Society plus 9 credits of 200-level or above didactic NS courses. Enrollment is limited in some courses. Please check [www.nutrition.cornell.edu/undergrad/calsminr.html](http://www.nutrition.cornell.edu/undergrad/calsminr.html) for details.

#### Plant Sciences

Plant sciences prepares students for careers that meet the challenges of providing a safe, nutritious, and abundant food supply for a growing world population and using plants to enhance the beauty of our landscapes. It is a multidisciplinary program administered by faculty in the Departments of Crop and Soil Sciences, Horticulture, Plant Biology, Plant Breeding and Genetics, and Plant Pathology, representing one of the strongest groups of plant scientists in the world. Students in the program share a common interest in learning about topics associated with plant growth and development in the broadest sense, but beyond that common thread, individual career goals vary widely. Some have their sights set on careers in applied agriculture, others plan to contribute to advancements of our knowledge by way of teaching or research,

and still others see study in plant science as a stepping-stone to specialized training in business, government, or law. In addition to the college distribution requirements, Plant Science majors must take at least one course in each of several areas including botany, plant physiology, ecology, taxonomy/systematics, genetics, statistics, plant-pest interactions, crop production, and soil science, for a total of 40 credits.

Students who begin with well-defined interests or who identify certain areas of interest after several semesters of course work may choose a specialization within one of the five cooperating departments. Each specialization has additional requirements beyond the basic core courses. However, students who are uncertain about the breadth of their interests or who are seeking as much flexibility as possible may choose to design their course of study in plant sciences without declaring a specialization. Those students develop a strong background in plant science but have fewer required courses so that they can explore other areas of interest.

More than 140 courses that deal directly with some area of plant science are offered by the cooperating departments, and other courses relating to plant science are offered elsewhere in the university. There are also ample opportunities for internships, undergraduate teaching, and research experience. Qualified students, especially those expecting to go on for graduate degrees, are encouraged to avail themselves of such opportunities. Students who are planning to enter the work force immediately upon completion of the B.S. degree are encouraged to obtain practical experience. This may involve summer employment in research or in a plant production or maintenance related industry such as a lawn and tree care company, commercial greenhouse, nursery, orchard, vineyard or winery, botanical garden or arboretum, crop production farm, or with Cooperative Extension. Plant sciences faculty members also encourage students to avail themselves of opportunities to work and/or study abroad.

In addition to classrooms and laboratories in five buildings on the Cornell campus proper, research and teaching facilities adjacent to the campus are freely available to students for hands-on practice, technical training, independent research projects, and internships. These facilities include research orchards and vineyards, golf courses and a turf research facility, the Cornell Plantations (including arboretum and natural areas) and vegetable and field crop farms. Demonstration/research facilities in Aurora (Cayuga County), Geneva (Ontario County), Highland (Ulster County), Lake Placid (Essex County), Middletown (Orange County), Odessa (Tioga County), and Riverhead (Suffolk County) are also sites administered by departments in the Plant Sciences consortium and are available for undergraduate and graduate field study.

**Crop science** is a specialization that focuses on the major food and feed crops of the world, such as wheat, corn, rice, soybeans, and alfalfa. In addition to 15 credits in applied crop science, students in this program also take at least 6 credits in plant protection (weed science, entomology, and plant pathology), and at least 6 credits in soil science. The crop science specialization can be focused

on preparation for graduate school or be combined with a crop management minor for those planning to be certified crop advisors.

**Enology and viticulture.** The College of Agriculture and Life Sciences offers a curriculum in viticulture and enology within existing undergraduate B.S. degree programs in plant sciences and food science.

Students with primary interest in viticulture and secondary interest in enology (V/E) can enroll in the plant sciences degree program, with a concentration in horticulture and a specialization in viticulture. For these students, plant sciences will be their "major," and their required courses in enology (offered within the food science program) will constitute a "minor" in food science with a concentration in enology.

Students with primary interest in enology and secondary interest in viticulture (E/V) will "major" in food science (with a concentration in enology) and "minor" in plant sciences (with a concentration in Horticulture).

Students in either track take many of the same courses during their two to four years, and must satisfy the core degree-program requirements of their major and minor programs, as well as the general requirements of the college. The curriculum consists of course work in the basic sciences (e.g., chemistry, biology, microbiology) as well as advanced courses in plant and food sciences. In addition, students are expected to participate in internships at vineyards and/or with wine makers.

The curriculum is designed to provide students with a strong background in the basic sciences, coupled with a thorough understanding of plant and food sciences as applied to viticulture and wine making. Elective courses can be taken in a variety of areas to support and expand the major.

Prospective students should contact the undergraduate coordinators in either the Department of Horticulture (viticulture option) or Food Science (enology option) for specific course requirements.

**Horticulture.** Derived from the Latin word "hortus," meaning garden, horticulture is a blend of science and culture involving knowledge of plants grown in farms and gardens, parks and landscapes, and athletic and recreational facilities; indoor plants; greenhouse and nursery plant production; and crops used for wines, herbs and spices, medicinal purposes, and coffee and teas. The knowledge and skills essential to grow, maintain, process, and market horticultural plants are in high demand in a world increasingly concerned with environmental quality, recreation, and health.

The 40 faculty members in horticulture specialize in almost every aspect of horticultural science, with active research and outreach programs regionally, nationally and internationally.

Students choosing a concentration in horticulture must complete a minimum of 40 credits of core courses for the plant sciences major, plus the following courses:

HORT 101 Horticultural Science and Systems (4 credits)

HORT 400 Plant Propagation (3 credits)

Two HORT courses in plant production or management at the 400 level (6 credits)

One additional course of integrated pest management (plant pathology, entomology, or weed science) beyond the 3-credit plant sciences core requirement (3 credits)

Students transferring into Cornell from other colleges can petition to waive or adjust these requirements, in consultation with their faculty advisors.

**Plant biology** stresses a basic, rather than applied, understanding of how plants function, grow, and develop, as well as a study of their genome, evolution, and relationships to man. It provides undergraduates with a thorough preparation for graduate study in plant sciences. In cooperation with an advisor each student plans a curriculum with a concentration in basic sciences, supplemented by more advanced courses in plant biology. Students specializing in plant biology within the plant sciences major should take a minimum of four courses beyond the core of plant sciences courses. Options include plant molecular biology, plant cell biology, biochemistry, ethnobotany, and further courses in the function, growth, genetics, systematics, ecology, and evolution of plants. Individual research under professorial guidance is encouraged. Different options within plant biology afford a flexible curriculum.

**Plant genetics and breeding** relates information about genetics/genomics of plants to the improvement of cultivated plant species. Agriculturally important genes are identified, characterized, and deployed through combinations of molecular studies and sexual crosses. This area of study integrates genetic information with plant physiology/biochemistry, plant pathology, entomology, conservation biology, international agriculture, and related areas to create crops that meet the needs of modern society. In addition to the core plant sciences courses, students should take PL BR 201, 403, 404, and BIOPL 343. Other courses may be included after consultation with the advisor. Students are encouraged to participate in research projects and take advantage of opportunities for internships in industry.

**Plant pathology** is the study of plant diseases caused either by microorganisms or by chronic exposure to toxic elements in air and water. At the very least, specialists in the field must learn how to identify plant diseases and to design management strategies that will limit their overall impact. However, by employing contemporary tools from molecular biology, plant pathologists are also well positioned to answer fundamental questions about the nature of host-pathogen interactions and the genes that control them. Use of these new tools has already led to rapid deployment of disease-resistant crop varieties and it promises to offer much more in the future. For most students, a concentration in plant pathology as an undergraduate is preparation for graduate study in the field. However, graduates may also be employed as representatives with agribusiness firms, Cooperative Extension educators, state or federal regulatory agents, and laboratory technicians. Suggested courses beyond the plant sciences core include organic chemistry, biochemistry, calculus, introductory plant pathology, mycology, entomology, and plant breeding.

**Plant protection** is offered to students who are interested in the management of plant pests. It includes the study of insects, diseases, weeds, vertebrate pests, and other factors that prevent maximum crop production. Although designed as a terminal program for students desiring practical preparation for careers in pest management, the specialization can also provide an adequate background for graduate work in entomology, plant pathology, or weed science.

### Science of Earth Systems (SES)

During the past several decades, with the increasing concern about issues such as air and water pollution, nuclear waste disposal, the destruction of the ozone layer, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The SES major emphasizes the basic study of the Earth system as one of the outstanding intellectual challenges in modern science and as the necessary foundation for the future management of our home planet. Cornell's strengths across a broad range of earth and environmental sciences have been fused to provide students with the tools to engage in what will be the primary challenge of the 21st century. The SES major has its home in the Department of Earth and Atmospheric Sciences, but includes collaboration with other departments across the university.

The SES curriculum includes a strong preparation in mathematics, physics, chemistry, and biology during the freshman and sophomore years. During the junior and senior years, students complete the SES core sequence, studying such topics as climate dynamics, Earth system evolution, biogeochemistry, and Earth's interior. These classes emphasize the interconnectedness of the Earth system. The selection of upper-level concentration courses allows the student to develop an area of expertise that complements the breadth of the introductory and SES core courses. Areas of concentration include biogeochemistry, geological sciences, and ocean sciences. Students may work with faculty advisors to develop individually tailored concentrations.

The SES major provides a strong preparation for graduate school in any one of the Earth system sciences, such as atmospheric sciences, geology/geophysics, oceanography, hydrology, ecology, and biogeochemistry. Students seeking employment with the B.S. degree will have many options in a wide variety of environmentally oriented careers in both the private sector and government. Students with the strong science background provided by the SES major are also highly valued by graduate programs in environmental law, public affairs, economics, and public policy.

Requirements for the Major

#### 1. Basic Math and Sciences

This part of the SES curriculum builds a strong and diverse knowledge of fundamental science and mathematics, providing the student with the basic tools needed in upper-level science classes.

- MATH 191-192 (or MATH 111-112)
- PHYS 207-208 (or PHYS 112-213)
- CHEM 207-208 (or CHEM 211-257)
- BIO G 101/103-102/104, or 105-106, or BIO G 109/110

#### 2. Required Introductory Course: EAS 220 The Earth System

#### 3. Science of Earth Systems Core Courses

The core courses emphasize the interconnectedness of the Earth system. These courses are founded on the most modern views of the planet as an interactive and ever-changing system, and each crosses the traditional boundaries of disciplinary science. Three courses selected from the following four core courses are required for the major.

- EAS 301 Evolution of the Earth System
- EAS 303/NTRES 303 Biogeochemistry
- EAS 304 Interior of the Earth
- EAS 305/ASTRO 331 Climate Dynamics

#### 4. Concentration Courses

Four intermediate to advanced-level courses (300 level and up) that build on the core courses and have prerequisites in the basic sciences and mathematics courses are required. Note that additional basic math and science courses may be required to complete the concentration courses; the specific courses will depend on the student's choice of a concentration. The concentration courses build depth and provide the student with a specific expertise in some facet of Earth system science. The concentration should be chosen during the junior year or before in consultation with an SES advisor whose interests match those of the student. Three concentrations are defined for the major: biogeochemistry, geological sciences, and ocean science (see EAS web site for details). Other concentrations can be tailored to a student's interests in concert with the student's advisor and approval of the curriculum committee.

#### 5. Field/observational/laboratory experience

Exposure to the basic observations of earth science, whether directly in the field, or indirectly by various techniques of remote sensing, or in the laboratory, is necessary to understand fully the chosen area of concentration in the major. Means of satisfying this requirement generally include 3 credits of course work. Possibilities include

courses in the Hawaii Environmental Semester program;

courses given by the Shoals Marine Laboratory;

EAS 250 (Meteorological Observations and Instruments);

EAS 352 (Synoptic Meteorology I);

EAS 417 (Field Mapping in Argentina);

EAS 437 (Geophysical Field Methods);

EAS 491 and/or 492 (Undergraduate Research, total 3 credits) with appropriate choice of project

Field courses taught by another college or university (3-credit minimum).

For more information, contact Professor Bryan Isacks, Department of Earth and Atmospheric Sciences, bli1@cornell.edu, or visit [www.eas.cornell.edu](http://www.eas.cornell.edu).

### Science of Natural and Environmental Systems

Environmental stewardship and sustainability are increasingly recognized as human and planetary imperatives. Graduates who understand how people both generate and can resolve environmental problems will contribute significantly to creating a sustainable environment for their own and future generations. This new major in environmental science provides a broad-based, integrative program in the physical, biological, social, and economic sciences, as well as disciplinary strength in one or more subjects suitable for entry-level professional positions or post-baccalaureate studies.

The curriculum comprises an intensive foundation in the sciences; an environmental core with courses covering earth, biotic, social, and economic systems; and several disciplinary programs of study. This major emphasizes inter- and multidisciplinary work, independent thinking and analysis, and development of competency in writing and speaking throughout the curriculum.

#### Foundation Courses

The foundation courses, listed here, can be used to fulfill many of the CALS distribution requirements. The purpose of this component of the program is to provide a strong foundation in the basic sciences and an introduction to the relationships between the biophysical and social sciences.

- two semesters of college-level biology
- two semesters of college-level calculus
- four semesters of college-level chemistry and physics (at least one semester of each)
- one semester of college-level statistics
- DEA 150 Introduction to Human-Environment Relationships
- NTRES 201 Environmental Conservation

The freshman and sophomore years are designed to provide foundation courses and meet CALS requirements at the outset. The freshman year provides engagement with environmental study through DEA 150 and NTRES 201. Depending on student interest and available time, other courses in environmental study may be taken as electives early in the schedule.

Advanced placement credit will be accommodated in the program through consultation with the student's faculty advisor.

#### Environmental Core

The environmental core consists of five courses. Its purpose is to provide a rigorous, integrated understanding of the environment, broadly defined. This core recognizes that knowledge of the environment encompasses physical and biological sciences, social sciences, and human behavior. SNES 101, required in the freshman year, provides a unifying overview of the goals, facts, depth, and breadth of the major.



Core courses are to provide integration (among areas, disciplines, methodologies, topics, and issues); systems emphasis; basic, rigorous presentation of core material; root competencies for understanding the environment; a framework for further advanced courses; and a new way of thinking that enables innovative solutions to difficult problems.

Biotic Systems: BIOEE 261 Ecology and the Environment

Earth Systems: CSS 365 Environmental Chemistry: Soil, Air, and Water

Economic Systems: AEM 250 Environmental and Resource Economics

Environmental Science: SNES 101 Intro to the Science and Management of Environmental and Natural Resources

Social Systems: D SOC 324 (S&TS/SOC 324) Environment and Society

### Programs of Study

Programs of study that focus in one or more areas of environmental science are being established to provide disciplinary expertise sufficient for entry-level proficiency. Each student in the major will be required to take four courses at the 300 level or above in at least one program of study.

Programs of study will not replace or duplicate current majors. Rather, they will provide the basic core of knowledge essential for an introductory understanding of the area—the concepts, basic science, methodologies, and major applications. Programs of study include

- Agroecosystem Science
- Environmental Biology
- Environmental Economics
- Environmental Information Science
- Sustainable Development

For more information about this major, see <http://snes.eas.cornell.edu>, visit the undergraduate program office in 12 Fernow Hall, or send e-mail to [sw38@cornell.edu](mailto:sw38@cornell.edu).

### Special Programs in Agriculture and Life Sciences

**Interdisciplinary Studies.** The opportunity to develop an independent major in interdisciplinary studies is available for students interested in pursuing a general education in agriculture and life sciences. In consultation with a faculty advisor, students may plan a sequence of courses suited to their individual interests, abilities, and objectives in an area not encompassed by the existing programs. In addition to the distribution and other college requirements, this major may include a concentration of courses in one of several academic units of the college or university. A course of study for a special program must be planned with and approved by a college faculty advisor. Information on the options and names of faculty advisors prepared to advise in special programs are available in the Counseling and Advising Office, 140 Roberts Hall.

## DESCRIPTION OF COURSES

Undergraduate and graduate courses in the college are offered through the academic departments and units and also through the biological sciences undergraduate program and the Division of Nutritional Sciences.

Descriptions of undergraduate and graduate courses are arranged by department, in alphabetical order.

Graduate study is organized under graduate fields, which generally coincide with the departments. Graduate degree requirements are described in the *Announcement of the Graduate School*. Courses for graduate students are described in the section on the academic department that offers them.

## INTERDEPARTMENTAL/INTERCOLLEGE COURSES

### American Indian Studies

The American Indian Program offers a minor in American Indian Studies to undergraduate students. The minor is earned upon the completion of five courses: AIS 100 and AIS 101, plus at least three other courses from the AIS curriculum, for a minimum total of 15 credit hours. The three additional courses must include one course from Group A (arts and humanities) and one course from Group B (social and natural sciences) as listed below. One of the courses offered toward the minor must be at the 300- or 400-level. Only one 3-credit independent study (AIS 497) may be counted toward the minor. Only program-listed courses for which the student has earned a letter grade of C or better will be counted toward the minor. No courses taken for S-U credit will be counted toward the minor. Students seeking to minor in American Indian studies are encouraged to contact Professor Kurt Jordan, associate director of academic development, 255-3109. Application materials for the minor may also be obtained from the AIP office, 4th floor, Caldwell Hall. Students are also advised to consult [www.aip.cornell.edu/academic.htm](http://www.aip.cornell.edu/academic.htm) for the most up-to-date listings of course offerings.

### Minor in American Indian Studies

#### Required Courses

- AIS 100 Introduction to American Indian Studies I: Indigenous North America to 1890
- AIS 101 Introduction to American Indian Studies II: Contemporary Issues in Indigenous North America

#### Electives

##### (Group A, Arts and Humanities)

- AIS 195 Colonial Latin America
- AIS 236 Native Peoples of the Northeast
- AIS 239 Seminar in Iroquois History
- AIS 260 Introduction to Native American Literature
- AIS 266 Introduction to Native American History
- AIS 364 Politics of "Nations Within"
- AIS 386 Contemporary American Indian Fiction of the United States
- AIS 404 Race and Ethnicity in Latin America

- AIS 486 American Indian Women's Literature
- AIS 490 New World Encounters, 1500–1800

##### (Group B, Social and Natural Sciences)

- AIS 230 Cultures of Native North America
- AIS 235 Archaeology of North American Indians
- AIS 311 Social Movements
- AIS 333 Environmental Issues and Indigenous People
- AIS 340 Contested Terrain: Hawaii
- AIS 348 Iroquois Archaeology
- AIS 353 Anthropology of Colonialism
- AIS 435 Indigenous Peoples and Globalization
- AIS 472 Historical Archaeology of Indigenous Peoples
- AIS 475 Governmentality, Citizenship, and Indigenous Political Theory

##### (Independent Study)

- AIS 497 Independent Study

J. Mt. Pleasant, director; E. Cheyfitz, L. Donaldson, C. Geisler, A. Gonzales, K. Jordan, M. Muskett, J. Parmenter, T. Richardson, A. Simpson

### AIS 100(1100) Introduction to American Indian Studies I: Indigenous North America to 1890 (CA) (HA) (D)

Fall. 3 credits. K. Jordan.

Provides an interdisciplinary introduction to American Indian cultures and histories from Precolumbian times to 1890, emphasizing the current relevance of traditional values and the ways the deep past continues to affect present-day Indian peoples. Course materials draw on perspectives from the humanities, social sciences and expressive arts.

### AIS 101(1110) Introduction to American Indian Studies II: Contemporary Issues in Indigenous North America (CA) (HA)

Spring. 3 credits. A. Simpson.

Interdisciplinary exploration of contemporary issues in American Indian Country north of Mexico after 1890. Examines Indian sovereignty, nationhood, agency and engagement through time using the perspective of American Indian Studies. Course materials are drawn from the humanities, social science and expressive arts.

### [AIS 195(1950) Colonial Latin America (also HIST 195(1950)) (CA) (HA)

Fall. 4 credits. S-U grades optional. Not offered 2006–2007. K. Graubart.

For description, see HIST 195.]

### AIS 230(2300) Cultures of Native North America (also ANTHR 230(2730)) (CA) (HA) (D)

Fall. 3 or 4 credits. B. Lambert.

For description, see ANTHR 230.

### AIS 235(2350) Archaeology of North American Indians (also ANTHR 235(2235)) (CA) (HA) (D)

Spring. 3 credits. K. Jordan.

For description, see ANTHR 235.

### AIS 236(2360) Native Peoples of the Northeast, Pre-Contact to the Present (also HIST/AM ST 236(2360)) (CA) (HA) (D)

Spring. 4 credits. J. Parmenter.

For description, see HIST 236.

**[AIS 239(2390) Seminar in Iroquois History (also HIST 239[2390]) (CA) (HA)]**

Fall. 4 credits. Not offered 2006–2007.  
J. Parmenter.

For description, see HIST 239.]

**[AIS 260(2600) Survey of American Indian Literatures in the United States (also ENGL 260[2600]) (LA) (CA) (D)]**

Spring. 4 credits. Not offered 2006–2007.  
E. Cheyfitz.

For description, see ENGL 260.]

**[AIS 266(2660) Introduction to Native American History (also HIST/AM ST 266[2660]) (CA) (HA)]**

Spring. 4 credits. J. Parmenter.

For description, see HIST 266.

**[AIS 311(3110) Social Movements (also D SOC/LSP 311[3110]) (D)]**

Fall. 3 credits. Prerequisites: D SOC/SOC 101 or permission of instructor. S-U grades optional. Not offered 2006–2007.  
A. Gonzales.

Social movements are collective efforts by relatively powerless groups of people to change society. Typically conceptualized as political activity outside the institutional framework, social movements are "politics by other means." This course examines the transnational dimensions of social movements to assess the implications of globalization for political mobilization and the ways that social movement actors engage the global political process to effect social change. Under what circumstances do movements emerge? How do global processes shape both domestic and transnational political mobilization? How do movements internally organize and choose political tactics and strategies to achieve their goals? How have social movements changed history, identities, society, and politics? This course addresses these and related questions through an examination of indigenous peoples' movements in the United States, Canada, and Latin America.]

**[AIS 333(3330) Environmental Issues and Indigenous People (also NTRES 333[3330]) (CA) (D)]**

Spring. 3 credits. M. Muskett.

For description, see NTRES 333.

**[AIS 340(3400) Contested Terrain: Hawaii (also SOC 342[3420]) (CA) (SBA)]**

Spring. 3 credits. Prerequisite: introductory or intermediate-level social sciences or history. M. M. Hamabata.

This course, offered in conjunction with Earth and Atmospheric Sciences' program in Hawaii, draws from the fields of history, political science, and sociology to present an historical understanding of contemporary Hawaiian society. Topics include Western contact, establishment of Western institutions, overthrow of a sovereign government, annexation, integration into the United States. Direct experience with Hawaiian leaders and institutions are incorporated to address contemporary issues: sovereignty, economic development/dependency, social change, and land use as a sociopolitical and cultural struggle. Students should consult [www.eas.cornell.edu/hawaii/](http://www.eas.cornell.edu/hawaii/) regarding the status of this course.

**[AIS 348/648(3480/6480) Iroquois Archaeology (also ANTHR 348/648[3480/6480]) (CA) (HA)]**

Spring. 4 credits. S-U grades optional. Not offered 2006–2007. K. Jordan.

For description, see ANTHR 348/648.]

**[AIS 353(3530) Anthropology of Colonialism (also ANTHR 353[3453]) (CA) (SBA) (D)]**

Fall. 4 credits. A. Simpson.

For description, see ANTHR 353.

**[AIS 364(3640) Politics of "Nations Within" (also GOVT 364[3640]) (SBA) (KCM)]**

Fall. 4 credits. Letter grades only. Offered alternate years. B. Hendrix.

For description, see GOVT 364.

**[AIS 386(3860) Contemporary American Indian Fiction (also ENGL 367[3670]) (LA) (CA) (D)]**

Fall. 4 credits. Not offered 2006–2007.

Examines contemporary American Indian fiction as a response to the colonial structure of federal Indian law. Beginning with Mourning Dove's *Cogewea*, a novel of the Allotment Era, students read works by a range of Native fiction writers (from a list that includes McNickle, Welch, Silko, Vizenor, Hogan, Alexie, Walters, Glancy, and Red Corn) that respond critically to U.S. federal Indian policy.]

**[AIS 404(4040) Race and Ethnicity in Latin America (also HIST 404[6041]) (CA) (HA)]**

Fall. 4 credits. Recommended: Latin

American history course. Not offered 2006–2007. K. Graubart.

For description, see HIST 404.]

**[AIS 435(4350) Tribal Governance and Environmental Policy (also NTRES 435[4350]) (CA)]**

Fall. 3 credits. M. Muskett.

For description, see NTRES 435.

**[AIS 472/772(4720/7720) Historical Archaeology of Indigenous Peoples (CA) (HA)]**

Fall. 4 credits. K. A. Jordan.

Seminar examining the responses of indigenous peoples across the world to European expansion and colonialism over the past 500 years. Archaeological case studies from North America, Africa, and the Pacific provide a comparative perspective on Postcolumbian culture contact and illustrate how archaeology can both supplement and challenge document-based histories.

**[AIS 475(4750) Governmentality, Citizenship, and Indigenous Political Theory (also ANTHR 475[4750]) (CA) (KCM)]**

Spring. 4 credits. A. Simpson.

For description, see ANTHR 475.

**[AIS 486(4860) American Indian Women's Literature (also ENGL 486[4860]) (LA) (CA) (D)]**

Spring. 4 credits. Not offered 2006–2007.

For description, see ENGL 486.]

**[AIS 490(4900) New World Encounters, 1500 to 1800 (also HIST 490[4990], AM ST 499[4990]) (CA) (HA) (D)]**

Spring. 4 credits. Not offered 2006–2007.  
J. Parmenter.

For description, see HIST 490.]

**[AIS 497(4970) Independent Study]**

Fall or spring. 1–4 credits. Staff.

Topic and credit hours TBA between faculty member and student. The American Indian Program office must approve independent study forms.

**[AIS 600(6000) American Indian Studies (D)]**

Fall. 4 credits. A. Simpson.

**[AIS 601(6010) American Indian Studies Proseminar]**

Fall and spring. 1 credit. Staff.

Graduate-level course that introduces students to ongoing research in the field of American Indian Studies in a proseminar/colloquium format. Advanced graduate students are expected to present their work in progress; all are expected to attend each seminar and provide presenters with critical and constructive commentary on papers.

**[AIS 635(6350) Indigenous Peoples and Globalization (also D SOC/LAT A 635[6350]) (D)]**

Fall. 3 credits. Not offered 2006–2007. Staff.

Explores ways in which processes of globalization affect indigenous peoples worldwide and the strategies indigenous peoples are using to deal with those pressures. Globalization, whether under the auspices of the World Trade Organization and regional economic agreements such as the NAFTA or the deterritorialization of social and political arrangements cotemporal with modernization or the expansion of communication technology and its impact on traditional knowledge systems, have had profound social, cultural, and economic impacts on indigenous peoples. At issue are the lands, resources, traditional knowledge, intellectual and cultural property, and indigenous struggles for recognition and self-determination.]

**[AIS 671(6710) Law and Literature in the Antebellum United States (also ENGL 671)]**

Spring. 4 credits. Not offered 2006–2007.  
E. Cheyfitz.

For description, see ENGL 671.]

**[AIS 726(7260) Federal Indian Law: The Legal Construction of Indian Country (also LAW 726) (D)]**

Spring. 3 credits. Limited enrollment.

Students who have taken LAW 608

American Indian Law may also take this seminar. Letter grades only. Not offered 2006–2007. E. Cheyfitz.

For description, see LAW 726.]

**Department of Statistical Science**

The university-wide Department of Statistical Science coordinates undergraduate and graduate study in statistics and probability. A list of suitable courses can be found at the front of this catalog (see p. 25).



## Environmental Toxicology

B. A. Ahner, A. J. Baeumner, S. E. Bloom, K. J. Boor, P. R. Bowser, D. L. Brown, J. W. Casey, R. R. Dietert, R. A. Durst, J. W. Gillett, A. G. Hay, A. Hedge, J. H. Hotchkiss, L. V. Kochian, W. L. Kraus, A. T. Lemley, L. W. Lion, R. H. Liu, E. L. Madsen, M. B. McBride, C. McCormick, A. Nikitin, B. U. Pauli, R. Richardson, M. Roberson, E. Rodriguez, J. G. Scott, M. L. Shuler, S. M. Snedeker, D. A. Soderlund, J. R. Stedinger, B. J. Strupp, D. A. Weinstein, R. S. Weiss, D. B. Wilson, A. Yen

There is both breadth and depth in many facets of environmental toxicology and related disciplines. The program offers a combination of research and didactic training that is designed to prepare students for solving the problems of modern toxicology. The graduate student may choose from three degree options: M.S., M.S./Ph.D., or Ph.D. Concentrations include cellular and molecular toxicology; nutritional and food toxicology; ecotoxicology and environmental chemistry; and risk assessment, management, and public policy. Research by the faculty associated with the program focuses on the interactions of drugs, pesticides, and other potentially hazardous environmental agents with a wide variety of living organisms (including humans) as well as the ecosystems with which these organisms are associated. General information is available through the Environmental Toxicology office in 116 Stocking Hall, or at [toxicology.cornell.edu](http://toxicology.cornell.edu).

### [TOX 323(3230) Principles of Toxicology (Undergraduate) (also NTRES 323(3230))]

Spring. 3 credits. Prerequisites: one year each of chemistry and biology with labs; one semester of organic chemistry lecture or permission of instructor. Not offered 2006–2007. Staff.

For description, see NTRES 323.]

### [TOX 370(3700) Pesticides and the Environment (also ENTOM 370(3700))]

Fall. 2 credits. Prerequisites: BIO G 101–102 or equivalent. Offered even years.

J. G. Scott.

For description, see ENTOM 370.

### [TOX 406(4060) Ecology Risk Assessment (also NTRES 406(4060))]

Fall. 3 credits. Prerequisites: BIOEE 261 or equivalent; advanced student in natural sciences or engineering or permission of instructor. Not offered 2006–2007. Staff.

For description, see NTRES 406.]

### [TOX 437(4370) Eukaryotic Cell Proliferation (also BIOBM 437(4370))]

Fall. Variable credit; students may take lec for 2 credits, or lec and disc for 3 credits. Limited to 20 students per disc; priority given to graduate students. Prerequisite: BIO G 101–102 or 105–106 and BIOBM 330 or 331/332. Recommended: BIOGD 281 and BIOBM 432. S. Lee.

For description see BIOBM 437.

### [TOX 490(4900) Insect Toxicology and Insecticidal Chemistry (also ENTOM 490(4900))]

Spring. 3 credits. Prerequisite: general chemistry course. Offered odd years.

J. G. Scott.

For description, see ENTOM 490.

### [TOX 597(5970) Risk Analysis and Management (also CEE 597(5970))]

Spring. 3 credits. Prerequisite: introduction to probability and statistics course (e.g., CEE 304, ENGRD 270, ILRST 210, BTRY 261 or AEM 210); two semesters of calculus. Prerequisite: senior or graduate standing or permission of instructor.

J. R. Stedinger.

For description, see CEE 597.

### [TOX 607(6070) Ecotoxicology (also NTRES 607(6070))]

Spring. 3 credits. Prerequisites: graduate or senior standing; two 300-level courses in chemistry, biological science, or toxicology. Offered alternate even years; not offered 2006–2007. Staff.

For description, see NTRES 607.]

### [TOX 610(6100) Introduction to Chemical and Environmental Toxicology (also BIOMI 610(6100))]

Fall. 3 credits. Prerequisite: graduate standing in field or permission of instructor. A. G. Hay.

For description, see BIOMI 610.

### [TOX 611(6110) Molecular Toxicology (also NS 611(6110))]

Spring. 3 credits. Prerequisites: TOX 610 or permission of instructors. Offered alternate years. S. Bloom, R. Dietert, D. Muscarella, and B. Strupp.

For description, see NS 611.

### [TOX 698(6980) Current Topics in Environmental Toxicology (also NTRES 698(6980), NS 700(7000))]

Fall, spring. 1 to 3 credits. Prerequisites: graduate or senior standing in scientific discipline and permission of instructor.

For description, see NTRES 698.

### [TOX 699(6990) Environmental Toxicology Journal Club (also BIOMI 699(6990))]

Spring only. 1 credit. Requirement for env. tox. students until post-A exam.

A. G. Hay.

### [TOX 701(7010) Mouse Pathology and Transgenesis (also VTBS 701(7010))]

Spring only. 1 credit. Prerequisites: basic course in histology (BIOAP 413 or equivalent) highly recommended, or permission of instructor. Letter grades only.

A. Nikitin.

For description, see VTBS 701.

### [TOX 702(7020) Seminar in Toxicology (also NS 702(7020))]

Fall or spring. 1 credit.

For description, see NS 702.

### [TOX 713(7130) Cell Cycle Analysis (also VTBS 713(7130))]

Spring. 1 credit. S-U grades only. Offered alternate years; next offered 2007–2008.

A. Yen.

For description, see VTBS 713.]

### [TOX 890(8900) Master's Thesis and Research]

Fall/spring. Credit TBA. Prerequisite: permission of chair of graduate committee and instructor.

### [TOX 990(9900) Doctoral Thesis and Research]

Fall/spring. Credit TBA. Prerequisite: permission of chair of graduate committee and instructor.

## Related Course in Other Department

FD SC 621(6210) Food Lipids

## NONDEPARTMENTAL COURSES

### ALS 100(1000) College and Career Exploration in the College of Agriculture and Life Sciences

Summer. 1 or 3 credits. Prerequisite: high school juniors or seniors. Letter grades only. B. Earle.

This program is a great opportunity to explore possible majors, careers, and research opportunities in Cornell's world-class College of Agriculture and Life Sciences (CALS) while earning college credit. The one-week program, for 1 credit, will consist of students attending presentations by admissions, career, and student services offices; talk with faculty members, staff, and students; visit labs and research facilities; enjoy field trips; participate in team projects; and write several short papers. You'll also focus on two of CALS's four priority areas. The three-week program, for 3 credits, combines the one-week program with two additional weeks of in-depth, hands-on exploration into the two subject areas you selected during the first week.

### ALS 101(1101) Transition to and Success at Cornell

Fall. 1 credit. Prerequisite: entering students in CALS. Letter grades only.

B. O. Earle and CALS Career Development Office.

Discussion-oriented course to enable all new CALS students to enjoy their experience at and transition to Cornell. Lecture, discussion, guest speakers, student panels, and assignments that explore Cornell's history, academic opportunities, services, and organizations are used. Emphasizes the role of Agriculture and Life Sciences in the future of all related careers.

### ALS 134(1340) Emergency Medical Technician

Fall and spring. 3 credits each semester.

Two-semester course; students enroll in fall semester only. Recommended: basic or advanced first aid. S-U grades optional.

D. A. Grossman, P. Rach, and

A. E. Gantert.

Intensive 140-hour course taught throughout the fall and spring semesters. Includes training in C.P.R. for the professional rescuer, oxygen administration, airway management, fracture management, bleeding control, patient assessment, spinal immobilization, the use of medical antishock trousers, and defibrillation. Students qualify for the New York State E.M.T. Certification Exam upon successful completion of the course.

### ALS 135(1350) Advanced Emergency Medical Technician, Critical Care

Fall and spring; two-semester course. 4 credits each semester. Prerequisite: current certification as N.Y.S. Basic E.M.T. or have applied for reciprocity. S-U grades optional. D. Grossman, P. Rach, and

D. Spaulding.

Includes topics such as emergency pharmacology, patient assessment, advanced cardiac life support, emergency hypoperfusion management, and basic trauma life support. Uses classroom, lab, hospital, and field sessions to teach skills such as intubation, emergency IV access, electro-cardioversion

and defibrillation, and patient assessment and pharmacological intervention. Requires extensive out of classroom (exceeds 140 hours) time.

**ALS 392(3920) New York State Government Affairs (also PAM 392[3920])**

Spring. 15 credits. Prerequisite: junior or senior standing; minimum GPA of 2.3. W. Rosen.

For description see PAM 392.

**ALS 400(4000) Internship**

Fall, spring, or summer. 6 credits max. Not open to students who have earned internship credits elsewhere or in previous semesters. S-U grades only.

Students may register only for internships in the New York State Assembly Intern Program, the New York State Senate Session Assistant's Program, and the Albany Semester Program. A learning contract is negotiated between the student and the faculty supervisor(s), stating conditions of the work assignment, supervision, and reporting. Requires participation in any structured learning activities associated with the internship.

**ALS 476(4760) Environmental Stewardship in the Cornell Community I**

Fall. 1 credit. Prerequisite: freshmen and new students. S-U or letter grades. R. Sherman.

This two-semester course is an opportunity for you to become involved with the Cornell Sustainable Campus initiative by designing and implementing a project that promotes environmental stewardship on campus. During the fall semester, we will explore concepts of sustainability, meet with student leaders of various campus organizations who are promoting Cornell's mission of sustainability, and learn about what has been done and what is being done to achieve a more environmentally friendly campus. In addition, each student will identify a potential project and conduct preliminary work that lays the groundwork for the spring semester course (ALS 477). Note: You are *not* required to take ALS 477 if you take ALS 476.

**ALS 477(4770) Environmental Stewardship in the Cornell Community II**

Spring. 2-4 credits, variable.

J. M. Regenstien, plus faculty advisor.

Each student undertakes an original project to improve the environment at Cornell while working with a faculty advisor and the Cornell infrastructure (generally campus life and/or facilities). Through class discussions, students learn how to be more effective at developing environmental programs in the future, both during and after college. Students present the final written project report orally at a public forum. (Note: If students prefer to take 1 or 2 credits of independent research in a department in the College of Agriculture and Life Sciences, this can be arranged. Assistance in finding a faculty advisor is provided. May be taken more than once.)

**ALS 494(4940) Special Topics in Agriculture and Life Sciences**

Fall or spring. 4 credits max. S-U grades optional.

The college teaches "trial" or temporary courses under this number. Offerings vary by semester and are advertised by the college before the beginning of the semester. The

same course is not offered more than twice under this number.

**ALS 499(4991/4992) Honors Project I and II (also B&SOC/S&TS 499[4991/4992])**

Fall and spring (yearlong). 8 credits (register for 8 credits each semester; total credits awarded is 8). Prerequisite: biology & society seniors and permission of department; overall GPA of 3.3. Apply in 306 Rockefeller Hall.

Students who are admitted to the honors program are required to complete two semesters of honors project research and to write an honors thesis. The project must include substantial research and the completed work should be of wider scope and greater originality than is normal for an upper-level course.

**ALS 500(4998) Politics and Policy: Theory, Research, and Practice (also AM ST 501[4998], PAM 406[4998], GOVT 500[4998])**

Students in CALS must register for ALS 500. S. Jackson and staff.

This course, taught in Washington, D.C., forms the core of the public policy option of the Cornell in Washington program. The central objective is to provide students with the instruction and guidance necessary to analyze and evaluate their own chosen issue in public policy. Toward that end, the course has three components: (1) weekly lectures providing background on the structures and processes of national politics and policy as well as training in research methodology; (2) student externships; and (3) individual research papers or projects. All three components interrelate to provide students with a strategy and framework for integrating classroom-based learning, field experience, and individual research. Students apply through the Cornell in Washington office, M101 McGraw Hall.

**ALS 580(5800) International Teaching Assistant Development Program Course 3**

Fall or spring. 2 credits. Prerequisite: EDUC 579. ITADP staff.

Specifically designed for international graduate students who plan to assume teaching assistant responsibilities that range from lab introductions to individual tutoring sessions. Participants address English-language issues relating to phonemes, grammar, and suprasegmentals. Activities in these areas target communicative functions such as presenting concepts, initiating and sustaining conversation, and interpreting information in academic settings.

**ALS 581(5810) International Teaching Assistant Development Program Course 4**

Fall or spring. 2 credits. Prerequisite: ALS 580. ITADP staff.

Specifically designed for international graduate students who have completed ALS 580 and who plan to assume teaching assistant responsibilities that range from lab introductions to individual tutoring sessions. Participants develop skills in self-monitoring, critical listening and language fluency with attention to time frame usage, academic terminology, extended discourse, and compensatory speech strategies.

**ALS 661(6610) Environmental Policy (also B&SOC 461[4611], BIOEE 661[6610])**

Fall and spring. 3 credits each semester; students must register for 6 credits each semester since "R" grade is given at end of fall semester. Limited to 12 students.

Prerequisite: permission of instructor. D. Pimentel.

For description, see BIOEE 661.

**APPLIED ECONOMICS AND MANAGEMENT**

W. H. Lesser, chair (154 Warren Hall, 255-4576); C. B. Barrett, N. L. Bills, G. Blalock, V. L. Bogan, R. N. Boisvert, L. D. Chapman, N. H. Chau, R. D. Christy, J. M. Conrad, R. T. Curtis, H. Daouk, H. de Gorter, B. A. Gloy, C. Gomes, D. A. Grossman, J. M. Hagen, D. R. Just, H. M. Kaiser, S. M. Kanbur, W. A. Knoblauch, S. C. Kyle, E. L. LaDue, D. R. Lee, A. E. Leiponen, J. E. Little, E. W. McLaughlin, T. D. Mount, D. T.-C. Ng, A. M. Novakovic, P. D. Perez, D. J. Perosio, G. L. Poe, J. E. Pratt, J. T. Prince, S. P. Raj, C. K. Ranney, T. M. Schmit, W. D. Schulze, D. H. Simon, M. W. Stephenson, D. H. Streeter, L. W. Tauer, W. G. Tomek, C. G. Turvey, C. L. van Es, A. Wang, B. Wansink, G. B. White

**Courses by Subject**

Farm management, agricultural finance, and production economics: 302, 403, 404, 405, 608, 708

Statistics, quantitative methods, and analytical economics: 210, 410, 411, 412, 415, 417, 419, 711, 712, 713, 714, 717

Management, finance, law, and accounting: 220, 221, 222, 320, 321, 322, 323, 324, 325, 329, 420, 421, 422, 424, 425, 427, 428, 429, 437

Policy and international trade: 230, 335, 430, 431, 432, 433, 434, 630, 632, 633, 634, 730, 735

Marketing and food distribution: 240, 241, 342, 344, 346, 442, 443, 444, 446, 447, 448, 449, 640, 641

Environmental and resource economics: 250, 450, 451, 455, 651, 655, 750

Economics of development: 464, 660, 667, 762, 765

Consumer economics: 670

General, contemporary issues, research, and other: 101, 200, 380, 494, 497, 498, 499, 694, 698, 699, 700, 800, 900, 901

**AEM 101(1101) Introduction to Applied Economics and Management**

Fall. 1 credit. Prerequisite: required of and limited to freshmen in AEM. S-U grades only. D. A. Grossman and A. M. Novakovic.

The purpose of this course is to acquaint first-year students in AEM with their new department and better enable them to make academic and early career decisions. A cross-section of faculty will lead discussions that introduce most of the major academic subjects taught in AEM. In addition, there are guest presenters on topics such as career planning, student organizations, course planning, and ethics and academic integrity. There are several homework assignments.

**AEM 120(1200) Foundations of Entrepreneurship and Business**

Fall. 2 credits. P. D. Perez.

Introductory course providing a sound base to both the understanding of entrepreneurial activity and possibilities and the study and practice of entrepreneurship at Cornell. Includes lectures, selected guest appearances by successful entrepreneurs, and extensive use of IT-based learning and presentation tools.

**AEM 121(1210) Entrepreneurship Speaker Series**

Fall, spring. 1 credit. M. P. D. Perez.

Seminars and guest lectures by faculty members engaged in the study and practice of entrepreneurship and by prominent entrepreneurs associated with the Entrepreneurship and Personal Enterprise program at Cornell, with a view to inform and inspire students. Evaluation includes attendance and written feedback on lectures. Intended as a companion to AEM 120 but may be taken independently.

**AEM 200(2000) Contemporary Controversies in the Global Economy**

Fall. 3 credits. Prerequisite: ECON 101. Recommended: ECON 102. Priority given to sophomores and juniors in AEM. C. Barrett.

Aims to stimulate critical thinking and cogent writing and speaking about contemporary controversies that attract regular attention in the international press and among key private and public sector decision-makers. Students read and discuss competing arguments about current issues such as patenting and pricing of pharmaceuticals worldwide, controls on commercial and humanitarian distribution of genetically modified foods, and immigration restrictions. Students write a series of short briefing papers and give regular oral briefs, which are evaluated for quality of communication and content.

**AEM 210(2100) Introductory Statistics**

Spring. 4 credits. Prerequisite: EDUC 115 or equivalent level of algebra. Two evening prelims. C. van Es.

Introduces statistical methods. Topics include the descriptive analysis of data, probability concepts and distributions, estimation and hypothesis testing, regression, and correlation analysis. Includes an introduction to Minitab, a statistical software package.

**AEM 220(2200) Introduction to Business Management (D)**

Spring, summer. 3 credits. Two evening prelims. P. D. Perez.

Provides an overview of management and business. Human resource, marketing, finance, and strategy concerns are addressed with consideration paid to current issues such as technology and its impact on operations, globalization, ethics, quality, and entrepreneurship. Guest speakers are an important part of the course.

**AEM 221(2210) Financial Accounting**

Fall. 3 credits. Not open to freshmen. Priority given to CALS majors. Two evening prelims. J. Little.

Comprehensive introduction to financial accounting concepts and techniques, intended to provide a basic understanding of the accounting cycle, elements of financial statements, underlying theory of GAAP, and financial statement interpretation. Topics include methods of recording inventory, receivables, depreciation, bonds, and equity. Requires two evening prelims and

a comprehensive final; weekly homework assignments.

**AEM 222(2220) Business Management Case Analysis**

Spring. 1 credit. Requirement for and limited to AEM majors. P. D. Perez.

Offers students teams the opportunity for hands-on application of general business management concepts through discussion and written analysis of a series of cases. Case topics are closely coordinated with both the content and sequencing of material presented in AEM 220.

**AEM 230(2300) International Trade and Finance (also ECON 230(2300))**

Spring. 3 credits. Prerequisites: ECON 101 or equivalent. Recommended: ECON 102 or equivalent. S-U grades optional. One evening prelim. D. R. Lee.

One-semester introduction to international economic principles and issues. Begins by surveying key topics such as the elements of comparative advantage, tariff and nontariff barriers, and multilateral institutions. The second part of the course treats selected topics in international finance, including exchange rates, balance of payments, and capital markets. Discusses current issues such as the effects of trade liberalization, trade and economic growth, and instability in international capital markets. Designed as a less technical introduction to concepts developed at a more advanced level in AEM 430 and ECON 361-362.

**AEM 240(2400) Marketing**

Fall. 3 credits. E. W. McLaughlin.

Provides a broad introduction to the fundamentals of marketing. Explores the components of an organization's strategic marketing program, including how to price, promote, and distribute goods and services. Industry guest lectures and current marketing applications from various companies are presented and analyzed.

**AEM 241(2410) Marketing Plan Development**

Fall. 1 credit. Requirement for and limited to AEM majors. D. J. Perosio.

Offers student teams the opportunity for an intense, hands-on application of basic marketing concepts through research and development of a marketing plan. Guided by a series of assignments, teams develop key components that are integrated into a comprehensive written plan for a local business.

**AEM 250(2500) Environmental and Resource Economics**

Spring. 3 credits. S-U grades optional. L. D. Chapman.

Introduces fundamental economic principles and the "economic approach" to policy issues, and demonstrates how these concepts underpin contemporary environmental and natural resource issues and policy solutions. Subjects include valuation, benefit-cost analysis, policy design, property rights, and ecological economics. Uses these tools to explore major current policy issues such as economic incentives in environmental policy, endangered species protection, air and water pollution, depletion of renewable and nonrenewable resources, and global warming.

**AEM 302(3020) Farm Business Management**

Fall. 4 credits. Not open to freshmen.

Prerequisite for AEM 405 and 427.

W. A. Knoblauch.

Intensive study of planning, directing, organizing, and controlling a farm business, with emphasis on the tools of managerial analysis and decision making. Topics include financial statements, business analysis, budgeting, and acquisition, organization, and management of capital, labor, land, buildings, and machinery.

**AEM 320(3200) Business Law I (also NBA 560(5600))**

Fall and summer. 3 credits. Prerequisite: junior, senior, or graduate standing. One evening prelim. D. A. Grossman.

Examines legal problems of particular interest to persons who expect to engage in business. Emphasizes the law of contracts, sales, agency, and property.

**AEM 321(3210) Business Law II (also NBA 561(5610)) (D)**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing; business law course or permission of instructor. D. A. Grossman.

The first portion of this course examines legal issues in the formation and operation of business enterprises, particularly partnerships, corporations, and limited liability companies. The second portion reviews selected topics in business law, like employment discrimination, debtor/creditor relations, product liability, unfair competition, e-commerce law, and international business law.

**AEM 322(3220) Information Technology Strategy**

Spring. 3 credits. Prerequisites: AEM 220 and ECON 101. A. Leiponen.

Explores the impact of new technologies on business processes and industries. Focuses particularly on the effects of information and communication technologies (ICT). The objective is to understand the nature of information as an economic good, business opportunities and challenges created by ICT, and organizational constraints involved in exploiting these opportunities.

**AEM 323(3230) Managerial Accounting**

Spring. 3 credits. Priority given to CALS majors. Prerequisite: AEM 221 or equivalent. Two evening prelims. J. Little.

Introduction to cost accounting emphasizing the application of accounting concepts to managerial control and decision making. Major topics include product costing, standard costing, cost behavior, cost allocation, budgeting, variance analysis, and accounting systems in the manufacturing environment. Requires use of electronic spreadsheets. Includes two evening prelims, a third exam, weekly homework.

**AEM 324(3240) Finance**

Fall. 4 credits. Priority given to CALS majors. Prerequisites: AEM 210, 220, and 221, or equivalents. Three evening prelims. R. Curtis.

Focuses on the mathematics of finance, valuation, and the economics of managerial decisions, corporate financial policy, risk management, and investments. Topics include the time value of money, bond and stock valuation, capital-budgeting decisions, financing alternatives, the cost of capital and the capital-structure decision, distribution policy, mergers and acquisitions and

restructuring, options, forward and futures contracts, market efficiency and market anomalies, strategies of successful investors, and personal finance.

**AEM 325(3250) Personal Enterprise and Small Business Management**

Spring. 4 credits. Prerequisites: junior or senior standing; AEM 220 and 221 or permission of instructor. Absolutely no adds or drops after second class meeting. Cost of term project: approx. \$100 per team. D. Streeter.

Focuses on the activities involved in planning a start-up business, including the exploration of strategic dimensions, performance of marketing research, and planning of financial aspects related to the new company. Lectures and hands-on clinics include visits by real world entrepreneurs, who discuss the start-up process and the challenges of managing growth in a small business. Term project is the development of a business plan, completed in teams of no fewer than three students.

**AEM 328(3280) Innovation and Dynamic Management (also H ADM 444[4443])**

Spring. 3 credits. Prerequisite: junior or senior standing. Staff.

For description, see H ADM 443.

**AEM 329(3290) International Agribusiness Study Trip**

Fall. 2 credits. Prerequisites: AEM 220 or 302, and 240. Open by application before March 1 of spring semester before course is offered. Approximately 12 students are selected with preference given to sophomores and juniors in CALS. Field study co-payment: \$800. B. A. Gloy and L. W. Tauer.

Gives students interested in agribusiness management exposure to the managerial practices essential to the success of agriculture, agribusiness, and food companies competing in the global marketplace. Involves a two-week international field study trip that takes place after the final exam period of the spring semester before the course is offered. The course meets for a few sessions in advance of the field study trip. A paper analyzing an aspect of the field study is required.

**AEM 330(3300) Managerial Economics and Decision Making**

Spring. 3 credits. Prerequisites: AEM 220 and ECON 101. D. Simon.

Focuses on tools for making various decisions managers encounter in the real world, including decisions of pricing, output, advertising expenditures, and new product introductions. Considers issues such as how to estimate a firm's demand and cost functions as considered in making such decisions. Compares standard microeconomic models with more realistic approaches to making decisions. Emphasizes considering decisions that are less stylized and more similar to those managers face on a regular basis.

**AEM 331(3310) Economic of Business Regulation**

Spring. 3 credits. Prerequisites: ECON 101, 313, and AEM 220. S-U or letter grades. J. Prince.

Studies the economics and other factors (e.g., politics, lobbying) that determine regulation policy along with firm strategies in regulated or potentially regulated markets. Major topics include: antitrust, economic regulation and

environmental regulation. Applications to the current business environment are emphasized.

**AEM 333(3330) European Business Institutions**

Spring. 1 credit. Prerequisites: ECON 101 and AEM 220. A. Leiponen.

This course examines the institutional environment of business in Europe on different levels including national and supranational (EU) power structures, forms of business organization and governance, and culture and values. As a result of this course, students will be able to understand and be sensitive to the drivers of business behavior and performance in a foreign, particularly European, context.

**AEM 334(3340) Women, Leadership, and Entrepreneurship (D)**

Fall. 1 credit. Prerequisite: junior or senior standing. D. Streeter.

Seminar that uses lectures, guest panels, and readings to focus on issues facing women (and their partners) in their business careers. Topics include status of women in business leadership, pathways and strategies for leadership development, family/life balance issues, gender issues in the workplace, and resources for emerging leaders.

**AEM 335(3350) International Technology Marketing of Biotechnology**

Spring. 3 credits. Prerequisites: ECON 101 and BIO G 109 or equivalents. S-U grades optional. W. H. Lesser.

Explores international technology marketing from an economics perspective using biotechnology as an example. Topics include technology theories, products, risk (health and environmental) regulation, industry structure, labeling uses and regulations, public perceptions, patents, trade, and international conventions. The course is of interest to students of biotechnology, public technology policy, and international technology marketing.

**AEM 342(3420) Integrated Marketing Communication**

Fall. 3 credits. Prerequisite: introductory marketing course; junior or senior standing. S. P. Raj.

Focuses on decisions regarding communication and promotion decisions in companies that market consumer products and services. Course also explores how business-to-business communication differs. Responsibility for many of these decisions typically resides under the brand-management umbrella and calls for an integrated approach to planning, budgeting, and evaluating advertising, sales promotion, and public relations.

**AEM 344(3440) Consumer Behavior**

Fall. 3 credits. Prerequisites: AEM 240 or equivalent. B. Wansink.

Develops a useful, conceptual understanding of the problems and strategies associated with psychology behind consumer behavior. In doing so, the course provides frameworks that enable students to address these issues responsibly, systematically, and creatively.

**AEM 346(3460) Dairy Markets and Policy**

Spring. 3 credits. Prerequisites: junior, senior, or graduate standing; ECON 101 or equivalent. S-U grades optional. A. Novakovic.

Survey of topics related to the structure and performance of U.S. dairy markets and federal and state policies that regulate market

activities. Emphasizes learning both the origin and characteristics of dairy policies and methods for analyzing their impacts on market performance.

**AEM 380(3800) Independent Honors Research in Social Science**

Fall or spring. 1-6 credits. Prerequisite: requirements for honors program met (see "Honors Program" under CALS).

Provides qualified students an opportunity to conduct original research under supervision. Information is available in the AEM undergraduate program office in Warren Hall.

**AEM 403(4030) Farm Management Study Trip**

Spring. 1 credit. Prerequisite: AEM 302. Open by application only.

W. A. Knoblauch and B. Gloy.

Special program to study production and management systems in diverse agricultural regions of the United States. Includes a trip (usually taken during spring break) to the region being studied. A different region is visited each year. The course meets in advance of the study trip and upon return from trip. Students must write a paper that further explores an aspect of the trip.

**[AEM 404(4040) Advanced Agricultural Finance Seminar**

Spring. 3 credits. Limited to 16 students. Prerequisite: senior standing; extensive course work in farm management and farm finance. Open by application before March 1 of year before course is offered. Not offered 2006-2007. Staff.

Special program in agricultural finance, conducted with financial support from the Farm Credit System. Includes two days at Northeast Farm Credit offices, one week in Farm Credit Association offices, a one-day program on FSA financing during fall semester, a two- to four-day trip to financial institutions in New York City, and an actual farm consulting and credit analysis experience in the spring semester.]

**AEM 405(4050) Agricultural Finance**

Spring. 4 credits. Prerequisite: AEM 302 or equivalent. Recommended: calculus and statistics. C. Turvey.

Discusses the principles and practices used in financing agricultural businesses, from the perspectives of the business owner and the lender. Topics include sources of capital, financing entry into agriculture, financial analysis of a business, capital management, financial statements, credit instruments, loan analysis, financial risk, and leasing.

**AEM 410(4100) Business Statistics**

Fall. 3 credits. Prerequisite: AEM 210 or equivalent. C. van Es.

Focuses on techniques used to analyze data from marketing research, business, and economics. Topics include experimental design and ANOVA, contingency-table analysis, quality-control methods, time-series analysis and forecasting. Also includes brief introductions to nonparametric methods and multivariate analysis. Involves a research project designed to give experience in collecting and interpreting data.

**AEM 411(4110) Introduction to Econometrics**

Fall. 3 credits. Prerequisite: AEM 210 and either ECON 313 or PAM 200 or equivalents. D. Just.



Introduces students to basic econometric principles and the use of statistical procedures in empirical studies of economic models. Introduces assumptions, properties, and problems encountered in the use of multiple regression are discussed and simultaneous equation models, simulation, and forecasting techniques.

**AEM 412(4120) Computational Methods for Management and Economics**

Spring. 3 credits. Primarily for juniors, seniors, and M.S. degree candidates. Prerequisite: AEM 210 or equivalent. C. Gomes.

Course in applied mathematical programming. Emphasizes formulation of and interpretation of solutions to mathematical models of problems in economics and business. Studies blending, resource allocation, capital budgeting, transportation and financial planning, and inventory management. Introduces integer and nonlinear programming.

**AEM 414(4140) Behavioral Economics and Managerial Decisions**

Fall. 3 credits. Prerequisites: junior or senior standing; ECON 313 or PAM 200. Lab fee: \$40. D. Just.

Behavioral economics integrates psychology and economics by identifying systematic anomalies in decision-making. These are now recognized to be an important source of error in business decisions, and provide the foundation for both behavioral marketing and finance. The course compares rational choice theory with behavior both in lecture and through a series of economics experiments in which students face situations that are likely to lead to anomalies such as "the winner's curse," the status quo bias, hyperbolic discounting, and bias in assessing risks. Students have the opportunity to evaluate their own decision-making.

**AEM 415(4150) Price Analysis (also ECON 415)**

Fall. 3 credits. Prerequisites: AEM 210 or equivalent, ECON 313 or PAM 200 or equivalent. H. M. Kaiser.

Focuses on the analysis of supply and demand characteristics of commodities with particular attention to agricultural products. Pays special attention to empirical analysis. Includes institutional aspects of pricing, temporal and spatial price relationships, price forecasting, and the economic consequences of pricing decisions.

**AEM 417(4170) Decision Models for Small and Large Businesses**

Fall. 3 credits. Prerequisites: junior or senior standing (priority given to AEM majors); AEM 210 or equivalent. No F lec in weeks labs are held. C. L. van Es.

Focuses on economic and statistical models of decision analysis and their applications in large and small business settings. Demonstrates how use of models can improve the decision-making process by helping the decision maker. Emphasizes the importance of sensitivity analysis and the need to combine both quantitative and qualitative considerations in decision making. Draws cases from small business scenarios, the public policy arena, and corporate settings. Lab sessions focus on implementing decision models with computers.

**AEM 419(4190) Strategic Thinking**

Spring. 3 credits. Prerequisite: PAM 200 or ECON 313. S-U grades optional. N. H. Chau.

The art of thinking strategically puts outdoing one's adversary at the core of the decision-making process, while anticipating that the adversary is doing exactly the same thing. Businesses make investment decisions and innovate products in anticipation of the reaction of their rivals; managers make pay contingent on peer performance, taking into account the reaction of their subordinates and superiors; national trade policies are formulated based on whether trading partners are committed to make credible concessions. This course introduces and explores the use of game theory to understand these interactions; students are expected to work with a balanced dose of both theory and relevant case studies. The objective of the course is to facilitate students' ability to think strategically on firm level issues (e.g., pricing, advertising wars, product differentiation, and entry deterrence) and strategic policy interaction in international economic relations (e.g., trade wars, and the arms race).

**AEM 420(4200) Investments**

Spring. 3 credits. Prerequisites: AEM 210 or equivalent and AEM 324. Recommended: basic knowledge of statistics and linear algebra. Priority given to AEM students. Letter grades only. A. Wang.

Introduces the basic conceptual frameworks and analytical tools used in investment analysis. These tools are then applied to a variety of financial applications, both theoretical and empirical. Topics include: forwards and futures, portfolio theory, CAPM, options, financial management, and selected advanced topics. A portion of this course involves the use of a spreadsheet or other computer programs.

**AEM 421(4210) Derivatives and Risk Management**

Fall. 3 credits. Prerequisites: AEM 210 and 324 or equivalents. Recommended: ECON 313 or equivalent and a calculus course; familiarity with calculus and probability and statistics. Priority given to students in AEM. S-U grades optional. H. Daouk.

Covers the pricing of derivatives and how derivatives can be used for the purpose of risk management and speculation. A portion of this course involves the use of a spreadsheet or other computer programs.

**AEM 422(4220) Estate Planning (also NBA 562[5620])**

Fall. 1 credit. Prerequisite: junior, senior, or graduate standing. S-U grades only. D. A. Grossman.

Fourteen sessions on the various aspects of estate planning techniques. Covers the law and use of trusts, the law of wills, federal and New York State estate and gift taxes, and substitutes for probate procedures.

**AEM 423(4230) Contemporary Topics in Applied Finance**

Fall. 3 credits. Prerequisites: ECON 101, MATH 111 or equivalent, AEM 210 or equivalent, AEM 324. Letter grades. V. Bogan.

Stimulates critical thinking about contemporary topics that attract attention in the press and among key finance decision-makers. This analytical course draws on the theory of modern finance to facilitate the understanding of real world issues. Covers

traditional topics in financial markets such as security trading, derivatives, fixed income, IPOs, portfolio formation, and market efficiency. Also explores newer issues such as technology and financial markets.

**AEM 424(4240) Management Strategy**

Fall and spring. 3 credits. Prerequisite: AEM seniors in business. Fall, G. Blalock; spring, D. Simon.

Capstone course designed to integrate what students have learned in other AEM courses with an emphasis on strategic decision making. Approaches issues from the standpoint of the board of directors, chief executive officer, and business unit managers. Focuses on what should be considered and how strategic decisions should be made.

**AEM 425(4250) Small Business Management Workshop**

Fall. 4 credits. Prerequisite: senior standing, AEM 325 or NBA 300 and permission of instructor. Cost of term project: approx. \$100 per team. D. Streeter.

Students serve as counselors to small businesses in the central New York area and confront problems facing small personal enterprises. Encourages the application of business principles to an existing business and the witnessing of the results of firm-level decision making. Student teams meet with the business owners and course staff members at arranged times during the semester.

**AEM 426(4260) Fixed-Income Securities**

Fall. 3 credits. Prerequisites: MATH 111 or equivalent, AEM 210 or equivalent, AEM 324. Letter grades. V. Bogan.

This course focuses on fixed-income securities including corporate bonds, default-free bonds, and floating rate notes. Other topics include related financial instruments such as forwards and futures on fixed-income securities, interest rate swaps, bond options, and mortgage-backed securities. In addition to the analysis of specific types of fixed-income securities, there will be an examination of the tools used in bond portfolio management.

**[AEM 427(4270) Agribusiness Strategy]**

Fall. 3 credits. Prerequisite: AEM 220 or 302. Not offered 2006–2007. B. A. Gloy.

Intended for students with an interest in agribusiness and designed to integrate previous course work and enhance problem identification and solving skills. Focuses on the evaluation, formulation, and implementation of strategy designed to create and sustain competitive advantage for agribusiness firms. Covers industry analysis, firm analysis, market analysis and selection, risk analysis, strategy development, organizational design and structure, and leadership for agribusiness firms. Designed as a capstone course for the agribusiness management specialization.]

**AEM 428(4280) Valuation of Capital Investment**

Spring. 3 credits. Prerequisites: AEM 210 and 324 or equivalents. D. T.-C. Ng.

Focuses on the analysis of financial information—particularly firms' financial reports—for making decisions to invest in businesses. The primary focus is on equity (share) valuation, with some attention given to credit analysis. Examines various valuation models in detail and applies them in cases and projects involving listed companies. Topics include models of shareholder value, discounted cash flow approaches to valuation,



the analysis of profitability, growth, and valuation generation in a firm, forecasting earnings and cash flows, proforma analysis for strategy and planning, analysis of risk, and the determination of price/earnings and market-to-book ratios.

#### **AEM 429(4290) International Finance**

Spring. 3 credits. Prerequisites: AEM 210 and 324. S-U grades optional. D. T.-C. Ng. Teaches students about issues in international financial management and international investment. The major issues discussed include exchange rate volatility, the benefit of international diversification, and the analysis of international capital budgeting decisions. Specific topics include the determination of the cost of capital for foreign investments, the determination and management of foreign exchange risks and country risks, and the use of innovative financing for the multinational corporation.

#### **AEM 430(4300) International Trade Policy**

Spring. 3 credits. Prerequisites: ECON 101-102 or equivalents and intermediate microeconomics course. S-U grades optional. N. H. Chau.

Examines the economic principles underlying international trade and monetary policy, and the policies, practices, and institutions that influence trade and foreign exchange markets. Also emphasizes applications to current topics in international trade policy, to trade in primary commodities, and to both developed and developing countries.

#### **AEM 431(4310) Agricultural and Food Policy**

Spring. 3 credits. Prerequisites: junior, senior, or graduate standing; PAM 200, ECON 301, 313, or equivalent. S-U grades optional. A. Novakovic.

Acquaints students with current and historically important U.S. policies related to agriculture and food, including subsidies and regulations related to markets, production, and the environment. Explores methods of policy analysis, and students learn to critique policies and write policy briefs.

#### **AEM 432(4320) Business and Governments in a Global Marketplace**

Fall. 3 credits. Prerequisite: intermediate microeconomics course. C. K. Ranney. The government agency and the individual business enterprise are two of the most powerful institutions in modern society. This course looks at the economic interfaces between government and business. The shifting and complicated relationships between them exert great influence on the changing performance of the economy and on the lives of citizens. These relationships range from cooperative to competitive, from friendly to hostile. It is an uneasy relationship, each side possessing basic powers and yet each having an important need for the other. In the United States, the result is a mixed economy in which the public and the private sectors interact in many ways. Government exercises a variety of important powers in dealing with the individual private enterprise, ranging from taxation to regulation. Business, in turn, relies on constitutional protections as well as on public support of its basic role in creating income, employment, and material standards of living. In a dynamic and increasingly globalized economy, the business-government relationship is constantly changing and the

line between public and private sectors frequently shifts. Future managers are constantly confronted with issues that relate to government-business interfaces.

#### **AEM 433(4330) Devolution, Privatization, and the New Public Management (also CRP 412[4120], FGSS 411/611[4110/6110])**

Fall. 4 credits. Prerequisite: ECON 101. S-U grades optional. M. E. Warner. For description, see CRP 412.

#### **AEM 434(4340) Government Policy Workshop (also CRP 418[4180], FGSS 420[4200])**

Spring. 4 credits. S-U grades optional. M. E. Warner.

For description, see CRP 418.

#### **AEM 437(4370) Technological Change and Innovation Strategy**

Spring. 3 credits. Prerequisites: AEM 220 and ECON 101. A. Leiponen.

Explores innovation and technological change. Studies how technological change affects economies and industries, and how innovation of new products, processes, and services takes place in firms. Focuses on the creation, management, and exchange of knowledge within and across organizational boundaries.

#### **AEM 442(4420) Emerging Markets**

Fall. 3 credits. Prerequisites: senior or graduate standing; AEM 240 and PAM 200 or ECON 313. R. D. Christy.

Provides a framework for examining the effectiveness of marketing strategies in economies in transition and identifying the challenges and opportunities for firms in low-income economies to access industrial markets. Appraises the risk of entering markets in low-income economies and assesses the political, legal, cultural, and economic forces. Analyzes and discusses case studies of companies.

#### **AEM 443(4430) Food-Industry Strategy**

Fall. 3 credits. Prerequisite: AEM juniors, seniors, or graduate students; AEM 240 or 448; or permission of instructor. J. M. Hagen.

Examines the decisions that businesses must make, such as what to sell, where to invest, when to outsource, and how to market—all in a changing and competitive environment. While the principles are applicable to any competitive environment, the focus is on one industry, the food industry, to allow an in-depth look at how the various players (manufacturers, retailers, and others) both cooperate and compete in the process of supplying food to consumers. Students learn how such issues as globalization, industry consolidation, new technologies, and health concerns add to their challenges and opportunities.

#### **AEM 444(4440) Marketing Strategy and Brand Management**

Fall. 3 credits. Prerequisite: AEM 240; junior or senior standing. S. P. Raj. A sound marketing strategy is essential for the long-term success of a firm. This requires an understanding of how customer needs evolve, how product-market boundaries shift, and how competitors are likely to react. The strategic roles of existing and new products need to be assessed, appropriate resource allocations made, and strategies developed to ensure sustained growth. The course is designed to provide opportunities to learn about the theoretical and applied perspectives

of marketing strategy from readings, case analyses, and guest speakers.

#### **AEM 446(4460) Food Marketing Colloquium**

Fall. 1 credit. Prerequisite: junior or senior standing; extensive course work in food industry management and marketing. D. J. Perosio.

The seminar covers advanced topics in food marketing, many of which have an important international dimension and are presented by industry members. A field trip may be taken. Students participate in research topics on various aspects of the food industry.

#### **AEM 447(4470) Food Marketing Colloquium**

Spring. 1 credit. Open to Food Marketing Fellows only. D. J. Perosio.

#### **AEM 448(4480) Food Merchandising**

Spring. 3 credits. Prerequisite: junior or senior standing; AEM 240. D. J. Perosio.

Covers merchandising principles and practices as they apply to food industry situations. Examines the various elements of merchandising such as buying, pricing, advertising, promotion, display, store layout, profit planning and control, and merchandising strategy. Considers the consequences of food industry trends and initiatives for other industry members, public policymakers, and consumers.

#### **AEM 449(4490) Global Marketing Strategy (D)**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing; marketing course. J. M. Hagen.

Examines opportunities and challenges in the rapidly changing global marketplace. Topics include the decision to serve a foreign market, alternative strategies for entry into foreign markets (such as exporting or establishing a local subsidiary), and issues in implementing those strategies. Includes case analysis and discussion.

#### **AEM 450(4500) Resource Economics (also ECON 450[4500])**

Fall. 3 credits. Prerequisites: MATH 111, ECON 313, and familiarity with Excel. J. M. Conrad.

Constructs dynamic models of renewable, nonrenewable, and environmental resources to examine market allocation and optimal resource management.

#### **AEM 451(4510) Environmental Economics (also ECON 409[4090])**

Spring. 3 credits. Prerequisites: undergraduate standing; intermediate microeconomics course, and calculus. S-U grades optional. G. L. Poe.

Explores the economic foundations for public decision making about environmental commodities and natural resources, using tools from intermediate microeconomics. Emphasizes the welfare economic approach for allocating public goods, with specific emphasis on market failure, externalities, benefit-cost analysis, nonmarket valuation techniques, and cost-effective policy instruments. Also examines property rights/institutional perspectives and ecological economic concepts.

#### **AEM 455 (4550) Sustainability, Business and the Environment**

Fall. 3 credits. Prerequisites: ECON 101 and 102 or equivalent and calculus course. L. D. Chapman.

Seminar giving an inside perspective on implementation and evaluation of environmental policy in a business or organization. Examines the effectiveness of the new market-based green policies; analyze the operational significance of sustainability in a business context; and come to understand the economic basis for government's role in environmental protection. Uses HBS case studies; each seminar participant prepares a case study of environmental management in a business or organization. Makes extensive use of guest speakers from finance, electricity, forest products, construction and manufacturing.

**AEM 460(4600) Security Trading and Market Making**

Spring. 3 credits. Prerequisite: AEM 324. Letter grades only. A. Wang.

Theory and practice of securities trading at exchanges around the world. How trading and the design of markets affects liquidity, informativeness, transparency, volatility, and fairness. Analyzes alternative trading strategies and the cost of trading. Examines innovations in security exchanges and regulatory policy. Provides hands-on trading experience using realistic trading simulations.

**AEM 464(4640) Economics of Agricultural Development (also ECON 464[4640])**

Fall. 3 credits. Prerequisites: ECON 101-102 or permission of instructor. R. D. Christy.

Provides an understanding of the economics of the agricultural sector in low-income countries. Also covers more general issues of economic development beyond the agricultural sector to provide the necessary context for an understanding of rural problems. Topics include the nature of development and technical change, welfare and income distribution, land reform, food and nutrition policy, food security and food aid, competition with more developed countries and international markets, the effect of U.S. policy on agricultural development, and the role of international institutions. Uses examples from a wide variety of developing countries to illustrate the basis for economic analysis.

**AEM 494(4940) Undergraduate Special Topics in Applied Economics and Management**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the beginning of the semester.

**AEM 497(4970) Individual Study in Applied Economics and Management**

Fall or spring. Variable credit. S-U grades optional. Students must register using independent study form (available in undergraduate program office in Warren Hall). Staff.

Used for special projects designed by faculty members.

**AEM 498(4980) Supervised Teaching Experience**

Fall or spring. 1-4 credits. Students must register using independent study form (available in undergraduate program office in Warren Hall). Staff.

Designed to give qualified undergraduates experience through actual involvement in

planning and teaching courses under the supervision of department faculty. Students cannot receive both pay and credit for the same hours of preparation and teaching.

**AEM 499(4990) Undergraduate Research**

Fall, spring, or summer. 1-4 credits.

Prerequisite: GPA of at least 2.7. Students must register using independent study form (available in undergraduate program office in Warren Hall). S-U grades optional. Staff.

Permits outstanding undergraduates to carry out independent study of suitable problems under appropriate supervision. Students cannot receive both pay and credit for the same hours of work.

**[AEM 605(6050) Agricultural Finance**

Fall. 3 credits. Prerequisite: AEM 324 or 405 or equivalent. Not offered 2006-2007. B. A. Gloy.

Covers advanced topics in agricultural finance, including investment analysis, capital budgeting under uncertainty, decision analysis, risk management, capital structure, and financial intermediaries.]

**AEM 608(6080) Production Economics (also ECON 408[4080])**

Fall. 3 credits. Prerequisite: ECON 313 and MATH 111 or equivalents. L. W. Tauer.

Studies the theory of production economics with emphasis on applications to agriculture and natural resources. Topics include the derivation, estimation, and use of production, cost, profit, revenue, demand, and supply functions. Discusses the concepts of efficiency and productivity. Introduces production response over time and under risk.

**[AEM 611(6110) Global Modeling**

Spring. 3 credits. Prerequisite: graduate micro theory course. T. D. Mount and R. N. Boisvert. Taught over Internet by Tom Hertel at Purdue University.

Teaches how to use a global general equilibrium model (GTAP) for research on trade and environment policies. Weekly assignments start with the components of a single-country model and end with a full global model. A final project and the assignments are the primary course requirements.]

**AEM 612(6120) Applied Econometrics**

Fall. 1 credit. Corequisite: AEM 411. D. Just.

Designed for M.S. and Ph.D. students who do not meet the prerequisites for other graduate-level econometrics courses. Complements AEM 411, providing greater depth of understanding of econometric methods and exposure to applied econometric literature. Focuses on preparing students to conduct their own applied economic research.

**AEM 630(6300) Policy Analysis: Welfare Theory, Agriculture, and Trade (also ECON 430[4300])**

Spring. 4 credits. Prerequisites: AEM 608 or PAM 603, ECON 313, or equivalent intermediate micro theory course incorporating calculus. H. de Gorter.

The first half of the course surveys the theory of welfare economics as a foundation for public policy analysis. Major issues addressed include the problem of social welfare measurement, the choice of welfare criteria, and the choice of market or nonmarket allocation. Basic concepts covered include measurement of welfare change, including

the compensation principle, consumer and producer surplus, willingness-to-pay measures, externalities, and the general theory of second-best optima. The second half focuses on public policy analysis as applied to domestic agricultural policy and international trade. The domestic policy component examines major U.S. farm commodity programs and related food and macroeconomic policies and analyzes their effects on producers, consumers, and other groups. The international trade component examines the structure of world agricultural trade, analytical concepts of trade policy analysis, and the principal trade policies employed by countries in international markets.

**AEM 632(6320) Open Economy Analysis: Theory and Applications**

Spring. 3 credits. Prerequisites: ECON 313/314 or permission of instructor. S-U grades optional. N. Chau and S. Kyle.

Explores both recent theoretical and methodological advances as well as practical applications in analyzing current topics and issues in open economies. Brings together research methods pertinent to open economy macroeconomics and international trade policies to give students a basic understanding of how different aspects of contemporary debates are analyzed in practice.

**AEM 633(6330) Devolution, Privatization, and the New Public Management (also CRP 612[6120], FGSS 611[6110])**

Fall. 4 credits. S-U grades optional. M. E. Warner.

For description, see CRP 612.

**AEM 634(6340) Government Policy Workshop (also CRP 618[6180], FGSS 620[6200])**

Spring. 4 credits. S-U grades optional. M. E. Warner.

For description, see CRP 618.

**AEM 640(6400) Analysis of Agricultural Markets (also ECON 440[4400])**

Fall. 3 credits. Prerequisites: AEM 411 and 415 or equivalents. Offered even years. H. M. Kaiser.

Focuses on the unique features of agricultural commodity markets. Emphasizes government and private institutions that affect these markets, as well as on models of price behavior including marketing margins and imperfect competition. Also covers empirical tools to evaluate market characteristics.

**AEM 641(6410) Commodity Futures Markets**

Spring. weeks 8-14. 2 credits. Prerequisites: AEM 411 and 415 or equivalents. Recommended: AEM 640. W. G. Tomek.

Focuses on markets for agricultural futures contracts. Emphasizes models of price behavior on futures markets including relationships among cash and futures prices. These principles provide a foundation for a discussion of hedging, speculation, and public policy issues.

**AEM 642(6420) Globalization, Food Safety, and Nutrition (also NS 642[6420])**

Fall. 2 credits. Prerequisites: permission of instructor, graduate standing, and basic understanding of economics and nutrition. Letter grades only. P. Pinstrup-Andersen.

Directed readings course with a weekly 50-minute discussion session. The course is aimed at graduate students in nutrition, agricultural economics, and other relevant fields, who wish to explore how globalization may affect poverty, food security, and nutrition in developing countries and how national policies and international agreements and institutions may influence the outcome. The discussion sessions are based on assigned readings for each week.

**AEM 651(6510) Environmental and Resource Economics**

Spring. 4 credits. Core course for environmental management concentration/option. Prerequisite: graduate standing. Open to graduate students outside economics. W. D. Schulze.

Review of welfare economics, environmental externalities, and common property resources, and a survey of current environmental and natural resource policy. Covers techniques for measuring benefits and costs—including property value and wage hedonic approaches, travel cost models, and contingent evaluation. Describes survey/data collection methods in detail. Explores innovative market mechanisms for resolving public good, common property, and externality problems. Students are required to complete a paper describing their own formal economic analysis of a natural resource or environmental problem.

**[AEM 652(6520) Land Economics Problems]**

Fall or spring. 1 or more credits. Prerequisite: graduate standing and permission of instructor. S-U grades optional. Staff.

Special work on any subject in the field of land and resource economics.]

**AEM 655(6550) Electric Systems Engineering and Economics (also ECE 551[5510])**

Fall. 2 credits. Prerequisites: basic calculus and microeconomics courses. T. D. Mount and R. Thomas.

For description, see ECE 551.

**AEM 660(6600) Agroecosystems, Economic Development, and the Environment**

Spring. 3-4 credits. Prerequisite: graduate standing. Open to graduate students outside economics; additional sec TBA for economics majors. S-U grades optional. D. R. Lee.

Examines selected topics in agricultural and economic development, technology assessment, ecosystem management and the environment, with a focus on developing countries. Topics include production, poverty, and environmental tradeoffs; sustainable technology development; trade and environment linkages; economics of conservation and development; and alternative methodologies for analyzing these interactions. Readings emphasize the economic literature, but also draw from the biophysical sciences, ecosystem management, and the broader social sciences.

**AEM 667(6670) Topics in Economic Development (also ECON 770[7770])**

Fall. 3 credits. Targeted to second- and third-year graduate students. Prerequisite: basic first-year courses in ECON or AEM or permission of instructor. S-U grades optional. R. Kanbur.

Topics vary from year to year but may include poverty, inequality, intra-household allocation,

structural adjustment, and debt. Examination is by term paper.

**AEM 670(6700) Economics of Consumer Demand (also PAM 608[6080])**

Fall. 3 credits. Prerequisites: ECON 311 or 313 and two semesters of calculus. S-U grades optional. C. K. Ranney.

Graduate-level introduction to theory and empirical research on household demand, consumption, and saving. Emphasizes the use of the theory in empirical research. Topics include neoclassical theory of demand, duality, complete demand systems, conditional demand, demographic scaling and translating, consumption, and savings. As time allows, Becker and Lancaster models of demand may be introduced.

**AEM 694(6940) Graduate Special Topics in Applied Economics and Management**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the beginning of the semester.

**AEM 698(6980) Supervised Graduate Teaching Experience**

Fall or spring. 1-4 credits; max. 4 credits during graduate program. Prerequisite: graduate standing; permission of instructor. Undergraduates should enroll in AEM 498. Students must register using independent study form (available in undergraduate program office in Warren Hall). S-U grades optional. Staff.

Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of departmental faculty members. The experience may include leading discussion sections, preparing, assisting in, or teaching lectures and laboratories, and tutoring. Students are expected to actually teach at least one hour per week for each credit awarded. Students may not receive both pay and credit for the same hours of preparation and teaching.

**AEM 699(6990) M.P.S. Research**

1-6 credits. Prerequisite: M.P.S. students. Credit granted for M.P.S. project report. Staff.

**AEM 700(7000) Individual Study in Applied Economics and Management**

Fall or spring. Prerequisite: graduate standing. S-U grades optional. Credit, class hours, and other details TBA with faculty member. Staff.

Used for special projects designed by faculty members. More than one topic may be given each semester in different sections. Student must register in section appropriate to topic being covered; section number is provided by instructor.

**[AEM 708(7080) Advanced Production Economics]**

Fall. 3 credits. Prerequisite: AEM 608, 710, or equivalents. Highly recommended: ECON 609. Offered alternate years; not offered 2006-2007. R. N. Boisvert.

Covers theoretical and mathematical developments in production economics, with emphasis on estimating production relationships, scale economies, technical change, and factor substitution. Emphasizes developments in flexible functional forms, duality, and dynamic adjustment models. Gives considerable emphasis to empirical

specification and estimation. Discusses other topics (risk, supply response, and household production functions) based on student interest.]

**AEM 710(7100) Econometrics I**

Spring. 3 credits. Prerequisites: matrix algebra and statistical methods courses at level of ILRST 311 or ECON 619.

H. Daouk.

Provides (together with AEM 711) a graduate sequence in applied econometrics that is suitable for M.S. and Ph.D. students. Covers linear-regression models and the associated estimation and testing procedures.

**AEM 711(7110) Econometrics II**

Fall. 3 credits. Prerequisite: AEM 710 or equivalent. T. D. Mount.

Coverage beyond AEM 710 of dynamic models, including single equation ARIMA, vector ARIMA, Kalman filtering, structural dynamic models, and regime switching. Topics include endogeneity, stability, causality, and cointegration.

**AEM 712(7120) Quantitative Methods I**

Fall. 4 credits. Prerequisite: some formal training in matrix algebra. Highly recommended: course at level of BTRY 417. R. N. Boisvert.

Comprehensive treatment of linear programming and its extensions, including postoptimality analysis. Topics include nonlinear programming, including separable, spatial equilibrium, and risk programming models. Discusses input-output models and their role in social accounting matrices and computable general equilibrium models. Makes applications to agricultural, resource, and regional economic problems.

**AEM 713(7130) Dynamic Optimization**

Spring. 3 credits. Prerequisite: ECON 609 and ECON 617. Letter grades only. J. M. Conrad.

Concerned with the solution of dynamic allocation problems. Objectives are to (1) pose prototype optimization problems in discrete and continuous time, (2) introduce the common methods for solving prototype problems, (3) present a set of numerical problems, and thereby (4) equip students with basic theory and methods to perform applied research on dynamic allocation problems.

**AEM 714(7140) Experimental Economics**

Fall. 4 credits. Prerequisite: ECON 609. Offered alternate years. W. D. Schulze.

Surveys both experimental economics methods and research as an approach to test economic theory. Students participate as subjects in a series of illustrative computerized experiments ranging from double auctions to public goods provision. Topics include experimental methods; decisions and games; markets (testing auction institutions); market power (monopoly, oligopoly); bargaining, compensation, and performance; public goods; externalities and voting; information and uncertainty; and economic anomalies. Students must design and write a paper describing their own experiment.

**AEM 717(7170) Research Methods in Agricultural Economics**

Spring. 2 credits. Prerequisite: graduate standing. R. N. Boisvert.

Discusses the research process and scientific method as applied in agricultural economics. Topics include problem identification, hypotheses, sources of data, sampling concepts and designs, methods of collecting

data, questionnaire design and testing, field organization, and analysis of data. During the semester, each student develops a research proposal that may be associated with his or her thesis.

**[AEM 730(7300) Seminar on International Trade Policy: Agriculture, Resources and Development]**

Spring. 3 credits. Prerequisite: graduate standing; AEM 630 or equivalent. Not offered 2006–2007. D. R. Lee.

Examines selected topics in the professional literature on international trade policy, focusing on agricultural trade and related topics, including trade liberalization, trade and environmental linkages, technological change and trade policy, and agricultural trade and development.]

**AEM 735(7350) Public Finance: Resource Allocation and Fiscal Policy (also ECON 735(7350))**

Spring. 4 credits. R. Kanbur.  
For description, see ECON 735.

**AEM 744(7440) Advanced Consumer Research**

Fall. 3 credits. Prerequisite: graduate standing; priority given to CALS Ph.D. students, especially in AEM, nutritional science, or food technology. B. Wansink. Workshop providing students with a unique opportunity to develop an advanced theory-based understanding of consumers by using innovative methods and new research techniques. Class sessions alternate theory with implementation.

**AEM 750(7500) Resource Economics**

Fall. 3 credits. Prerequisites: ECON 609 and 618, or AEM 713. J. M. Conrad.  
Uses optimal control and other methods of dynamic optimization to study the allocation and management of natural resources.

**AEM 751(7510) Environmental Economics**

Spring. 4 credits. Prerequisites: ECON 609 and graduate-level econometrics course. S-U grades optional. G. L. Poe.

The objective of this course is to provide a graduate-level survey of the two prevailing contemporary themes in environmental economics: the measurement of the demand for environmental resources as input into benefit-cost analyses, and the design of incentive-based, cost-effective policy instruments to achieve environmental goals. Core topics include market failure, conceptual foundations for valuing changes in environmental quality, empirical applications of non-market valuation methods, and cost-effective market mechanism design for reducing pollution. Additional topics include information asymmetries and mechanism design for non-point source pollution, and international/global environmental issues.

**AEM 762(7620) Microeconomics of International Development**

Fall. 3 credits. Prerequisite: completion of first-year Ph.D. course sequence in AEM or ECON or permission of instructor. S-U grades optional. C. B. Barrett.

Focuses on models of individual, household, firm/farm, and market behavior in low- and middle-income developing economies. Topics include agricultural land, labor, and financial institutions; technology adoption; food security and nutrition; risk management; intra-household analysis; reciprocity networks; and

product/factor markets analysis. Emphasizes empirical research.

**AEM 765(7650) Development Microeconomics Graduate Research Seminar**

Fall/spring. 1–3 credits. Prerequisite: graduate standing and permission of instructor. C. B. Barrett.

Graduate students and the instructor present draft research proposals, papers, and preliminary thesis results for group review and discussion. Students who actively participate by offering written and oral comments on others' work receive 1 credit. Students who also present their own proposal or paper receive 2 credits. Presentations last 75 minutes and thus represent a substantial investment of time. Students who present a second proposal or paper receive 3 credits.

**AEM 800(8900) Master's-Level Thesis Research**

Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.

For students admitted specifically to a master's program.

**AEM 900(9900) Graduate-Level Thesis Research**

Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.

For Ph.D. students only before "A" exam has been passed.

**AEM 901(9910) Doctoral-Level Thesis Research**

Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.

For Ph.D. candidates after "A" exam has been passed.

## ANIMAL SCIENCE

A. W. Bell, chair (149 Morrison Hall, 255-2862); R. E. Austic, D. E. Bauman, R. W. Blake, Y. R. Boisclair, D. L. Brown, W. R. Butler, L. E. Chase, D. J. R. Cherney, W. B. Currie, H. N. Erb, R. W. Everett, D. M. Galton, J. Gavalchin, P. A. Johnson, X. G. Lei, Q. M. Long, P. A. Oltenacu, T. R. Overton, J. E. Parks, A. N. Pell, E. J. Pollak, R. L. Quaas, S. M. Quirk, R. D. Smith, M. L. Thonney, M. E. Van Amburgh

**AN SC 100(1000) Domestic Animal Biology I**

Fall. 4 credits. S-U or letter grades. W. B. Currie.

Introduction to the biology of economically important species (morphology, anatomy, and physiology) and its application to the management of animals in major livestock industries. Topics include domestication and origins of animal science, anatomy, quantitative cell biology, regulatory mechanisms, public domain genetic databases, major life support systems, and digestion. Students undertake the care and management of several species of farm animals. Laboratory exercises include animal handling, examining aspects of anatomy, and small group discussions of contemporary biotechnologies. Living farm animals are used noninvasively, and fresh organs from dead animals are examined.

**AN SC 105(1050) Contemporary Perspectives of Animal Science**

Spring. 1 credit. Prerequisite: freshmen, sophomores, or first-year transfer standing. D. J. R. Cherney and D. E. Bauman.  
A forum to discuss the students' career planning and the contemporary and future role of animals in relation to human needs.

**AN SC 110(1100) The Animals That Sustain Us: Lecture**

Spring. 2 credits. S-U or letter grades. D. L. Brown.

Teaches the importance of the symbiosis between humans and domestic animals and how animal enterprises can be ethically, environmentally, and economically sound.

**AN SC 111(1110) The Animals That Sustain Us: Lab**

Spring. 1 credit. S-U or letter grades. D. L. Brown.

Teaches students to restrain and care for several species of domestic animals, including cats, dogs, sheep, cattle, goats, fish, and horses. Other species may be added according to student interest. Associated with AN SC 110 but may be taken separately.

**AN SC 150(1500) Domestic Animal Biology II**

Spring. 4 credits. S-U or letter grades. W. R. Butler and staff.

Second of a two-semester sequence (100/150) applying the basic biology and physiology of growth, defense mechanisms, reproduction, and lactation to life cycle aspects of the production and care of domestic animals. Uses fresh tissues and organs from dead animals along with preserved specimens in laboratories, exercises, and demonstrations. Uses a colony of Japanese quail for growth exercises, behavior, and data collection.

**AN SC 204(2040) Sophomore Seminar: Domestic Animal Issues**

Fall. 3 credits. S-U or letter grades. D. Brown.

Expression of discoveries, opinions, and solutions to problems in the area of domestic animal science and industry take on an extremely wide variety of forms. These expressions may include: the peer-reviewed journal article, summaries of scientific work for the public, grant writing for science, film, music, cowboy poetry, investigative journalism, web pages, online discussion groups, computer models and the conference. Topics used as points of reference for exposition of biological principles and for practicing those means of expression will vary, but for 2005–2006 included: roles animals play in society; BSE; vegetarianism; gender stereotypes and livestock; impact of animals on air and water quality; using hormones and antibiotics in food production; feral horses of the West.

**AN SC 212(2120) Animal Nutrition**

Fall. 4 credits. Prerequisite: CHEM 208 or equivalent. Recommended: AN SC 100 and 150. A. W. Bell and D. J. R. Cherney.

Introduction to animal nutrition, including digestive physiology and metabolism of domestic animals and other species; nutrient properties and requirements for different aspects of animal production and performance; principles of feed evaluation and ration formulation. Laboratory classes include gastrointestinal tract dissections and nutritional experiments performed on laboratory or farm animal species.



**AN SC 213(2130) Nutrition of the Dog**

Spring, weeks 1-7. 1 credit. Prerequisite: AN SC 212 or equivalent. Offered alternate years. A. W. Bell.

Covers digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease in canine species.

**[AN SC 214(2140) Nutrition of Exotic Animals]**

Fall, weeks 1-7. 1 credit. Prerequisite: AN SC 212 or equivalent. Offered alternate years; next offered 2007-2008. Staff.

Discusses nutrient requirements, sources of nutrients, feeding management systems, and ration formulation. Describes signs of nutrient deficiencies and excesses.]

**AN SC 215(2150) Exotic Avian Husbandry and Propagation**

Fall. 2 credits. Limited to 100 students. Prerequisite: AN SC 100, 150, or one year introductory biology. J. Parks and D. Muscarella.

Natural history, care, management, health, and breeding of exotic avian species with emphasis on psittacines (parrots and related species) and raptors (birds of prey). Includes lectures, demonstrations, and local field trips.

**AN SC 216(2160) Nutrition of the Cat**

Fall, weeks 1-7. 1 credit. Prerequisite: AN SC 212 or equivalent. Offered alternate years. A. W. Bell.

Covers digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease in feline species.

**AN SC 221(2210) Introductory Animal Genetics**

Spring. 3 credits. Prerequisite: one year of college biology. E. J. Pollak.

Examination of basic genetic principles and their application to the improvement of domestic animals, with emphasis on the effects of selection on animal populations.

**AN SC 250(2500) Dairy Cattle Principles**

Fall. 3 credits. Prerequisite for AN SC 251, 351, 354, and 355. S-U or letter grades. D. M. Galton.

Introduction to the background and scientific principles relating to dairy cattle production. Laboratories are designed to provide an understanding of production techniques.

**AN SC 251(2510) Dairy Cattle Selection**

Fall. 2 credits. Prerequisite: senior standing or permission of instructor. S-U or letter grades. D. M. Galton.

Application of scientific principles of genetic programs in herds with different breeding programs. Emphasizes economical traits to be used to improve genetic progress and herd profitability.

**AN SC 265(2650) Horses**

Fall. 3 credits. Prerequisites: AN SC 100 and 150 or permission of instructor. S-U or letter grades. C. Collyer.

Selection, management, feeding, breeding, and training of light horses.

**[AN SC 280(2800) Molecular Biology in Agriculture and Medicine]**

Fall. 3 credits. Prerequisite: one year introductory biology. Not offered 2006-2007. S. M. Quirk.

Lectures discuss the applications of molecular biology to animal research, animal agriculture, industry, and medicine. Class discussions

explore ethical issues surrounding these technologies.]

**AN SC 290(2900) Meat Science (also FD SC 290(2900))**

Fall. 2 or 3 credits. Lec only, 2 credits; lec plus lab, 3 credits; lab cannot be taken without lec. Lab fee: \$15. D. Shaw.

Introduction to meat science through a study of the structure, composition, and function of muscle and its conversion to meat. Also study properties of fresh and processed meat, microbiology, preservation, nutritive value, inspection, and sanitation. Laboratory exercises include anatomy, meat-animal slaughter, meat cutting, wholesale and retail cut identification, inspection, grading, curing, sausage manufacture, and quality control. An all-day field trip to a commercial meat plant may be taken.

**AN SC 300(3000) Animal Reproduction and Development**

Spring. 3 credits. Prerequisite: AN SC 100-150 or equivalent and one year introductory biology. J. E. Parks.

Comparative anatomy and physiology of mammalian and avian reproduction, with emphasis on domestic and laboratory animals; fertilization through embryonic development, pregnancy, and growth to sexual maturity; emphasizes on physiological mechanisms and application to fertility regulation. Separate laboratory is offered to demonstrate fundamental aspects of reproduction and reproductive technology.

**AN SC 301(3010) Animal Reproduction and Development Lab**

Spring. 1 credit. Limited to 30 students per lab. Prerequisite: AN SC 100-150 or equivalent; concurrent enrollment in or completion of AN SC 300. J. E. Parks.

Demonstrates fundamental principles and applied aspects of mammalian and avian reproduction. A limited number of live animals are used in some demonstrations. Dissection and examination of tissues from vertebrate animals are included in selected laboratories.

**AN SC 305(3050) Farm Animal Behavior (also BIOAP 312(3120))**

Spring. 2 credits. Prerequisites: one year introductory biology and introductory animal physiology (AN SC 100 and 150 or equivalent or BIOAP 311). Recommended: at least one animal production course or equivalent experience. S-U or letter grades. P. Perry.

The behavior of production species (avian and mammalian) influences the success of any management program. Students study behaviors relating to communication, learning, social interactions, reproduction, and feeding of domestic animals and their physiological basis. Management systems for commercial livestock production and their implications for animal behavior and welfare are stressed.

**AN SC 310(3100) Introduction to Animal Welfare**

Fall. 2 credits. S-U or letter grades. Staff.

Animal welfare issues will be discussed, mainly for farm animals, but companion animals will also be considered. Both animal specific and general areas of animal welfare will be discussed. This course will provide much of the background needed for Cornell to field a team and participate in the U.S. National Animal Welfare Judging contest in the spring.

**AN SC 341(3410) Biology of Lactation**

Spring. 2 credits. Prerequisite: AN SC 100-150 or animal physiology course. Offered alternate years. Y. R. Boisclair.

Comprehensive survey of the biology of the mammary gland. Lectures cover (1) basic aspects such as anatomy and development of the mammary gland, biochemistry and hormone regulation of milk synthesis and regulation of gene expression in the mammary cells; (2) practical aspects such as the impact of lactation on nutrition, reproduction, and diseases. Lactation in the dairy cow provides the primary context, but examples from other mammals, including humans, are used.

**AN SC 351(3510) Dairy Herd Management**

Spring. 4 credits. Prerequisite: AN SC 250 or permission of instructor. Recommended: AEM 302. D. M. Galton.

Application of scientific principles to practical herd management with components of reproduction, milking, housing, records, and production economics. Laboratories emphasize practical applications, analyses of alternatives, decision making, field trips, and discussion.

**AN SC 354(3540) Dairy Cattle Herd Health**

Fall. 3 credits. Prerequisite: AN SC 250 or permission of instructor. W. Stone and D. M. Galton.

Application of scientific principles to practical herd management with emphasis on herd health and animal well-being. Laboratory emphasizes practical applications of herd health management including on-farm herd health analysis.

**AN SC 355(3550) Dairy Cattle Nutrition**

Spring. 3 credits. Prerequisite: AN SC 250 or permission of instructor. Letter grades only. T. R. Overton.

Application of scientific principles to practical herd nutrition relating to herd production and feeding management. Laboratory emphasizes practical applications and field trips.

**[AN SC 360(3600) Beef Cattle]**

Spring. 3 credits. Offered even-numbered years; next offered 2007-2008. M. L. Thonney.

Emphasizes the management of reproduction, nutrition, and selection in beef cattle enterprises. Laboratories acquaint students with management skills through computerized simulations and working with cattle.]

**[AN SC 365(3650) Equine Nutrition]**

Fall. 3 credits. Prerequisites: AN SC 100, 212, and 265 or equivalent. S-U or letter grades. Not offered 2006-2007. Staff.

Presents the principles of nutrition for horses. Discusses digestive physiology, sources of nutrients, feeding programs for various classes of horses, and interactions of nutrition and diseases.]

**[AN SC 370(3700) Swine Nutrition and Management]**

Fall. 3 credits. Recommended: AN SC 212. Offered alternate years; not offered 2006-2007. X. G. Lei and K. Roneker.

Offers laboratory practice, animal projects, and problem troubleshooting.]

**AN SC 380(3800) Sheep**

Spring. 3 credits. Offered odd-numbered years. M. L. Thonney.

Emphasizes the breeding, feeding, management, and selection of sheep from a production-system approach. Lectures and



laboratories are designed to give students a practical knowledge of sheep production as well as the scientific background for improved management practices. Students work directly with sheep during laboratories and spend several days during the semester feeding and caring for ewes and their newborn lambs.

**AN SC 400(4000) Livestock in Tropical Farming Systems**

Spring. 3 credits. Prerequisite: upperclass standing. Cost of optional field trip (includes airfare, local transport, and lodging; some merit and need-based financial aid may be available): approx. \$2,000. R. W. Blake.

Comprises analyses of constraints on livestock production in developing countries of the tropics, economic objectives and risk, and methods of management. The 2006–2007 editions focus on livestock systems in the Yucatán Peninsula. Emphasis is on strategic use of animal and plant resources, animal performance with inputs restricted, and decision making. Principles, field study, independent study projects and classroom interactions aided by videoconferencing with Mexican partners facilitate problem-solving to improve welfare of rural households. Interactions with Mexican farmers and other professionals during a 10-day field-study trip provide context and opportunities for developing study projects aligned with needs of Yucatecan farmers.

**AN SC 401(4010) Dairy Production Seminar**

Spring. 1 credit. Prerequisite: senior standing. T. R. Overton.

Capstone course in which students, with the help of faculty members, complete a study of the research literature on topics of current interest in the dairy industry. Students then make an oral and a written report on their topic with emphasis on integrating theory and practice.

**AN SC 402(4020) Seminar in Animal Sciences**

Spring. 1 credit. Prerequisite: students engaged in undergraduate honors research projects. S-U or letter grades. S. Quirk.

Reports of undergraduate research and honors projects. Students present oral reports of their work for class discussion.

**[AN SC 403(4030) Tropical Forages**

Spring. 2 credits. Prerequisites: knowledge of crop production and livestock nutrition. Offered alternate years; not offered 2006–2007. Staff.]

**AN SC 410(4100) Nutritional Physiology and Metabolism**

Fall. 3 credits. Prerequisites: biochemistry and physiology courses. R. E. Austic and D. E. Bauman.

Fundamental approach to nutrition focusing on the metabolic fate of nutrients and the interrelationships among nutrients, nutritional state, and metabolic processes. The overall goal is to increase understanding of metabolism and metabolic regulation through an integration of nutrition, biochemistry, and physiology.

**AN SC 411(4110) Applied Cattle Nutrition**

Fall. 4 credits. Designed for juniors, seniors, and entering graduate students. Prerequisites: AN SC 100 and 212 (or equivalent). Highly recommended: AN SC 355. M. E. Van Amburgh.

Integrates concepts of cattle nutrition and farm nutritional management to help students understand and appreciate factors influencing the performance of cattle under diverse conditions. Topics covered include: the effect of environment on maintenance costs; the nutrient requirements for various stages of growth, lactation, and pregnancy; rumen function, feed composition and chemistry, nutrient partitioning and the environmental impacts of cattle and how to minimize them. Computer models (Cornell Net Carbohydrate and Protein System) are used in the laboratory to actualize the information presented in lectures. Herd case studies are used in lab and there are field trips to farms to evaluate the nutrition program.

**AN SC 412(4120) Whole-Farm Nutrient Management (also CSS 412[4120])**

Spring. 2 or 4 credits. Prerequisite: junior, senior, or graduate standing; AN SC 411. Offered as two modules. Enrollment in Module 1 for first half of semester required (2 credits). Consists of crop and manure nutrient management planning; no prerequisites for CALS students. Enrollment in Module 2 for second half of semester is optional (additional 2 credits); builds on crop and manure nutrient management planning module by integrating agronomic nutrient management planning with herd nutrient management planning. Work on case studies outside lab. M. E. Van Amburgh and Q. M. Ketterings.

Provides students with an understanding of the concepts underlying whole farm nutrient management planning to improve profitability while protecting water and air quality. Students learn and apply concepts in the development of a Comprehensive Nutrient Management Plan (CNMP) that is required for a Concentrated Animal Feeding Operation plan to meet environmental regulations. Students develop components of a CNMP for a case study farm, using the Cornell University Nutrient Management Planning System (cuNMPs) and other tools. All students enrolled learn the concepts and processes of developing the crop and manure nutrient management plan component of a CNMP during the first half of the semester in Module 1. Students opting to continue through the end of the semester in Module 2 (4-credit option) build upon knowledge gained in the first half of the semester by learning the knowledge and skills necessary to integrate crop production and herd feeding management for reducing nutrient imports on farms.

**AN SC 414(4140) Ethics and Animal Science**

Fall. 2 credits. Prerequisite: junior or senior standing. D. J. R. Cherney.

Explores the place of humans in the biological world, origins of ethics and morality, speciesism, the use of animals for research and agricultural purposes, transgenic animals. A book review, participation in discussion in class and online, and a project of the student's choice are used to evaluate the performance of each student.

**AN SC 420(4200) Quantitative Animal Genetics**

Spring. 2 credits. Limited to 30 students. Prerequisite: AN SC 221 or equivalent. S-U grades only. E. J. Pollak.

Consideration of problems involved in improvement of animals through application

of the theory of quantitative genetics, with emphasis on genetic evaluation and analysis of data for genetic parameters. Computer labs use interactive matrix algebra programs for problem solving.

**[AN SC 425(4250) Gamete Physiology and Fertilization (also BIOAP 425[4250])]**

Fall. 2 credits. Limited to 50 students.

Prerequisite: AN SC 300 or equivalent.

Offered alternate years; next offered 2007–2008. J. E. Parks.

Study formation, growth, differentiation, maturation, and transport of mammalian sperm and oocytes and cytological, physiological, and molecular changes required for fertilization.)

**AN SC 427(4270) Fundamentals of Endocrinology (also BIOAP 427[4270])**

Fall. 3 credits. Prerequisite: animal or human physiology course or permission of instructor. P. A. Johnson.

Physiology and regulation of endocrine secretions. Emphasizes neuroendocrine, reproductive, growth, and metabolic aspects of endocrinology. Examples are selected from many animals, including humans.

**AN SC 451(4510) Dairy Herd Business Management**

Fall. 3 credits. Corequisite: AN SC 456.

J. Karszes and D. M. Galton.

Emphasizes dairy herd business management with application to herd management analysis. Laboratory includes farm tours and analysis.

**AN SC 456(4560) Dairy Management Fellowship**

Spring. 2 credits. Prerequisites: senior standing; AN SC 351; permission of instructor. S-U grades only. D. M. Galton.

Designed for undergraduates who have a sincere interest in dairy farm management. Objective is to gain further understanding of the integration and application of dairy farm management principles and programs with respect to progressive dairying and related industries.

**AN SC 457(4570) Introductory Spanish for Dairy Producers**

Spring. 2 credits. Prerequisite: AN SC 250 or permission of instructor. Staff.

Students with a focus on dairy management learn to communicate with the increasingly Spanish-speaking workforce to assure that the knowledge of cutting-edge dairy management and observations from the field are exchanged accurately. This is the first of a sequence of two courses developed to meet these goals.

**AN SC 458(4580) Advanced Spanish for Dairy Producers**

Fall. 2 credits. Prerequisite: AN SC 457 or permission of instructor. Staff.

Students with a focus on dairy management need to be able to communicate with the Spanish-speaking workforce, and upward mobility of that workforce depends on knowledge of cutting-edge dairy management. This is the second course of a two-sequence program that will further develop the students' skills to be able to communicate in Spanish higher-level dairy production tasks and principles to Spanish-speaking dairy workers.

**AN SC 494(4940) Special Topics in Animal Science**

Fall or spring. 4 credits max. Prerequisite: undergraduate standing. S-U or letter grades. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**AN SC 496(4960) Internship in Animal Science**

Fall or spring. 1-3 credits, variable; 6 credits max, during undergraduate career. Students must register using independent study form (available in 140 Roberts Hall). S-U grades only. Staff.

Structured, on-the-job learning experience under supervision of qualified professionals in a cooperating organization (e.g., farm, agribusiness, pharmaceutical company, zoo, educational institution). Internships are arranged by the student and must be approved in advance by the student's academic advisor. The internship should provide a professionally supervised experience with at least 60 hours on the job per credit required.

**AN SC 497(4970) Individual Study in Animal Science**

Fall or spring. 1-3 credits, variable; may be repeated for credit. Intended for students in animal sciences. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). S-U or letter grades. Staff.

May include individual tutorial study or a lecture topic selected by a professor. Because topics may change, the course may be repeated for credit.

**AN SC 498(4980) Undergraduate Teaching**

Fall or spring. 1-3 credits, variable; limited to two experiences during undergraduate career. Prerequisite: GPA of at least 2.7. Students must register using independent study form (available in 140 Roberts Hall).

Designed to consolidate the student's knowledge. A participating student assists in teaching a course allied with his or her education and experience. The student is expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

**AN SC 499(4990) Undergraduate Research**

Fall or spring. 6 credits max. during undergraduate career. Prerequisite: junior or senior standing; GPA of at least 2.7. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Students must register using independent study form (available in 140 Roberts Hall).

Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

**AN SC 603(6030) Mineral Nutrition: Metabolic, Health, and Environmental Aspects (also NS 603[6030])**

Fall. 2 credits. Prerequisites: biochemistry, physiology, and nutrition courses. Letter grades only. Offered alternate years. X. G. Lei and C. C. McCormick.

Emphasizes metabolism, gene regulation, antioxidation, and genetic defects related to mineral nutrition. Team-taught lectures cover topics ranging from single gene mutation to social and environmental aspects of mineral nutrition and mineral-related disorders. Discusses effective approaches to improve global mineral nutrition by agriculture and food systems.

**AN SC 606(6060) Ruminant Nutrition: Microbial Ecology and Forage Chemistry**

Spring. 4 credits. Prerequisites: AN SC 212, biochemistry course; senior or graduate standing or permission of instructor. S-U or letter grades. Offered alternate years. Staff.

Provides an overview of ruminant nutrition with an emphasis on microbial ecology, forage chemistry, and rumen function.

**AN SC 610(6100) Animal Science Seminar**

Fall and spring. 1 credit. Prerequisite: graduate standing. S-U grades only. A. W. Bell.

Weekly seminar on topics related to animal science. The requirement for an S grade is regular attendance at seminars during the semester.

**AN SC 619(6190) Field of Nutrition Seminar (also NS 619[6190])**

Fall and spring. 0 credits. No grades given. For description, see NS 619.

**AN SC 620(6200) Seminar in Animal Breeding**

Fall and spring. 1 credit. Prerequisite: graduate standing and major or minor in animal breeding. S-U grades only. E. J. Pollak.

Current topics in animal breeding and statistics as applied to genetic evaluation and selection of domestic animals.

**AN SC 621(6210) Reproductive Physiology/Endocrinology Seminar**

Fall and spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only. W. R. Butler and staff.

Current research in reproductive physiology is presented by faculty and staff members, graduate students, and invited speakers.

**AN SC 622(6220) Seminar in Animal Metabolism**

Fall and spring. 1 credit. Prerequisite: permission of instructor. S-U grades only. Y. R. Boisclair and D. E. Bauman.

Current issues in metabolism are discussed as they relate to productivity, well-being, and diseases of animals. Students present research proposals for new initiatives, progress reports on ongoing projects and recent peer-reviewed publications of high significance.

**AN SC 640(6400) Individual Study in Animal Science: TIES Seminar, Decision Support of Ruminant Livestock Systems in the Gulf Region of Mexico (U.S.-Mexico Training, Internships, Exchanges, and Scholarships [TIES] Partnership Initiative)**

Fall and spring. 1 credit. S-U grades only. R. W. Blake.

Study of topics in animal science more advanced than, or different from, other courses. Subject matter involves research and training collaborations between Cornell University and Mexican institutions in the Gulf Region of Mexico.

**[AN SC 650(6500) Molecular Techniques for Animal Biologists**

Spring. 4 credits. Limited to 15 students. Prerequisites: BIOBM 330 or 332 or 333 or equivalents and permission of instructors. Offered alternate years. Y. Boisclair and staff.

Intensive lab course designed for students who have limited experience with techniques in molecular biology. Emphasizes modern techniques used in conducting research on higher animals.]

**AN SC 694(6940) Special Topics in Animal Science**

Fall or spring. 4 credits max. Prerequisite: graduate standing. S-U or letter grades.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**[AN SC 720(7200) Advanced Quantitative Genetics**

Spring. 3 credits. Prerequisites: matrix algebra, linear models, and mathematical statistics courses. S-U or letter grades. Offered alternate years; next offered 2007-2008. R. L. Quaas.

Covers statistical methods used in a variety of problems in the quantitative genetics of animal populations.]

**AN SC 800(8900) Master's-Level Thesis Research**

Fall or spring. Credit TBA, max. 12 per semester. Prerequisite: permission of advisor. S-U grades only. Graduate faculty. For students admitted specifically to a master's program.

**AN SC 900(9900) Graduate-Level Thesis Research**

Fall or spring. Credit TBA, max. 12 per semester. Prerequisite: permission of advisor. S-U grades only. Graduate faculty. For students in a Ph.D. program only before "A" exam has been passed.

**AN SC 901(9910) Doctoral-Level Thesis Research**

Fall or spring. Credit TBA, max. 12 credits per semester. Prerequisite: permission of advisor. S-U grades only. Graduate faculty. For students admitted to candidacy after "A" exam has been passed.

**Related Courses in Other Departments**

Introductory Animal Physiology (BIOAP 311)

Animal Physiology Experimentation (BIOAP 319)

Milk Quality (FD SC 351)

Agriculture in the Developing Nations (IARD 602)

Lipids (NS 602)

Basic Immunology Lectures (BIO G 305)

## BIOLOGICAL AND ENVIRONMENTAL ENGINEERING

M. F. Walter, chair (104 Riley-Robb Hall; 255-2270, -2465); B. A. Ahner, L. D. Albright, D. J. Aneshansley, A. J. Baeumner, J. A. Bartsch, A. K. Datta, K. G. Gebremedhin, D. A. Haith, J. B. Hunter, L. H. Irwin, W. J. Jewell, D. Luo, J. C. March, J.-Y. Parlange, N. R. Scott, R. M. Spanswick, T. S. Steenhuis, M. B. Timmons, L. P. Walker, M. T. Walter. Lecturers: T. J. Cook, L. D. Geohring, P. E. Hillman

### BEE 102(1102) Introduction to Microcomputer Applications

Fall or spring. 3 credits. All students, including those pre-enrolled, must attend first lec and first lab to guarantee admittance to a desired lab sec. All graduating seniors will be admitted as long as they attend first lec. After first lec, students admitted only by permission of instructor. No students admitted after first lab. Letter grades only. Fee: \$35. P. E. Hillman.

Introduction to application packages on microcomputers. Laboratories provide experience with word processing, object-oriented and bit-mapped graphics, spreadsheets, visual basic macros, database management, presentation graphics, and web page authoring. An independent group project utilizing spreadsheets and presentation graphics is required. These packages and others such as desktop publishing, multimedia, anti-virus software and those used for searching the Internet for information are discussed and demonstrated in the lectures, along with an overview of computer hardware and health hazards of computing, computer malware, and software piracy.

### BEE 110(1030) Introduction to Metal Fabrication Techniques

Spring. 3 credits. Limited to 20 students per lab. Letter grades only. T. J. Cook. Emphasis is on selection of proper materials and techniques to accomplish a variety of metal fabrication and maintenance projects. Covers hand and machine tools, fasteners, strengths of materials, classification and identification of metals, sheet metal work, soldering, pipe fitting, forging, controlling distortion, oxy-acetylene torch cutting, welding and brazing, carbon steel stick arc welding, arc cutting and use of the carbon arc torch.

### BEE 132(1040) Introduction to Wood Construction

Fall. 3 credits. Limited to 16 students per lab. Letter grades only. T. J. Cook. Principles and practice of wood construction. Covers site selection and preparation, drainage, water and septic development, footers and foundations, concrete work and block construction, material properties, framing and roofing, comparison of alternatives to wood construction, use of hand and power tools, wood joining methods and joinery, fasteners and their application. Each

student plans and constructs an approved carpentry project (fine furniture to livestock equipment that will be useful, durable, and show the students ability and mastery of the subject matter).

### BEE 151(1510) Introduction to Computer Programming

Fall. 4 credits. Limited to 18 students per lab and rec. No previous programming experience assumed. Pre- or corequisite: MATH 191 or equivalent. Letter grades only. Staff.

Introduction to computer programming and concepts of problem analysis, algorithm development, and data structure in an engineering context. The structured programming language MATLAB is used, implemented on interactive personal computers and applied to problems of interest in biological and environmental engineering.

### BEE 200(1200) The BEE Experience

Spring. 1 credit. Requirement for CALS BEE freshmen. Not required for students who have completed ENGRD 150. Prerequisite: BEE majors or permission of instructor. Letter grades only. J. A. Bartsch.

Forum covering the career opportunities for engineering students and the activities and curricula that lead to these opportunities. A series of seminars are given by practicing engineers, Cornell faculty members, alumni, staff from Cornell career services offices, and students. Students develop their undergraduate course plans, complete a web search assignment to locate jobs and internships, and select future courses to meet their academic objectives and career goals.

### BEE 222(2220) Bioengineering Thermodynamics and Kinetics

Spring. 3 credits. Prerequisites: MATH 192, BIO G 110, PHYS 213, and chemistry course completed or concurrent. Letter grades only. J. B. Hunter.

Living systems rely on chemical and phase equilibria, precise coordination of biochemical pathways, and the release of chemical energy as heat, all of which are governed by the laws of thermodynamics and the rates of chemical reactions. The course covers concepts and laws of thermodynamics as applied to phase transformations, work, heat, and chemical reactions; and reaction kinetics applied to industrial processes and living systems, all with a focus on biological examples.

### BEE 251(2510) Engineering for a Sustainable Society (also ENGRD 251[2510])

Spring. 3 credits. Pre- or corequisite: MATH 293. Letter grades only. Offered spring 2007 and fall 2007 and every fall thereafter. B. A. Ahner.

Case studies of contemporary environmental issues including pollutant distribution in natural systems, air quality, hazardous waste management, and sustainable development. Emphasis is on the application of math, physics, and engineering sciences to solve energy and mass balances in environmental sciences. Introduces students to the basic chemistry, ecology, biology, ethics, and environmental legislation relevant to the particular environmental problem. BEE students must complete either BEE 251 or BEE 260 according to their academic plan. BEE students who complete both BEE 251 and BEE 260 receive engineering credit for only one of these courses.

### BEE 260(2600) Principles of Biological Engineering (also ENGRD 260[2600])

Fall. 3 credits. Pre- or corequisite: MATH 293. Letter grades only. A. J. Baeumner.

Focuses on the integration of biological principles with engineering, math, and physical principles. Students learn how to formulate equations for biological systems in class and practice in homework sets. Topics range from molecular principles of reaction kinetics and molecular binding events to macroscopic applications such as energy and mass balances of bioprocessing and engineering design of implantable sensors. BEE students must complete either BEE 251 or BEE 260 according to their academic plan. BEE students who complete both BEE 251 and BEE 260 receive engineering credit for only one of these courses.

### BEE 299(3299) Sustainable Development: A Web-Based Course

Spring. 3 credits. Prerequisite: at least sophomore standing. S-U grades optional. N. R. Scott.

Sustainable development is the dominant economic, environmental, and social issue of the 21st century. This course develops the concepts of sustainable development as an evolutionary process, demanding the integration of the physical sciences and engineering with the biological and social sciences for design of systems. Topics include the nature of ecosystems, global processes, sustainable communities, and industrial ecology and life cycle analysis.

### BEE 305(3050) Principles of Navigation (also NAV S 301[3050])

Spring. 4 credits. Four classes each week (lec-rec-project work). Letter grades only. Lt. Gamicchia.

Introduction to the fundamentals of marine navigation emphasizing piloting and celestial navigation procedures. Covers coordinate systems, chart projections, navigational aids, instruments, compass observations, time, star identification, use of the nautical almanac, tides, and currents. Also *briefly* discusses electronic navigation systems.

### BEE 310(1050) Advanced Metal Fabrication Techniques

Spring. 1 credit; 2-credit option available. Prerequisite: BEE 110 or permission of instructor. Letter grades only. T. J. Cook.

Principles and practices beyond the scope of BEE 110. Includes out-of-position, low-hydrogen, high-carbon steel and cast iron welding. Topics such as soldering and brazing of aluminum, hard surfacing, both tungsten (TIG) and metallic (MIG) inert gas welding, plasma-arc, and oxy cutting of metals are covered. Planning, development, and fabrication of a metal construction project is required for the 2-credit option.

### [BEE 325(3250) Environmental Management

Fall. 3 credits. Letter grades only. Not offered 2006–2007. W. J. Jewell.

Explores the decline in environmental quality caused by human activities and the limits of science and technology solutions. Emphasizes understanding complex issues such as global warming and deriving sustainable solutions, which are illustrated with case studies. Includes field trips to water supply and waste treatment facilities. Emphasizes water, using energy, air quality, and soil evaluations to illustrate environmental quality problems. Meets concurrently with BEE 625. BEE 625

students complete a semester-long design-oriented project.]

### **BEE 331 (3310) Bio-Fluid Mechanics**

Fall. 4 credits. Prerequisites: ENGRD 202 and Engineering math sequence. Letter grades only. K. G. Gebremedhin.  
Properties of Newtonian and non-Newtonian fluids; hydrostatic and dynamic forces; principles of continuity, conservations of mass, energy and momentum and their applications; laminar and turbulent flows and boundary layer, introduction to Navier Stokes; dimensional analysis and similarity; blood flow in the cardiovascular system; gas exchange in the pulmonary system; blood flow and sodium transport in the kidney.

### **BEE 350(3500) Biological and Environmental Transport Processes**

Fall. 3 credits. Pre- or corequisites: MATH 293 and fluid mechanics course. Letter grades only. A. K. Datta.

Focuses on understanding the principles of heat and mass transfer in the context of biological, biomedical, and environmental systems. Emphasizes physical understanding of transport processes and simple reaction rates with application examples from plant, animal, and human biology, the environment (soil/water/air), and industrial processing of food and biomaterials.

### **BEE 360(3600) Molecular and Cellular Bioengineering (also BME 360(3600))**

Spring. 3 credits. Prerequisite: biochemistry course or A&EP 252 or permission of instructor. Letter grades only. U. March.  
Biological engineering at the molecular and cellular level, focusing on different organisms (viruses, bacteria, cells, animals, and plants) and different scales (nano, molecular, cellular, tissue, and environment) with two underlying themes: DNA and cancer. Introduction of quantitative analysis and measurement as well as ethics in molecular and cellular bioengineering with emphasis on integration of molecular and cell biology with engineering.

### **BEE 362(3620) Fundamentals of Tissue Engineering**

Spring. 3 credits. Limited to 25 students; priority given to graduating seniors. Prerequisites: biochemistry, BEE 350. Letter grades only. R. C. Gorewit.  
Biochemical and physiological fundamentals of tissue engineering. Cell technology, cell function in constructs and sources of cells for tissue engineering. Biomaterials, including functional requirements, biomimetics and substrates, and bioartificial construct technology. Diffusion and transport processes in engineered tissue, manufacture and scale-up of production processes, regulation and FDA approval of engineered products. Examples include cartilage, bone, skin, cardiovascular and neural tissues.

### **BEE 365(3650) Properties of Biological Materials**

Spring. 3 credits. Pre- or corequisite: ENGRD 202. Letter grades only. J. A. Bartsch.  
Mechanics and structural properties of biological materials; mechanical testing of animal, plant, and food products. Laboratory exercises involve quasistatic and dynamic testing of materials and interpretation of test results. Uses experimental techniques to determine engineering properties of these materials. Satisfies BEE laboratory experience requirement.

### **BEE 368(3680) Biotechnology**

**Applications: Animal Bioreactors**  
Fall. 3 credits. Prerequisite: biochemistry course or permission of instructor. Letter grades only. R. C. Gorewit.  
Introduces students to the biotechnological applications of animals; their organs, tissues, and cells as bioreactors for the production of substances such as pharmaceuticals; growth factors, anti-tumor proteins, antibodies, and vaccines. Exposes students to various design issues, technical constraints, societal concerns, and ethical considerations of this biotechnology.

### **BEE 371(3710) Physical Hydrology for Ecosystems**

Spring. 3 credits. Prerequisite: MATH 192 or permission of instructor. Letter grades only. Offered alternate years. T. S. Steenhuis and M. T. Walter.  
This is an introduction to fundamental hydrology emphasizing physical hydrological processes and the roles of interactions among hydrology, ecology, biogeochemistry, and human activities. This course focuses on surface and near surface processes and introduces deeper, groundwater-hydrology. A broad range of specific topics is covered: e.g., the hydrologic cycle, watershed hydrology, runoff generation, physical and biophysical vadose zone processes, erosion and sediment transport, and eco-hydrological systems.

### **BEE 401(4010) Renewable Energy Systems**

Spring. 3 credits. Prerequisite: college physics. Letter grades only. L. D. Albright.  
Introduces energy systems with emphasis on quantifying costs and designing renewable energy systems to convert environmental inputs into useful forms of energy. Covers solar energy, small-scale hydropower, wind, bio-conversion processes, house energy balances. Focuses on the technologies and small-scale system design, not policy issues. Use of spreadsheets is extensive.

### **BEE 427(4270) Water Sampling and Measurement**

Fall. 3 credits. Satisfies BEE laboratory experience requirement. Prerequisites: fluids or hydrology course and MATH 191. Letter grades only. L. D. Geohring and T. S. Steenhuis.  
Get wet and down and dirty with this course on water measurement sampling methods where science and engineering technologies are integrated to quantify, characterize, and analyze environmental engineering problems. This field-based lab course focuses on quantification of surface and subsurface flow and quality, utilizing various sampling equipment and analytical techniques. Quality assurance and control protocols, and interpretation of watershed loading of contaminants are addressed.

### **BEE 435(4350) Principles of Aquaculture**

Spring. 3 credits. BEE students who wish to take this course to satisfy BEE capstone design requirement must co-register in BEE 496 for 1 credit hour. Prerequisite: at least junior standing. Letter grades only. M. B. Timmons.  
An in-depth treatment of the principles of aquaculture: fish biology, waste treatment, engineering design, fish health, nutrition, processing, etc. This course is intended to build upon the undergraduate's previous course background and interests. Includes supervised "hands-on" laboratory experiences.

### **BEE 450(4500) Bioinstrumentation**

Spring. 4 credits. Satisfies both BEE laboratory experience and BEE capstone design requirement. Satisfies College of Engineering technical writing requirement when co-registered in BEE 493. Prerequisites: MATH 294, BEE 151, PHYS 213, or permission of instructor. Letter grades only. D. J. Aneshansley.  
Lab-based course emphasizing biological and biomedical applications. Considers the electronic instrument from sensor to computer. Static and dynamic characteristics of components and systems are determined theoretically and empirically. General analog and digital signal condition circuits are designed, constructed, and tested.

### **BEE 453(4530) Computer-Aided Engineering: Applications to Biomedical Processes (also M&AE 453(4530))**

Spring. 3 credits. Satisfies BEE capstone design requirement. Prerequisite: heat and mass transfer (BEE 350 or equivalent). Letter grades only. A. K. Datta.  
Introduction to simulation-based design as an alternative to prototype-based design; analysis and optimization of complex real-life processes using industry-standard physics-based computational software high-end personal computer. Covers biomedical processes and industrial food processing applications of heat and mass transfer. Computational topics introduce the finite-element method, pre- and post-processing, and pitfalls of using computational software. Students choose their own term project, which is the major component of the course (no final exam).

### **BEE 454(4540) Physiological Engineering**

Fall. 3 credits. Satisfies BEE laboratory experience requirement. Corequisite: fluid mechanics course. Letter grades only. D. J. Aneshansley.  
Engineering analysis and design in the physiology of animals and humans. Covers the use of engineering principles to study how animals work in nature and to intervene in physiological functions. The two major engineering themes are: signal processing as related to neural conduction, sound processing, vision, and image processing; and systematics as applied to cardiovascular and respiratory systems, bioenergetics, and bird flight. Laboratories involve experiments, computing applications, field trips, and live animal demonstrations.

### **[BEE 459(4590) Biosensors and Bioanalytical Techniques**

Fall. 3 credits. Prerequisites: biochemistry course and permission of instructor. Letter grades only. Next offered 2007-2008. A. J. Baeumner.  
Provides students with an understanding of the scientific and engineering principles of biosensors and bioanalytical techniques. Addresses selected topics from simple biosensors to micro/nanofabricated Micro Total Analysis Systems (MicroTAS). Biosensor and Micro TAS applications in environmental analysis, food safety, and medical diagnostics are explored. Students give oral presentations in lecture, analyze biosensors published in literature, and theoretically design a biosensor based on criteria discussed in class. Undergraduate students work together in teams of two to three. Meets concurrently with BEE 659. BEE 659 students work



independently on individual biosensor projects.]

#### **BEE 464(4640) Bioseparation Processes**

Fall. 3 credits. Prerequisites: introductory biochemistry, physics, MATH 192, BEE 260 or equivalent, or permission of instructor. S-U or letter grades. J. B. Hunter.

Bioseparation is the science and engineering of fractionating and purifying biological materials: DNA, proteins, living cells, antibiotics, biofuels, and even foods. This course covers separation methods used in the biotechnology industry, principles governing these methods, approaches to improving bioseparation performance, and the special challenges of scale-up. Key topics (centrifugation, filtration, extraction, membrane methods, ion exchange, chromatography, electrophoresis) are supplemented with student presentations. Intended for seniors and graduate students in engineering, chemistry, biology, and food science.

#### **BEE 471(4710) Introduction to Groundwater (also EAS 471[4710])**

Spring. 3 credits. Prerequisites: MATH 293, fluid mechanics or hydrology course. S-U or letter grades. Field trip. L. M. Cathles and T. S. Steenhuis.

Intermediate-level study of aquifer geology, groundwater flow, and related design factors. Includes description and properties of natural aquifers, groundwater hydraulics, soil water, and solute transport.

#### **BEE 473(4730) Watershed Engineering**

Fall. 3 credits. BEE students who wish to take this course to satisfy BEE capstone design requirement must co-register in BEE 496 for 1 credit. Satisfies College of Engineering technical writing requirement when co-registered in BEE 493. Satisfies BEE laboratory experience requirement. Prerequisite: fluid mechanics or hydrology course. Letter grades only. M. F. Walter and M. T. Walter.

This course teaches basic design and analysis as practiced for water control and nonpoint source pollution prevention. We will discuss the origins of design approaches including their theoretical bases but this is not a theory course. Most of the course is dedicated to practicing applied design. Assignments are generally representative of real-life engineering problems and will involve as much hands-on experience as possible. Some example topics include risk analysis, water conveyance, nonpoint source pollution control, stream restoration, stormwater management, and erosion control.

#### **BEE 474(4740) Water and Landscape Engineering Applications**

Spring. 3 credits. Satisfies BEE capstone design requirement. Prerequisite: fluid mechanics or hydrology course or permission of instructor. Letter grades only. T. S. Steenhuis and L. D. Geohring.

This course will focus on how water moves in soil and the implications for design of drainage and irrigation systems. The course will also address aspects of water quality and water supply or disposal in regards to drainage and irrigation applications. Emphasis is placed on problem solving with actual situations used wherever possible. One major design project is required of each student.

#### **BEE 475(4750) Environmental Systems Analysis**

Fall. 3 credits. Prerequisites: computer programming and one year of calculus. Letter grades only. D. A. Haith.

Applications mathematical modeling, simulation, and optimization to environmental-quality management. Fate and transport models for contaminants in air, water, and soil. Optimization methods (search techniques, linear programming) to evaluate alternatives for solid-waste management and water and air pollution control. Introduction to hydrologic simulation (runoff and streamflow). Software packages for watershed analyses of point and nonpoint source water pollution.

#### **BEE 476(4760) Solid Waste Engineering**

Spring. 3 credits. Prerequisites: one semester of physics and chemistry. Letter grades only. D. A. Haith.

Planning and design of processes and facilities for management of municipal solid wastes. Source characterization and reduction; collection and transport systems; waste-to-energy combustion; sanitary landfills; composting; recycling, and materials recovery facilities; and hazardous waste management. Emphasizes quantitative analyses.

#### **BEE 478(4780) Ecological Engineering**

Spring. 3 credits. BEE students who wish to take this course to satisfy BEE capstone design requirement must co-register in BEE 496 for 1 credit. Prerequisite: junior-level environmental quality engineering course or equivalent. Letter grades only. W. J. Jewell.

Ecological engineering is the language of sustainable living. Waste management with natural systems, the most advanced form of this new engineering direction, includes constructed wetlands, hydroponic applications of plants in resource-recovery waste management systems, soil restoration, phytoremediation, and bioremediation of toxics. Biomass refineries to create energy-independent communities, sustainable drinking water systems, carbon sequestration, and zero polluting farms are future sustainable living topics that also solve some of society's larger problems.

#### **BEE 481(4791) LRFD-Based Engineering of Wood Structures (also CEE 481[4791])**

Spring. 3 credits. BEE students who wish to take course to satisfy BEE capstone design requirement must co-register in BEE 496 for 1 credit. Prerequisite: ENGRD 202. Letter grades only. Two evening prelims. K. G. Gebremedhin.

Computer-aided and manual computation procedures of Load and Resistance Factor Design (LRFD)-based engineering of wood structures. National design codes and standards; estimation of factored design loads and load combinations; mechanical properties of wood and wood products; designs of beams, columns, trusses, frames, arches, bridges, diaphragms; connections and wood structural systems. Also discusses engineering design judgment as an integral component of the quantitative design procedure.

#### **BEE 482(4820) Biothermal Engineering for Humans**

Fall. 3 credits. Satisfies BEE capstone design requirement. Prerequisites: BEE 350 or equivalent and introductory biology. Letter grades only. Fee: \$25. P. E. Hillman.

Engineering design to help humans survive outdoor extremes of heat and cold as well as

achieving comfort indoors. Three major topics are discussed: principles of heat and mass transfer applied to humans interacting with their environment, physiological responses to stressful environments, and designing outerwear for environmental extremes.

#### **BEE 484(4840) Metabolic Engineering**

Spring. 3 credits. Prerequisite: biochemistry course or permission of instructor. Letter grades only. R. M. Spanswick.

The principles of metabolic engineering as they relate to the regulation of metabolic pathways, including membrane transport, are considered in terms of enzyme kinetics and metabolic control analysis. Case studies, reflecting the interests of the instructor, include examples involving higher plants. Each student is expected to investigate one topic in depth and make a short class presentation.

#### **[BEE 487(4870) Sustainable Energy Systems**

Fall. 3 credits. Satisfies BEE capstone design requirement. Intended for upper-level undergraduates and graduate students. Prerequisite: BEE 350 and thermodynamics course. Letter grades only. Next offered 2007-2008. N. R. Scott and L. D. Albright.

Offers a systems approach to understanding renewable energy systems (solar, wind, and biomass) and their conversion processes, from various aspects of biology, physics, engineering, environmental impacts, economics, and sustainable development.]

#### **BEE 489(4890) Engineering Entrepreneurship, Management, and Ethics**

Spring. 4 credits. Satisfies College of Engineering technical writing requirement. Prerequisites: junior standing; ENGRD 270 or CEE 304 or equivalent highly recommended. Letter grades only. M. B. Timmons.

The course focuses on how to start a new company centered around engineering or biological technologies. Course objectives include coverage of: entrepreneurship principles, fund raising, negotiation, financial calculations (internal rate of return, time value of money, proforma statements); legal structures of businesses; project management; and to develop an awareness of issues related to professional ethics; and technical writing and communication.

#### **BEE 493(4930) Technical Writing for Engineers**

Fall or spring. 1 credit. Meets College of Engineering technical writing requirement when taken concurrently with BEE 473 in fall or BEE 450 in spring. Letter grades only. Staff.

Covers writing skills necessary for technical project reports. Also considers outlines, style, audience, and general writing mechanics.

#### **BEE 494(4940) Special Topics in Biological and Environmental Engineering**

Fall or spring. 4 credits max. S-U or letter grades. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and will be advertised by the department. Courses offered under this number will be approved by the department curriculum committee and the same course will not be offered twice under this number.



**BEE 494(4940) Mini Baja (also M&AE 490, section 56)**

Fall, spring. 1-4 credits. Prerequisite: permission of instructor. No evening prelims. Letter grades only. L. Collins. Design and build off-road vehicle for Society of Automotive Engineers competition.

**BEE 495(4950) BEE Honors Research**

Fall or spring. 1-6 credits, variable. Prerequisite: enrollment in BEE research honors program. Students must be eligible for Latin honors and complete honors program application by third week of fall semester, senior year. Letter grades only. Staff.

Intended for students pursuing the research honors program in BEE.

**BEE 496(4960) Capstone Design in Biological and Environmental Engineering**

Fall and spring. 1 credit. Corequisite: one approved upper-level course (BEE 435, 473, 478, 481). Letter grades only. Staff. Involves capstone design experience, including a team project incorporating analysis, design, evaluation, synthesis, and a written and oral report of the end product.

**BEE 497(4970) Individual Study in Biological and Environmental Engineering**

Fall and spring. 1-4 credits. Prerequisite: written permission of instructor and adequate ability and training for work proposed; normally reserved for seniors in upper two-fifths of their class. Students must register using independent study form (available in 207 Riley-Robb Hall). Letter grades only. See department office for course ID specific to your project advisor. Staff.

Special work in any area of biological and environmental engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obtained.

**BEE 498(4980) Undergraduate Teaching**

Fall and spring. 1-4 credits. Prerequisite: written permission of instructor. Letter grades only. Students must register using independent study form (available in 207 Riley-Robb Hall). See department office for course ID specific to your project advisor. Staff.

The student assists in teaching a biological and environmental engineering course appropriate to his or her previous training. The student meets with a discussion or laboratory section, prepares course materials, grades assignments, and regularly discusses objectives and techniques with the faculty member in charge of the course.

**BEE 499(4990) Undergraduate Research**

Fall and spring. 1-4 credits. Prerequisites: normally reserved for seniors in upper two-fifths of their class; adequate training for work proposed; written permission of instructor. Letter grades only. Students must register using independent study form (available in 207 Riley-Robb Hall). See department office for course ID specific to your project advisor. Staff.

Research in any area of biological or environmental engineering on problems under investigation by the department or of special interest to the student, provided that adequate facilities can be obtained. The student must review pertinent literature, prepare a project

outline, carry out an approved plan, and submit a formal final report.

**BEE 501(5010) Bioengineering Seminar (also BME 501[5010])**

Fall, spring. 1 credit. Prerequisite: junior, senior, or graduate standing. S-U grades only. D. Lipson.

To give you, the engineer-in-training, a broad overview of different aspects of biological and biomedical engineering including business, legal, and clinical issues. To give the students a working knowledge of how abstracts are written and revised.

**BEE 520(5900) M.P.S. Project**

Fall and spring. 1-6 credits. Requirement for each M.P.S. candidate in field. Letter grades only. BEE graduate faculty. Comprehensive project emphasizing the application of agricultural technology to the solution of a real problem.

**BEE 551(5950) Master of Engineering Design Project**

Fall and spring. 3-6 credits. Prerequisite: admission to M.Eng. degree program.

Letter grades only. BEE graduate faculty. Comprehensive engineering design projects relating to the candidate's area of specialization. Projects are supervised by faculty members on an individual basis. A formal project report and oral presentation of the design project are required for completion of the course(s). A minimum of 3 to a maximum of 12 credits of 551 is required for the M.Eng. degree (can be taken in two semesters).

**[BEE 625(6250) Environmental Management**

Fall. 3 credits. Letter grades only. Not offered 2006-2007. W. J. Jewell.

For description, see BEE 325.]

**[BEE 647(6470) Water Transport in Plants (also BIOPL 651[6510])**

Fall. 2 credits. Letter grades only. Offered alternate years; next offered 2007-2008.

R. M. Spanswick. Topics include water relations of plant cells and tissues using water potential terminology; permeability of plant cells to water and the role of aquaporins; transport of water through whole plants, including transpiration, stomatal physiology, and the modifications due to plant communities; water status and plant growth in relation to water stress.]

**BEE 649(6490) Solute Transport in Plants (also BIOPL 649[6490])**

Fall. 3 credits. Letter grades only. Offered alternate years. R. M. Spanswick. Fundamental treatment of the transport of ions and small organic molecules in plants. Topics include electrophysiology of cell membranes, including ion channels and electrogenic ion pumps; transport mechanisms for the major ions; intercellular and long-distance ion transport; cotransport systems for sugars and amino acids; phloem transport; ABC-type transporters.

**BEE 651(6510) Bioremediation: Engineering Organisms to Clean Up the Environment**

Spring. 3 credits. Prerequisites: BIOMI 290 or BIOBM 331 or permission of instructor. Letter grades only. B. A. Ahner.

Examines ways in which organisms may be used to remove or metabolize pollutants in the environment, including bacterial degradation of organics and phytoremediation

of heavy metals. Through lectures and current literature, students evaluate the benefits as well as the current obstacles. Examines the current efforts to genetically engineer organisms for bioremediation and the potential risks of releasing them into the environment.

**[BEE 655(6550) Thermodynamics and Its Applications**

Fall. 3 credits. Prerequisite: MATH 293 or equivalent; for undergraduates, permission of instructor. Letter grades only. Offered alternate years; next offered 2007-2008.

J.-Y. Parlange. Thermodynamics and its applications to problems in engineering and agriculture. Topics include basic concepts (equilibrium, entropy, processes, systems, potentials, stability, phase transitions) and applications (soil and water processes, dilute solutions, electromagnetism, surface phenomena, heat and mass transport, and structure of organizations.).]

**[BEE 659(6590) Biosensors and Bioanalytical Techniques**

Fall. 3 credits. Prerequisites: biochemistry course and permission of instructor. Letter grades only. Not offered 2006-2007.

A. J. Baeumner.

For description, see BEE 459.]

**BEE 671(6710) Analysis of the Flow of Water and Chemicals in Soils**

Fall. 3 credits. Prerequisites: four calculus courses and fluid mechanics course. Letter grades only. Offered alternate years.

J.-Y. Parlange. Encompasses a full range from simple to complex methods to describe the chemical and water flows on the surface, in the vadose zone, and through the aquifer. Discusses current analytical, semi-analytical, and computer-based techniques. Analyzes both homogeneous and heterogeneous soils. Offered alternately with CEE 633—a complementary, but not identical, course.

**BEE 672(6720) Drainage**

Spring. 4 credits. Prerequisites: BEE 471 or BEE 473. Letter grades only. T. S. Steenhuis and L. D. Geohring.

Discusses the theory of water and solute flow in aquifers, hill slopes, and the vadose zone as it relates to artificial drainage. Critically reviews drainage design as it relates to agricultural land, landfills, and land application sites. Examines the importance of preferential flow and matrix flow on water quality of drainage waters. Laboratories provide hands-on experience with measuring soil parameters and for actual drainage design.

**BEE 673(6730) Sustainable Development Seminar (also NBA 573[5730])**

Spring. 1-3 credits. Prerequisites: upper-division undergraduate or graduate standing or permission of instructor. Letter grades only. N. R. Scott.

Sustainable development is the most beneficial concept to come out of the environmental movement in years. The concept of a sustainable world, however, is not a constant. There are many aspects of sustainability involving economics, environment, and political, social, scientific, and technological developments. This seminar explores topics such as energy, agricultural and food systems, green buildings and ecological design, corporate sustainability, and other contemporary issues.

**BEE 687(6870) The Science and Engineering Challenges to the Development of Sustainable Bio-Based Industries**

Fall. 1 credit. Prerequisite: graduate standing. S-U grades only. L. P. Walker. Environmentally sustainable alternatives for our energy and chemical needs are critical. This seminar series explores challenges facing the development of industries that use biologically derived materials to produce useful chemicals and energy for society. Topics include natural products from biological systems, conversion of biomass to fuel and other commodities, and the use of biological systems for environmental bioremediation.

**BEE 694(6940) Graduate Special Topics in Agricultural and Biological Engineering**

Fall or spring. 4 credits max. S-U grades optional. BEE graduate faculty. The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department. Courses offered under this number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**[BEE 694(6940) Ecohydrology]**

Spring. 3 credits. Prerequisite: ecology or hydrology course. Letter grades only. Offered alternate years. Next offered 2007–2008. M. T. Walter. The objective of this course is to investigate novel topics that involve the interactions between physical hydrological processes and ecosystem processes, including the impacts of human activities on the ecohydrological system. The course is designed to encourage teams of students from historically disparate disciplines to collaboratively combine their unique skills and insights to answer multidisciplinary ecohydrological questions. This course will consider a broad range scales from a stomate and a soil pore to a forest, watershed, and region, with emphasis placed on those scales and systems most appropriate to student interests. Through course work we will clarify the current understanding of various topics, identify knowledge gaps, develop hypotheses, and test them quantitatively by creating models and analyzing available data. The goal of this course is to identify the basic principles of ecohydrology and become familiar and comfortable with a range of quantitative tools and approaches for answering ecohydrological questions.]

**BEE 697(6970) Graduate Individual Study in Agricultural and Biological Engineering**

Fall or spring. 1–6 credits. Prerequisite: permission of instructor. S-U grades optional. BEE graduate faculty. Topics are arranged by the staff at the beginning of the semester.

**BEE 700(7010) BEE Seminar Series**

Spring. 1 credit. S-U grades optional. Staff. Presentation and discussion of research and special developments in agricultural and biological engineering and related fields.

**BEE 740(6430) Veterinary Perspectives on Pathogen Control in Animal Manure (also VTMED/BIOMI 740[6430])**

Spring, March 24–May 16. 2 credits. Prerequisite: graduate standing or permission of instructor. D. D. Bowman. In-depth look at the management of pathogens in animal manures. Reviews the pathogens involved, the role of governing agencies, the survival of pathogens in the field, and methods of pathogen destruction. Discusses commercial methods of manure processing for the control of these pathogens for the protection of other animals and the human population. Concludes with class discussions with major stakeholders representing the dairy, beef, pork, and poultry industries and their understanding of the problem as it relates to veterinary students.

**BEE 750(7000) Orientation to Graduate Study**

Fall, first seven weeks. 1 credit. Prerequisite: new graduate students. S-U grades only. D. J. Aneshansley. Introduction to BEE research policy, programs, methodology, resources, and degree candidates' responsibilities and opportunities.

**[BEE 754(7540) Watershed Management]**

Spring. 2–3 credits. Prerequisite: graduate standing or permission of instructors. S-U grades only. Offered alternate years; next offered 2007–2008. T. S. Steenhuis. Traditional top-down approaches to watershed management have been challenged by advocates of public participation. These challenges have raised questions about how to effectively integrate science, policy, and public participation. This course reviews different management approaches and evaluates their usefulness in dealing with different watershed management problems. Considers case examples from watersheds in the United States and overseas.]

**BEE 760(7600) Nucleic Acid Engineering (also BME 760[7600])**

Spring. 2 credits. Prerequisite: graduate standing; BEE 360 or permission of instructor. Letter grades only. D. Luo. Nucleic acid engineering focuses on manipulating nucleic acid molecules in a true engineering sense as well as in the "genetic engineering" sense by treating nucleic acids (including DNA, RNA, PNA, and TNA) as both genetic and generic materials. Both biomedical and nonbiomedical applications of nucleic acid engineering, including tool kits for nucleic acid engineering and current examples of DNA-based engineering, DNA nanotechnology, and DNA-based medicine are introduced. A design project and formal project presentation are required.

**BEE 771(7710) Soil and Water Engineering Seminar**

Fall and spring. 1–3 credits. Prerequisite: graduate standing or permission of instructor. S-U grades only. T. S. Steenhuis, J.-Y. Parlange, M. F. Walter, and M. T. Walter. Study and discussion of research or design procedures related to selected topics in irrigation, drainage, erosion control, hydrology, and water quality.

**BEE 781(7810) Structures and Related Topics Seminar**

Spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only. Staff. Advanced analysis and design of production systems with emphasis on structural and environmental requirements, biological responses, and economic considerations.

**BEE 785(7850) Biological Engineering Seminar**

Spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only. Staff. Examines the interactions of engineering and biology, especially the environmental aspects of plant, animal, and human physiology to improve communication between engineers and biologists.

**BEE 787(7870) Industrial Ecology of Agriculturally Based Bioindustries**

Spring. 3 credits. Prerequisites: graduate standing; one year of calculus, some knowledge of MATLAB, BEE 687. Letter grades only. L. P. Walker. This course is designed to bring students from the life sciences and engineering together in teams to model and simulate sustainable agriculturally based bioindustries like those currently being used to produce bioenergy and biodegradable polymers. It is a system modeling and analysis course focused on interconnecting discrete physical, chemical, and biological processes to create novel industrial ecologies that are sustainable. An input/output modeling methodology is employed to develop and manipulate the structure of complex agriculturally based bioindustries and to generate the material, energy, and monetary flows. Special emphasis is placed on designing and analyzing webs of connected processes such that waste products from one process can be used as a raw material for another process. Students will use linear algebra and state space tools in the MATLAB toolbox to simulate static and dynamic behavior of these complex webs of connected processes and to conduct life cycle analysis of these complex webs.

**BEE 788(7880) Biomass Conversion of Energy and Chemicals**

Fall. 3 credits. Prerequisite: one year of college calculus and chemistry; minimum of one course in thermodynamics and computer programming. Letter grades only. L. P. Walker. Biological and physical conversion of biomass to bioenergy and bioproducts. Biological and engineering concepts associated with microbial and enzymatic conversion of biomass to useful products, physical and chemical concepts associated with the pretreatment of biomass and the separation of key biomolecules. Uses mass and energy balances and mathematical models (with MATLAB) to simulate process behavior.

**BEE 800(8900) Master's-Level Thesis Research**

Fall and spring. 1–15 credits. Prerequisite: permission of advisor. S-U grades only. BEE graduate faculty.

**BEE 900(9900) Doctoral-Level Thesis Research**

Fall and spring. 1–15 credits. Prerequisite: permission of advisor. S-U grades only. BEE graduate faculty. Variable credit for Ph.D. research.

## BIOLOGICAL SCIENCES

The program of study in biology is coordinated by the Office of Undergraduate Biology. For course descriptions, see the separate section "Biological Sciences."

## BIOLOGY & SOCIETY

The undergraduate major field of study in biology & society is offered through the Department of Science and Technology Studies. For a full description of courses that fulfill field requirements, see "Biology & Society" under the College of Arts and Sciences.

## BIOMETRY AND STATISTICS

M. Wells, chair (301 Malott Hall, 255-5488, -4388), J. Booth, C. Bustamante, G. Hooker, J. Mezey, S. J. Schwager, A. C. Siepel, R. Strawderman

The Department of Biological Statistics and Computational Biology in Statistical Science offers the following courses in Biometry and Statistics. Students must register under Course Listings: College of Agriculture and Life Sciences—Biometry and Statistics.

### **BTRY 301(3010) Biological Statistics I (also NTRES 313[3130], STBTRY 301[3010])**

Fall and summer. 4 credits.

Develops and applies statistical methods to problems encountered in the biological and environmental sciences. Methods include data visualization, population parameter estimation, sampling, bootstrap resampling, hypothesis testing, the Normal and other probability distributions, and an introduction to modeling. Carries out applied analysis in the S-Plus statistical computing environment.

### **BTRY 302(3020) Biological Statistics II (also NTRES 413[4130], STBTRY 302[3020])**

Spring. 4 credits. Prerequisite: BTRY 301 or 601.

Applies linear statistical methods to quantitative problems addressed in biological and environmental research. Methods include linear regression, inference, model assumption evaluation, the likelihood approach, matrix formulation, generalized linear models, single factor and multifactor analysis of variance (ANOVA), and a brief foray into nonlinear modeling. Carries out applied analysis in the S-Plus statistical computing environment.

### **BTRY 310(3100) Statistical Sampling (also ILAST 310[3100], STBTRY 310[3100])**

Fall. 3 credits. Prerequisites: two semesters of statistics.

Applied methodology and theory of statistical sampling, with particular emphasis on sampling methods, sample design, cost, estimation of population quantities, and error estimation. Assessment of nonsampling errors. Discussion of application to social and biological sciences and business. Includes an applied project.

### **[BTRY 382(3820) Introduction to Statistical Genomics and Bioinformatics (also STBTRY 382[3820])**

Fall. 4 credits. Intended for undergraduates and beginning graduate students in mathematical and biological sciences.

Prerequisite: BTRY 301, MATH 111, BIO G 102, or equivalent. Not offered 2006-2007.

Survey course focusing on the statistical analysis of genomic data. Includes an introduction to probability and statistics and application to DNA sequence analysis, phylogenetic inference, population genetics, genetic mapping, molecular evolution, and macromolecular structure prediction. Evaluation is based on weekly problem sets and computer assignments as well as a midterm and final examination.]

### **BTRY 408(4080) Theory and Probability (also STBTRY 408[4080])**

Fall. 4 credits. Prerequisites: MATH 111, 112, at least concurrent enrollment in 213 or 222 or equivalents. Recommended: at least one introductory course in statistical methods.

Introduction to probability theory: axiomatic foundations; combinatorics and equally likely events; conditional probability and independence; discrete and continuous random variables, their distributions and moments; generating functions; transformations; extensions to problems involving two or more random variables; random samples. Can serve as either one-semester introduction or a foundation for a course in statistical theory.

### **BTRY 409(4090) Theory of Statistics (also STBTRY 409[4090])**

Spring. 4 credits. Prerequisites: BTRY 408 or equivalent and at least one introductory statistics course.

Introduction to classical theory of parametric statistical inference that builds on the material covered in BTRY 408. Topics include sampling distributions, principles of data reduction, likelihood, parameter estimation, hypothesis testing, interval estimation, and basic asymptotic theory.

### **[BTRY 421(4210) Matrix Computation**

Fall. 4 credits. Prerequisite: calculus course. Not offered 2006-2007.

Introductory course in matrix computations that reviews linear algebra (vector spaces, linear independence) and emphasizes a matrix approach to solving systems (LU-factorization, QR-decomposition, SVD, Schur complements) and the role of the condition number of a matrix. Discusses positive definite matrices, eigenvalues, and their applications in mathematical modeling and statistics.]

### **BTRY 482(4820) Statistical Genomics (also STBTRY 482[4820])**

Fall. 4 credits. Prerequisites: MATH 111. Highly recommended: at least one previous course in statistical methods and one in biology.

A course on the statistical analysis of genetic, molecular, and genomic data. The first module of the course presents a thorough treatment of important probability distributions and the concepts of likelihood and Bayesian inference. We then focus on how statistical models are developed for linkage analysis, basic Quantitative Trait Locus mapping, analysis of pedigrees, molecular population genetics and genomics, and phylogenetic inference. Meets concurrently with BTRY 682.

### **BTRY 483(4830) Quantitative Genomics and Genetics (also STBTRY 483[4830])**

Spring. 4 credits. Recommended: at least one previous course in statistical methods and genetics.

The focus of this course is recent advances in the statistical analysis and application of genomic data to the study of complex traits studied in model/nonmodel organism genetics, plant and animal sciences, and evolutionary biology. Topics include issues related to mapping, identification, and characterization of genes underlying complex traits (quantitative trait loci-QTLs), microarray data analysis, and analysis of genetic variation in populations. Meets concurrently with BTRY 683.

### **BTRY 484(4840) Computational Genomics (also STBTRY 484[4840])**

Fall. 4 credits. Highly recommended: at least one previous course in statistical methods and at least one in algorithms.

A rigorous treatment of important computational principles and methods for the analysis of genomic data, emphasizing comparative and evolutionary genomics. Topics include sequence alignment, gene and motif finding, phylogeny reconstruction, and inference of gene regulatory networks. Covers both maximum likelihood and Bayesian principles, and both exact and approximate algorithms for inference. Draws heavily on general concepts from probabilistic graphical models. Meets concurrently with BTRY 684.

### **BTRY 494(4940) Undergraduate Special Topics in Biometry and Statistics (also STBTRY 494[4940])**

Fall or spring. 1-3 credits. S-U grades optional.

Course of lectures selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

### **BTRY 495(4950) Statistical Consulting (also STBTRY 495[4950])**

Fall and spring. 2-3 credits. Pre- or corequisites: BTRY 302 or 602 and 409 and permission of instructor. S-U grades optional.

Participation in the Department of Biological Statistics and Computational Biology consulting service: faculty-supervised statistical consulting with researchers from other disciplines. Discussion sessions are held for joint consideration of literature and selected consultations encountered during previous weeks.

### **BTRY 497(4970) Undergraduate Individual Study in Biometry and Statistics (also STBTRY 497[4970])**

Fall and spring. 1-3 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Consists of individual tutorial study selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

### **BTRY 498(4980) Undergraduate Supervised Teaching (also STBTRY 498[4980])**

Fall and spring. 2 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Students assist in teaching a course appropriate to their previous training. Students meet with a discussion or laboratory section

and regularly discuss objectives with the course instructor.

**BTRY 499(4990) Undergraduate Research (also STBTRY 499[4990])**

Fall or spring. 1–3 credits. Prerequisite: statistics and biometry undergraduates; permission of faculty member directing research. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

**BTRY 601(6010) Statistical Methods I (also STBTRY 601[6010])**

Fall and summer. 4 credits. Prerequisite: graduate standing or permission of instructor.

Develops and uses statistical methods to analyze data arising from a wide variety of applications. Topics include descriptive statistics, point and interval estimation, hypothesis testing, inference for a single population, comparisons between two populations, one- and two-way analysis of variance, comparisons among population means, analysis of categorical data, and correlation and regression analysis. Introduces interactive computing through MINITAB statistical software. Emphasizes basic principles and criteria for selection of statistical techniques.

**BTRY 602(6020) Statistical Methods II (also STBTRY 602[6020])**

Spring. 4 credits. Prerequisite: graduate standing or permission of instructor; BTRY 601 or equivalent.

Continuation of BTRY 601. Emphasizes the use of multiple regression analysis, analysis of variance, and related techniques to analyze data in a variety of situations. Topics include an introduction to data collection techniques; least squares estimation; multiple regression; model selection techniques; detection of influential points, goodness-of-fit criteria; principles of experimental design; analysis of variance for a number of designs, including multi-way factorial, nested, and split plot designs; comparing two or more regression lines; and analysis of covariance. Emphasizes appropriate design of studies before data collection, and the appropriate application and interpretation of statistical techniques. Practical applications are implemented using a modern, widely available statistical package.

**[BTRY 603(6030) Statistical Methods III (also STBTRY 603[6030])**

Spring. 3 credits. Prerequisite: BTRY 601 and 602 or permission of instructor. Offered alternate years.

Categorical data analysis, including logistic regression, log-linear models, stratified tables, matched pairs analysis, polytomous response and ordinal data. Applications in biomedical and social sciences.]

**BTRY 604(6040) Statistical Methods IV: Applied Design (also STBTRY 604[6040])**

Spring. 4 credits. Prerequisites: BTRY 601 and 602 or permission of instructor. Offered alternate years.

Applications of experimental design including such advanced designs as split plots, incomplete blocks, fractional factorials. Stresses use of the computer for both design and analysis, with emphasis on solutions of real data problems.

**BTRY 652(6520) Computationally Intensive Statistical Inference (also STBTRY 652[6520])**

Spring. 4 credits. Prerequisite: BTRY 421 and 409 or equivalent. S-U grades optional. Offered alternate years.

Modern applications in statistics often require intensive computation not handled by "off-the-shelf" software. This course covers topics in statistical computing, including numerical optimization and finding zeros (likelihood and related techniques including generalized estimating equations and robust estimation), kernel density estimation, resampling methods (randomization and bootstrap tests and confidence intervals), and statistical simulation (random number generation, heuristic search methods, Bayesian estimation, and Monte Carlo Markov Chain methods for tests and interval estimation). Programming is done in MATLAB. Focuses on the use of numerical analysis methods for solving problems in statistical inference and estimation.

**[BTRY 672(6720) Topics in Environmental Statistics (also STBTRY 672[6720])**

Fall and spring. 2 credits. S-U grades optional. Prerequisite: BTRY 601 or permission of instructor. Not offered 2006–2007.

Discussion group focusing on statistical problems arising in the environmental sciences. Explores these issues in a number of different ways, such as student presentations of research papers, directed readings, and outside speakers.]

**BTRY 682(6820) Statistical Genomics (also STBTRY 682[6820])**

Fall. 4 credits. Prerequisite: MATH 111. Highly recommended: at least one previous course in statistical methods and one in biology.

A course on the statistical analysis of genetic, molecular, and genomic data. The first module of the course presents a thorough treatment of important probability distributions and the concepts of likelihood and Bayesian inference. We then focus on how statistical models are developed for linkage analysis, basic Quantitative Trait Locus mapping, analysis of pedigrees, molecular population genetics and genomics, and phylogenetic inference. Meets concurrently with BTRY 482.

**BTRY 683(6830) Quantitative Genomics and Genetics (also STBTRY 683[6830])**

Spring. 4 credits. Recommended: at least one previous course in statistical methods and genetics.

The focus of this course is recent advances in the statistical analysis and application of genomic data to the study of complex traits studied in model/non-model organism genetics, plant and animal sciences, and evolutionary biology. Topics include issues related to mapping, identification, and characterization of genes underlying complex traits (quantitative trait loci-QTLs), microarray data analysis, and analysis of genetic variation in populations. Meets concurrently with BTRY 483.

**BTRY 684(6840) Computational Genomics (also STBTRY 684[6840])**

Fall. 4 credits. Highly recommended: at least one previous course in statistical methods and at least one in algorithms.

A rigorous treatment of important computational principles and methods for

the analysis of genomic data, emphasizing comparative and evolutionary genomics. Topics include sequence alignment, gene and motif finding, phylogeny reconstruction, and inference of gene regulatory networks. Covers both maximum likelihood and Bayesian principles, and both exact and approximate algorithms for inference. Draws heavily on general concepts from probabilistic graphical models. Meets concurrently with BTRY 484.

**BTRY 689(6890) Topics in Population Genetics and Genomics (also STBTRY 689[6890])**

Fall. 1 credit; may be repeated for credit. Prerequisite: BTRY 682 or permission of instructor.

This course is a graduate seminar on current topics in population genetic data analysis. Topics this semester may include: detecting signatures of natural selection, estimating demographic parameters, and recombination rate variation from whole-genome data; statistical methods for association mapping; efficient methods for disease gene mapping; use of comparative genomic data for population genetic inference. Readings will be chosen primarily from current literature.

**BTRY 694(6940) Graduate Special Topics in Biometry and Statistics (also STBTRY 694[6920])**

Fall or spring. 1–3 credits. S-U grades optional.

Course of lectures selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

**BTRY 697(6970) Individual Graduate Study in Biometry and Statistics (also STBTRY 697[6970])**

Fall, spring, or summer. 1–3 credits. S-U grades optional.

Individual tutorial study selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

**BTRY 717(7170) Theory of Linear Models (also STBTRY 717[7170])**

Fall. 3 credits. Prerequisites: BTRY 409, 421, and 602 or equivalents.

Properties of the multivariate normal distribution. Distribution theory for quadratic forms. Properties of least squares and maximum likelihood estimates. Methods for fixed effect models of less than full rank. Analysis of balanced and unbalanced mixed effects models. Restricted maximum likelihood estimation. Some use of software packages and illustrative examples.

**BTRY 720(7200) Topics in Computational Genomics (also STBTRY 720[7200])**

Spring. 1 credit. Prerequisite: BTRY 484/684 or permission of instructor.

Weekly seminar series on recent advances in computational genomics. A selection of the latest papers in the field will be read and discussed. Methods will be stressed, but biological results and their significance will also be addressed.

**BTRY 726(7260) Problems and Perspectives in Computational Molecular Biology (also PL BR 726[7260], COM S 726[7590])**

Fall and spring. 1 credit. Prerequisite: permission of instructor. S-U grades only.

Weekly seminar series discussing timely topics of computational molecular biology. Addresses methodological approaches to



sequence annotation, protein structure and function relationships, and evolutionary relationships across species. Discusses statistical and deterministic computational approaches are covered and specific and detailed biological examples. Discusses topics of interest discussed in relation to papers prepared by teams of students and/or faculty members. Students/faculty members from biology backgrounds are paired with students from math, computer science, and statistics for paper preparation. Students summarize the salient questions addressed by the paper, the research methods used, and the results obtained. At the end of the presentation, questions should be listed on an overhead slide to initiate discussion in the group.

**BTRY 795(7950) Statistical Consulting (also STBTRY 795[7950])**

Fall and spring. 2-3 credits. Pre- or corequisites: BTRY 602 and 409 and permission of instructor. S-U grades optional.

Participation in the Department of Biological Statistics and Computational Biology consulting service: faculty-supervised statistical consulting with researchers from other disciplines. Discussion sessions are held for joint consideration of literature and selected consultations encountered during previous weeks.

**BTRY 798(7980) Graduate Supervised Teaching (also STBTRY 798[7980])**

Fall and spring. 2-4 credits. Prerequisites: permission of instructor and chair of special committee plus at least two advanced courses in statistics and biometry. S-U grades only.

Students assist in teaching a course appropriate to their previous training. Students meet with a discussion section, prepare course materials, and assist in grading. Credit hours are determined in consultation with the instructor, depending on the level of teaching and the quality of work expected.

**BTRY 800(8900) Master's-Level Thesis Research**

Fall or spring. Credit TBA. Prerequisite: M.S. candidates; permission of graduate field member concerned. S-U grades only. Research at the M.S. level.

**BTRY 900(9900) Graduate-Level Dissertation Research**

Fall or spring. Credit TBA. Prerequisite: Ph.D. candidates; permission of graduate field member concerned. S-U grades only. Research at the Ph.D. level.

**BTRY 901(9910) Doctoral-Level Dissertation Research**

Fall or spring. Credit TBA. S-U grades only.

## COMMUNICATION

G. K. Gay, chair; K. L. Berggren, S. A. Conroe, R. D. Colle, B. O. Earle, T. L. Gillespie, D. A. Grossman, J. T. Hancock, B. V. Lewenstein, K. A. McComas, P. L. McLeod, S. M. Nelson, R. E. Ostman, T. M. Russo, C. W. Scherer, J. E. Shanahan, M. A. Shapiro, L. P. Van Buskirk, Y. C. Yuan

**COMM 101(1010) Cases in Communication (SBA)**

Fall. 3 credits. B. Lewenstein.

Through analysis of cases, this course introduces students to key principles

and theories in the study of human communication. Cases cover personal situations, entertainment, national crises, business situations, new technologies, and other contexts. The goal is to understand the links between these daily activities, "mid-range" theories of human behavior, and broad social concepts of modernity and post-modernity.

**COMM 130(1300) Visual Communication**

Spring. 3 credits. C. Scherer.

Introduction to visual communication theory. Examines how visuals influence our attention, perspectives, and understanding. Uses examples of visuals drawn from advertising, TV news, documentaries, entertainment movies, print, and interactive media develop a theoretical framework for becoming more visually aware and for thinking more critically about how visuals influence us.

**COMM 131(1310) Writing about Communication**

Spring. 3 credits. Corequisite: COMM 130. L. Van Buskirk and staff.

Students develop skill in various writing styles and genres. This course explores communication practices and theories as they are observed and studied in personal and professional contexts. Assignments polish students' ability to gather information, analyze information, integrate ideas about communication, and express those ideas clearly and cogently. Several assignments focus on visual communication theories explored in COMM 130 as well as ideas from COMM 101.

**COMM 201(2010) Oral Communication (D)**

Fall, spring, or summer. 3 credits. Limited to 20 students per sec (fall and spring) or 15 students per sec (summer). Priority given to juniors and seniors, then sophomores. Fluency in spoken English assumed. Sections meet beginning first day of instruction; may precede lecture. Students absent twice during first week of class are dropped from course roster. Enrolled students must drop by end of second week to allow wait-listed students to add course. K. Berggren, T. Russo, and staff.

Through theory and practice, students develop self-confidence and competence in researching, organizing, and presenting material to audiences. Students give four graded speeches, write short papers, perform speaker evaluations, and engage in other speech-related activities.

**COMM 203(2030) Argumentation and Debate (D)**

Fall, spring, and summer. 3 credits. S. Nelson.

Students learn the principles of argumentation and debate. Topics emphasize Internet database research, synthesis of collected data, policy analysis of evidentiary quality, refutation of counter claims, identification of logical fallacies, risk evaluation, framing of issues, and coherent storytelling. Prepares students to work with a great range of opinion and evidence. Emphasizes different viewpoints, including those of different cultures. Assumptions are interrogated.

**COMM 220(2300) Contemporary Mass Communication (SBA) (D)**

Fall or summer. J. Shanahan.

The processes and effects of mass communication systems. Topics include the

evolution of communication media, current knowledge about mediated communication, and the role of communication in contemporary social issues.

**COMM 245(2450) Psychology of Social Computing (also INFO 245[2450])**

Fall. 3 credits. J. Hancock and staff.

Course focuses on understanding online communication through principles of cognitive and social psychology, and aspects of the Internet that defy traditional psychological understandings. Topics include impression formation and management, deception and trust, group dynamics, social support, "Internet addiction," online pornography, and organizational impacts of new communication technology.

**COMM 260(2600) Science Writing for Public Information**

Fall, spring, or summer. 3 credits. Limited to 25 students per sec. Prerequisite: junior or senior standing; college-level writing course. S. Conroe.

Intensive course in simplifying scientific and technical material for specific audiences within the general public. Weekly assignments include translations, descriptions, explanations, and summaries in such formats as the newsletter, brochure, and report. Emphasizes audience analysis. Not oriented to the mass media.

**COMM 263(2630) Organizational Writing**

Fall, spring, or summer. 3 credits. Limited to 25 students per sec. Prerequisite: junior, senior, or graduate standing; college-level writing course. L. Van Buskirk and staff.

Students write from the point of view of various organizations, including businesses, government agencies, and nonprofit organizations. This course emphasizes appropriate representation of the writer's organization, audience analysis, and clear and effective written presentation of detailed content. Assignments include text for web sites, reports, proposals, memoranda, letters, and e-mail.

**COMM 272(2720) Principles of Public Relations and Advertising**

Summer. 3 credits. Not open to freshmen. Staff.

Survey of the fields of public relations and advertising. Describes organizations, jobs, and functions in the industry. Covers the roles of public relations and advertising in society, the economic system, and organizations; psychological and sociological principles as bases for appeals; strategies for media selection and message execution. Introduction to research and regulation.

**COMM 276(2760) Cases in Communication and Social Influence (SBA)**

Spring. 3 credits. Prerequisite: COMM 101. P. McLeod.

Social influence is one of the most basic and important functions of communication. Through case studies, exercises and field projects the course will address issues ranging from influence between individuals to influence at national and international levels.

**COMM 282(2820) Research Methods in Communication Studies**

Fall. 3 credits. Pre- or corequisite: sophomore standing. C. Yuan.

The course covers social scientific methods to solve communication research problems empirically. Topics include basic principles of



social scientific research, random sampling, questionnaire design, experimental research design, focus group techniques, content analysis, and basic descriptive and inferential statistics. Students will also learn basic data manipulation, presentation and analysis techniques using SPSS and EXCEL.

**COMM 284(2840) Sex, Gender, and Communication (D)**

Fall. 3 credits. Not open to freshmen.  
L. Van Buskirk.

Explores the personal, career, social, and economic implications of male and female gender categories. Topics include theories of male and female gender construction, social structures, personal relationships, and gender concerns in the workplace.

**COMM 285(2850) Communication In Life Sciences (also S&TS 285[2851])**

Spring. 3 credits. B. Lewenstein.

Environmental problems, public health issues, scientific research—in each of these areas, communication plays a fundamental role. From the mass media to individual conversations, from technical journals to textbooks, from lab notes to the web, communication helps define social issues and research findings. This course examines the institutional and intellectual contexts, processes, and practical constraints on communication in the life sciences.

**COMM 301(3010) Business and Professional Presentation**

Fall and spring. 3 credits. Prerequisite: COMM 201; second-semester sophomore, junior, or senior standing. B. Earle.

The study and practice of written and oral communication skills used in formal and informal organizations. These skills include interviews; informative, persuasive, and special-occasion speeches; reports; discussions; and Powerpoint presentations. Students study and practice the organizational, analytical, and presentational skills needed in contexts suited to their own business and professional career goals.

**COMM 303(3030) Speech and Debate Practicum**

Fall and spring. 2 credits. Prerequisite: Program in Speech and Debate members; permission of instructor; completion of one year in program. S. Nelson.

Students learn how to prepare for CEDA (Cross Examination Debate Association) debate, Lincoln-Douglas debate, or individual speaking events. The class is divided into four groups according to level of experience; therefore, it may be repeated to a maximum of 8 credits.

**COMM 310(3100) Communication and Decision Making in Groups (SBA)**

Spring. 3 credits. Prerequisite: junior or senior standing; priority given to COMM majors. P. McLeod.

This course will provide students with a greater understanding of information sharing, persuasion, and decision development in small work groups. Through practical exercises, class discussions and lectures, students will learn first hand about factors that affect group performance. The course will be taught in an interactive hands-on format that emphasizes application of tested theory.

**COMM 320(3200) Mass Media and Society**

Spring. 3 credits. T. Gillespie.

This course builds on mass communication research and the study of culture and technology to investigate the social, political, and technological dynamics of contemporary media. We investigate how mass media frames our experience of the world and shapes our political involvement in it, and at how mass media intersects with our sense of identity and role in culture.

**COMM 345(3450) Human-Computer Interaction Design (also INFO 345[3450])**

Spring. 3 credits. G. Gay.

Gives students insight into the design of computer interfaces and software from the user's point of view. Students come to understand how hardware and software design influence the interaction between people and computers. Using assigned readings, demonstrations, and projects, students examine issues and trade-offs in interaction design and invent and evaluate alternative solutions.

**COMM 349(3490) Media Technologies (also S&TS 349[3491])**

Spring. 3 credits. Offered odd-numbered years. T. Gillespie.

Our efforts to communicate, share culture, and drive social agendas depend on the tools we've developed. However, our commonplace notions of communication and media regularly overlook the role of the material technologies that are so crucial to them. This course considers the technologies of media (including printing, photography, film, telegraph, telephone, radio, television, and computer networks) as an opportunity to think about the intersection of technology, communication, and its social context.

**COMM 350(3500) Writing for Magazines**

Fall. 3 credits. Limited to 25 students. Prerequisite: junior, senior, or graduate standing or permission of instructor; college-level writing course. No drops after third week. S. Conroe.

Course in nonfiction freelance writing for magazines. Intensive fact writing to help students communicate more effectively through the medium of the printed word in magazines. Art and techniques of good writing are studied; magazines in many fields of interest are reviewed. All articles are analyzed and returned to the student to rewrite and submit to a magazine. Extensive out-of-class writing assignments.

**COMM 352(3520) Science Writing for the Mass Media (also S&TS 352[3521])**

Fall and spring. 3 credits. Limited to 24 students. Not open to freshmen. Prerequisite: college-level writing course. B. Lewenstein and S. Conroe.

How to write about science, technology, and medicine for the mass media. Discussion topics include accuracy, simplicity, comprehensiveness, risk communication, and the history and social structure of science. Writing assignments focus on writing news and feature stories for newspapers and magazines, with excursions into newsletters, and other media.

**COMM 353(3530) Science Writing Practicum**

Spring. 1 credit. Prerequisite: COMM 260, COMM/S&TS 352, ENGRC 350, or permission of instructor. B. Lewenstein.

Students cover the annual meeting of the American Association for the Advancement

of Science, held in February each year. Before the meeting, students review science writing techniques and issues. At the meeting, students meet with science writers and attend press conferences and scientific sessions. Students write at least two stories. Students are responsible for all costs of travel, lodging, and meals.

**COMM 376(3760) Planning Communication Campaigns**

Fall. 3 credits. Pre- or corequisites: COMM 282 or equivalent social research course. K. McComas.

Provides a theoretical and practical overview of the audiences, messages, and evaluation of communication campaigns. Includes principles of planning and evaluation relevant to several kinds of campaigns. Topics include discussion of campaign goals, objectives, strategies, and tactics; research design and implementation; audience segmentation; message construction; and techniques of evaluation. Considers common methods of data collection (e.g., focus groups, experiments, surveys) and analysis of campaign-related data sources.

**[COMM 382(4932) Advanced Communication Research**

Fall. 3 credits. Prerequisite: COMM 282 or equivalent social research course. C. Yuan.

Advanced approaches to methods of data collection and analysis in communication research for students who intend to complete advanced research projects such as honors research or other independent studies and who have preliminary research under way. Every week the class examines one or two research situations in detail, analyzes specific problems connected to the method used, and discusses strategies for data analysis and presentation. This format provides all students—independent of their specific thesis topic—with an in-depth understanding of the methods used in communication research and how they are applied to specific projects.]

**COMM 398(3980) Issues in Teaching Communication**

Fall and spring. 1 credit. Pre- or corequisite: junior or senior standing; present or past undergraduate teaching assistant for COMM course. K. Berggren.

Seminar bringing together novice educators to discuss ideas, experiences, and practice. Integration of theory into actual education efforts is challenging for professional educators. Novice teachers are not aware of their common experiences, much less of a theoretical component to education. In discussions of actual teaching experiences, literature reviews, research reports, textbook chapters, curriculum, and evaluation tools, students examine new ideas and practices. The primary goal of the seminar is to enrich and deepen the novice teaching experience.

**COMM 405(4050) Community Service Practicum**

Fall and spring. 1 credit; may be repeated once for credit. Meets one hour weekly. S. Nelson.

Students share their communication talents in structured experiences in which they design and implement a speech or debate project in local schools or the community.

**COMM 410(4100) Organizational Communication: Theory and Practice (D) (SBA)**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing; COMM 101 or permission of instructor. C. Yuan.

Study of management communication processes in formal organizations. Applies relevant organizational behavior and communication principles in today's business environment; examines formal and informal communication networks.

**[COMM 420(4200) Public Opinion and Social Process (SBA)]**

Spring. 3 credits. Prerequisite: COMM 282.

Offered even-numbered years. J. Shanahan. The course provides a scientific and applied overview of the concept of "public opinion" and its implications for macrosocial processes. The concept's historical development in fields such as political science, social psychology, and communication science is reviewed, followed by a closer look at what is meant by "measuring" public opinion. For example, is public opinion measured by summing across individual opinions, or are there macro-level dynamics of public opinion that go beyond what individuals in a society think?]

**COMM 421(4210) Communication and the Environment**

Spring. 3 credits. Offered odd-numbered years. J. Shanahan.

Students investigate how values, attitudes, social structure, and communication affect public perceptions of environmental risk and public opinion about the environment. A primary focus is mass media's impact on public perceptions of the environment, how the media portray the environment, and discussion of the implications of public consumption of environmental content.

**COMM 422(4220) Psychology of Television (and Beyond) (SBA)**

Fall. 3 credits. Prerequisites: introductory psychology or HD 120 or COMM 101 or 220. M. Shapiro.

Survey of knowledge about how people mentally process television and other audiovisual communication technologies—including movies, video games, virtual reality, and the Internet. Topics include why people watch, what happens mentally when they watch, how people understand and mentally process media, and how media psychologically influence beliefs, attitudes, thinking, and emotion.

**COMM 428(4280) Communication Law**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing or permission of instructor. D. Grossman.

This course deals with the law governing communication media. Topics include First Amendment concepts, restraints on newsgathering and dissemination, libel, invasion of privacy, copyright protection, regulation of broadcast and nonbroadcast electronic media, advertising law, and current legal issues unique to online communication.

**COMM 429(4290) Copyright in the Digital Age (also INFO 429[4290]) (CA)**

Fall. 3 credits. Offered odd-numbered years. T. Gillespie.

This course looks at recent legal and cultural battles about digital copyright, to investigate how participation in a digital world is structured: who speaks, what they can say, who hears, and with what consequences. We use these cases to look at the collision of

authorship and the market, technology and law, individual and institution, culture and power.

**COMM 440(4400) Advanced Human-Computer Interaction Design (also INFO 440[4400])**

Fall. 3 credits. Prerequisite: COMM/INFO 245 or permission of instructor. G. Gay.

Focuses on the design of computer interfaces and software from the user's point of view. The goal is to teach user interface designs that "serve human needs" while building feelings of competence, confidence, and satisfaction. Topics include formal models of people and interactions, collaborative design issues, psychological and philosophical design considerations, and cultural and social issues.

**COMM 445(4450) Seminar in Computer-Mediated Communication (also INFO 445[4450])**

Fall. 3 credits. Prerequisite: COMM/INFO 245. J. Hancock and staff.

Focuses on reading and evaluating the theories and research methodologies used to investigate communication via computer systems. Assignments include student collaborations using electronic conferencing and other advanced communication technologies, as well as reflections on and evaluations of these collaborations in light of current theories and research findings. Topics include virtual teams, videoconferencing, and others as they emerge.

**COMM 450(4500) Language and Technology (also INFO 450[4500])**

Spring. 3 credits. J. Hancock and staff.

Examines how new communication technologies affect the way we produce and understand language and modify interaction with one another. Focuses on the collaborative nature of language use and how Internet technologies affect the joint activities of speakers and listeners during the construction of meaning in conversation.

**COMM 456(4560) Community Involvement in Environmental Decisions (SBA)**

Spring. 3 credits. Prerequisite: junior or senior standing or permission of instructor. K. McComas.

Community involvement is an essential part of environmental decision making, but it is also one of the most challenging aspects of the decision making process. Through selected readings and course activities, this class will examine both traditional and contemporary methods of community involvement. When evaluating the methods, the class will discuss how social structures work to define criteria for success.

**[COMM 466(4660) Public Communication of Science and Technology (also S&TS 466[4660])]**

Spring. 3 credits. Prerequisite: COMM 260 or 352, ENGRC 350, or permission of instructor. Offered even-numbered years. B. Lewenstein.

Explores the structure, meanings, and implications of "public communication of science and technology" (PCST). Examines the contexts in which PCST occurs, looks at motivations and constraints of those involved in producing information about science for nonprofessional audiences, and analyzes the functions of PCST. Ties existing ideas about PCST to general communication research, and leads to developing new knowledge about PCST. Format is primarily seminar/discussion.]

**COMM 476(4760) Communication Fellows Program**

Spring. 2 credits. Prerequisites: communication seniors selected based on goals and academic preparation; permission of instructor. Fee for three-day trip: \$150. B. O. Earle.

Series of lectures, seminars, and guest speakers exploring the planning, evaluation, and policy-making process. Includes a three-day trip to a metropolitan area to visit corporate leaders, administrative agencies, and policymakers.

**COMM 480(4800) Independent Honors Research in Social Science**

Fall or spring. 1-6 credits. Prerequisite: undergraduate standing; requirements met for honors program. Staff.

Students who have successfully completed COMM 382 register for no more than 3 credits. Students who have not completed an advanced research methods course may register for up to 6 credit hours.

**COMM 486(4860) Risk Communication**

Fall. 3 credits. C. Scherer.

Examination of theory and research related to the communication of scientific information about environmental, agricultural, food, health, and nutritional risks. Concentrates on social theories related to risk perception and behavior. Examines case studies involving pesticide residues, waste management, water quality, environmental hazards, and personal health behaviors. Emphasizes understanding, applying, and developing theories.

**COMM 494(4940) Special Topics in Communication (D)**

Fall, spring, or summer. 1-3 credits, variable. Prerequisite: permission of instructor. S-U grades optional.

Study of topics in communication not otherwise provided by a department course and determined by the interest of the faculty and students.

**COMM 496(4960) Communication Internship**

Fall or spring. Work component and variable. 1 credit; may be repeated once for a total of 2 credits. Prerequisite: COMM major or minor (first-, second-, third-, or fourth-year) for 1 credit (minimum 60 hours). K. Berggren.

Students receive a structured, on-the-job learning experience under the supervision of communication professionals in cooperating organization. A minimum of 60 hours of on-the-job work is required; the number of work hours beyond 60 is left to the discretion of the intern and the supervising company. A final paper linking communication theory to practical work experience is required. All internships must be approved before the work experience segment by the internship coordinator.

**COMM 497(4970) Individual Study in Communication**

Fall or spring. 1-3 credits; may be repeated to 6 credits with different supervising faculty member. Prerequisite: 3.0 GPA. Students must register using independent study form (available in 140 Roberts Hall).

Individual study under faculty supervision. Work should concentrate on locating, assimilating, synthesizing, and reporting existing knowledge on a selected topic. Attempts to implement this knowledge in a practical application are desirable.

**COMM 498(4980) Communication Teaching Experience**

Fall or spring. 1-3 credits; may be repeated to 6 credits with different courses. Intended for undergraduates desiring classroom teaching experience. Prerequisite: junior or senior standing; 3.0 GPA (2.7 if teaching assistant for skills development course); permission of faculty member who supervises work and assigns grade. Students must register using independent study form (available in 140 Roberts Hall).

Periodic meetings with the instructor cover realization of course objectives, evaluation of teaching methods, and student feedback. In addition to aiding with the actual instruction, each student prepares a paper on some aspect of the course.

**COMM 499(4990) Independent Research**

Fall or spring. 1-3 credits; may be repeated to 6 credits. Prerequisites: senior standing; 3.0 GPA. Students must register using independent study form (available in 140 Roberts Hall).

Permits outstanding students to conduct laboratory or field research in communication under appropriate faculty supervision. The research should be scientific: systematic, controlled, empirical. Research goals should include description, prediction, explanation, or policy orientation and should generate new knowledge.

**[COMM 610(6100) Seminar in Social Networks**

Spring. 3 credits. Prerequisite: graduate standing. C. Yuan.

Examination of the structures and processes of group, organizational, and social networks. Review of research literature in communication and social networks. Survey of network methods with an emphasis on quantitative analysis using relevant software. Application of graph theory, matrix algebra, and sociometry techniques. Analysis and social interpretation of extant network datasets.]

**[COMM 618(6180) Communication and Persuasion**

Spring. 3 credits. Prerequisite: introductory research methods course and introductory psychology or social psychology course. Staff.

Focuses on theories of communication's influence on persuasion and attitude change. Familiarizes students with a variety of social-psychological theories of attitude change and persuasion. Also applies those theories to a variety of communication situations including mass communication, advertising, public relations/public information, and interpersonal communication.]

**COMM 621(6210) Advanced Communication and the Environment**

Spring. 3 credits. Offered odd-numbered years. J. Shanahan.

Students investigate how values, attitudes, social structure, and communication affect public perceptions of environmental risk and public opinion about the environment. A primary focus is mass media's impact on public perceptions of the environment, how the media portray the environment, and discussion of the implications of public consumption of environmental content. Lectures concurrent with COMM 421; graduate students should enroll in COMM 621.

**COMM 622(6220) Advanced Psychology of Television (and Beyond)**

Fall. 3 credits. Prerequisites: graduate standing and permission of instructor. M. Shapiro.

Survey of knowledge about how people mentally process television and other audiovisual communication technologies—including movies, video games, virtual reality, and the Internet. Topics include why people watch, what happens mentally when they watch, how people understand and mentally process media, and how media psychologically influence beliefs, attitudes, thinking, and emotion.

**COMM 624(6240) Communication in the Developing Nations**

Fall. 3 credits. Prerequisite: junior, senior, or graduate standing. R. D. Colle.

The role of communication in development programs, particularly in Third World nations. Emphasizes communication interventions in agriculture, health, nutrition, family planning, and community development, and especially methods for designing communication strategies for reaching low-income, rural people. Among the approaches considered are extension, social marketing, and development support communication.

**COMM 640(6400) Human-Computer Interaction Design (also INFO 640[6400])**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor. G. Gay.

Graduate-level readings and research supplementing COMM/INFO 440. Focuses on the design of computer interfaces and software from the user's point of view. The goal is to teach user interface designs that "serve human needs" while building feelings of competence, confidence, and satisfaction. Topics include formal models of people and interactions, collaborative design issues, psychological and philosophical design considerations, and cultural and social issues.

**[COMM 645(6450) CMC Graduate Seminar (also INFO 645[6450])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor. J. Hancock and staff.

Graduate-level readings and research supplementing COMM/INFO 445. Through close reading and research in communication and technology, and participation in projects using these technologies, students enhance experiential, theoretical, and critical understanding of contemporary computer-mediated communication systems and uses. Topics include virtual teams, videoconferencing, and others.]

**COMM 650(6500) Language and Technology (also INFO 650[6500])**

Spring. 3 credits. J. Hancock.

Graduate-level readings and research supplementing COMM/INFO 450. Examines how new communication technologies affect the way we produce and understand language and modify interaction with one another. Focuses on the collaborative nature of language use and how Internet technologies affect the joint activities of speakers and listeners during the construction of meaning in conversation.

**[COMM 676(6760) Communication Planning for Social and Behavioral Change**

Spring. 3 credits. Not offered 2006-2007. Staff.]

**COMM 680(6800) Studies in Communication**

Fall. 3 credits. Prerequisite: communication graduate students or permission of instructor. J. Shanahan.

Reviews classical and contemporary readings in communication, including key concepts and areas of investigation. Explores the scope of the field, the interrelationships of its various branches, and examines the role of theory in the research process.

**COMM 681(6810) Advanced Communication Theory**

Spring. 3 credits. Prerequisite: COMM 680 or graduate standing and permission of instructor. M. Shapiro.

Development of, and contemporary issues in, communication theory. Discusses the interaction between communication and society, social groupings, and mental processing.

**COMM 682(6820) Methods of Communication Research**

Spring. 3 credits. Recommended: familiarity with basic statistical concepts. R. Ostman.

Analyzes methods of communication research based on a social science foundation. Goals will be to understand processes and rationales for qualitative, textual, survey, and experimental methods and to experience each method through modest individual or group research projects. Critiques of selected contemporary communication studies.

**[COMM 683(6830) Qualitative Research Methods in Communication]****COMM 684(6840) Theories and Methods of Small Group Research**

Fall. 3 credits. P. McLeod.

The main objective of this course is to prepare doctoral students to conduct independent empirical research relevant to small groups within organizations. We will examine theoretical foundations and special methodological issues of research in this area. We will focus on task-oriented groups, incorporating research from social psychology, sociology and organizational behavior. Class sessions will consist of discussion and "hands-on" practice of data collection and analysis methods.

**COMM 686(6860) Risk Communication**

Fall. 3 credits. K. McComas and C. Scherer.

Examination of theory and research related to the communication of scientific information about environmental, agricultural, food, health, and nutritional risks. Concentrates on social theories related to risk perception and behavior. Examines case studies involving pesticide residues, waste management, water quality, environmental hazards, and personal health behaviors. Emphasizes understanding, applying, and developing theories of risk communication.

**COMM 691(6910) Seminar: Topics in Communication**

Fall and spring. 0 credits. S-U grades only. Staff.

Some weeks scholars from a wide variety of fields present varied topics in theory or research as it relates to communication; other weeks graduate students present thesis

(project) proposals to faculty members and peers.

**COMM 694(6940) Special Topics in Communication**

Fall, spring, or summer. 1-3 credits, variable. Prerequisite: permission of instructor. S-U grades optional.

Study of topics in communication not otherwise provided by a department course and determined by the interest of faculty members and students.

**COMM 781(7810) Seminar in Psychology of Communication**

Spring. 3 credits. Prerequisite: COMM 680 and 681 or equivalent graduate-level theory in psychology or social psychology. Letter grades. Offered odd-numbered years. M. Shapiro.

Discusses and analyzes selected current issues in the psychology of communication. Students discuss and synthesize current research and theory in the mental processing of communication.

**COMM 794(7940) Seminar in Communication Issues**

Fall, spring, or summer. 1-3 credits. Prerequisite: permission of instructor. Letter grades only.

Small group study of topical issue(s) in communication not otherwise examined in a graduate field course.

**COMM 797(7970) Graduate Independent Study**

Fall, spring, or summer. 1-3 credits. Prerequisite: permission of instructor. Letter grades only.

Individual study concentrating on locating, assimilating, synthesizing, and reporting existing knowledge on a selected topic.

**COMM 798(7980) Communication Teaching Laboratory**

Fall and spring. 1-3 credits each semester; may be repeated once. Prerequisite: graduate standing and permission of faculty member who will supervise work and assign grade. (Students must use faculty member's section number to register.) Letter grades only. Graduate faculty.

Designed primarily for graduate students who want experience in teaching communication courses. Students work with an instructor in developing course objectives and philosophy, planning, and teaching.

**COMM 799(7990) Graduate Research**

Fall, spring, or summer. 1-3 credits. Prerequisite: appropriate communication graduate course work or permission of instructor. Letter grades only.

Small-group or individual research based on original, empirical, data-based designs regarding topical issues in communication not otherwise examined in a graduate field course.

**COMM 800(8900) Master's-Level Thesis Research**

Fall or spring. 1-6 credits; may be repeated for max. of 6 credits. Prerequisite: permission of committee chair. S-U grades only.

Thesis research for M.S. (communication) students.

**COMM 901(9900) Doctoral-Level Dissertation Research**

Fall or spring. 1-9 credits; may be repeated for max. of 9 credits. Prerequisites: completion of "A" exam; permission of committee chair. S-U grades only.

Dissertation research for Ph.D. candidates.

## CROP AND SOIL SCIENCES

S. D. DeGloria, chair (232 Emerson Hall, 255-5459); P. C. Baveye, D. R. Bouldin, D. Buckley, J. H. Cherney, W. J. Cox, A. DiTommaso, J. M. Duxbury, G. W. Fick, R. R. Hahn, P. Hobbs, Q. Ketterings, L. V. Kochian, J. Lehmann, A. Lembo, M. B. McBride, R. L. Obendorf, S. J. Riha, J. M. Russel-Anelli, T. W. Scott, T. L. Setter, J. E. Thies, H. M. van Es, A. Van Wambeke, R. M. Welch

### Courses by Subject

Crop Science: 311, 312, 315, 317, 403, 414, 426, 444, 455, 608, 610, 612, 613, 614, 642, 690, 691, 820, 920, 921

Environmental Information Science: 397, 410, 411, 420, 465, 485, 486, 620, 621, 660, 675, 694, 860, 960, 961

Soil Science: 260, 362, 363, 365, 372, 412, 421, 466, 471, 472, 483, 663, 666, 667, 669, 671, 672, 684, 693, 696, 880, 980, 981

### General Courses

**CSS 190(1900) Sustainable Agriculture**

Fall. 3 or 4 credits, variable. Limited to 60 students. S-U grades optional. G. W. Fick.

Concerns food, farming, and the future. Designed to introduce basic food production resources in the context of the human aspects of farming. The information is of general value for nonmajors and students new to the field. Several field trips enhance appreciation for the diversity of agriculture. Students can earn 1 extra credit by participating in team preparation and delivery of a lesson in sustainable agriculture.

**CSS 494(4940) Special Topics in Crop and Soil Sciences (undergraduate level)**

Fall or spring. 4 credits max. S-U grades optional.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester begins. Courses offered under this number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**CSS 497(4970) Individual Study in Crop and Soil Sciences**

Fall or spring. 1-6 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Topics in soil science, crop science, or environmental information science are arranged at the beginning of the semester for individual study or for group discussions.

**CSS 498(4980) Teaching Experience in Crop and Soil Sciences**

Fall or spring. 1-5 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Teaching experience in soil science, crop science, or environmental information science is obtained by assisting in the instruction of a departmental course. This course should not be taken by teaching assistants.

**CSS 499(4990) Undergraduate Research**

Fall or spring. Credit TBA. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Independent research on current problems selected from any phase of crop science, soil science, or environmental information science.

**CSS 690(6900) Scientific Method in Practice**

Spring. 1 credit. Prerequisite: junior, senior, or graduate standing. S-U grades only. H. G. Gauch, Jr., and G. W. Fick.

Students in this course study Hugh Gauch's book *Scientific Method in Practice*, which is designed to help scientists become better scientists through deeper understanding of common themes that extend across the disciplines. Topics include the history and philosophy of science, reliance on evidence, deductive and inductive logic, probability, parsimony, and hypothesis testing.

**CSS 696(6960) Seminar in Crop and Soil Sciences**

Fall and spring. 1 credit. S-U grades only. Staff.

Covers current research and selected topics in the crop and soil sciences and related fields.

**CSS 696(6960) Agroecological Perspectives for Sustainable Development**

Fall and spring. Sec 2. 1 credit. S-U grades only. Staff.

Agroecological perspectives for sustainable development.

## Crop Sciences

**CSS 311(3110) Grains and Nutraceuticals**

Fall. 4 credits. Prerequisite: CSS 260 or BIOL 241. One or two field trips during lab periods. R. L. Obendorf.

Globally, six seed crops provide 75 percent of the caloric and protein needs of mankind by direct consumption or indirectly through animal and microbial products. Seed crops for starch, protein, oil, fiber, sugar, nutraceutical, pharmaceutical, and industrial uses are emphasized, including adaptation, growth and development, environmental stress, optimization of yield and quality, and genetic improvement in the context of food systems for improved health. Laboratory uses living plants, an extensive crop garden, and computer simulation.

**CSS 312(3120) Forage Crops**

Spring. 4 credits. Prerequisite: introductory crop and/or soil science course. Recommended: animal nutrition course. G. W. Fick.

Considers the production and management of crops used for livestock feed in terms of establishment, growth, maintenance, harvesting, and preservation. Emphasizes forage grasses, forage legumes, and corn



and considers their value as livestock feed in terms of energy, protein, and other nutritional components.

**CSS 315(3150) Weed Science**

Fall. 4 credits. Prerequisite: introductory course in biology or botany.

A. DiTommaso.

Examines principles of weed science. Emphasizes (1) weed biology and ecology; (2) weed-management strategies used in agricultural and natural ecosystems; and (3) chemistry of herbicides in relation to effects on plant growth and the environment. Hands-on laboratory sessions cover weed identification and ecology, herbicide application, selectivity, and symptomology.

**[CSS 317(3170) Seed Science and Technology (also HORT 317(3170))]**

Fall. 3 credits. Prerequisite: BIOPL 241 or equivalent. Two all-day field trips. Offered alternate years; not offered 2006–2007.

A. G. Taylor, Geneva Experiment Station. (Ithaca contact, R. L. Obendorf.)

The principles and practices involved in the production, harvesting, processing, storage, testing, quality management, certification, and use of high-quality seed from improved cultivars. Information is applicable to various kinds of agricultural seeds. Hands-on laboratory experience.]

**CSS 403(4030) Traditional Agriculture in Developing Nations (also IARD 403(4030))**

Fall. 1 credit. S-U grades only. P. Hobbs. Half the world's arable land is farmed by traditional farmers who have produced food and fiber for millennia with few outside inputs. Many of these practices are forgotten but some are still used by farmers in developing countries. This course examines the pros and cons of some of these traditional systems.

**CSS 414(4140) Tropical Cropping Systems: Biodiversity, Social, and Environmental Impacts (also IARD 414(4140))**

Fall. 3 credits. Prerequisite: introductory crop science or soil science or biology course or permission of instructor.

P. Hobbs.

Characterizes and discusses traditional shifting cultivation; lowland rice-based systems; upland cereal-based systems; smallholder mixed farming including root crops and livestock; plantation fruit and oil crop systems; and agroforestry. In addition to species diversity and domestication, factors such as climate, land quality, soil management, land tenure, labor, and markets are considered. Evaluates the impact of tropical cropping systems on the environment.

**CSS 426(4260) Practicum in Forest Farming as an Agroforestry System (also HORT/NTRES 426(4260))**

Fall. 2 credits. K. W. Mudge, L. E. Buck, and P. Hobbs.

For description, see HORT 426.

**[CSS 444(4440) Integrated Pest Management (also ENTOM 444(4440))]**

Fall. 4 credits. Prerequisites: biology course or permission of instructor. Not offered 2006–2007; next offered 2007–2008.

J. E. Losey and A. DiTommaso.

For description, see ENTOM 444.]

**[CSS 455(4550) Mineral Nutrition of Crops and Landscape Plants (also HORT 455(4550))]**

Spring. 3–5 credits. Prerequisite: CSS 260 and BIOPL 242, or equivalent. Offered alternate years; not offered 2006–2007.

H. C. Wien and staff.

Modular course on principles of plant mineral nutrition and nutrient management. A mandatory module on principles is followed by others on agronomic crops, vegetables, floriculture, and fruit crops. Each module carries 1 credit; a minimum of 3 credits must be taken in one semester. By the end of the course, students understand the principles of mineral nutrient function in crop plants, and are able to diagnose deficiencies by symptoms and tissue tests and devise organic and conventional nutrient management schemes that maximize productivity and mineral nutrient quality.]

**[CSS 608(6080) Water Status in Plants and Soils]**

Fall. 1 credit. Prerequisite: permission of instructor. S-U grades only. Offered alternate years; not offered 2006–2007.

T. L. Setter.

Covers techniques for field appraisal of the status of water in plants and soil, including methods used in physiological studies, such as the psychrometer, pressure chamber, gas exchange analyzer, and abscisic acid analysis with ELISA.]

**CSS 610(6100) Physiology of Environmental Stresses**

Fall. 3 credits. Prerequisite: plant physiology course (BIOPL 242 or 342) or permission of instructor. Offered alternate years. T. L. Setter.

Study of the responses of plants to environmental stresses, including chilling, drought, freezing, high temperature, salinity, hypoxia, and toxic elements. Emphasizes the physiological and biochemical basis of injury and plant resistance mechanisms at the whole-plant, cellular, and molecular levels.

**CSS 612(6120) Seed Biology**

Fall. 3 credits. Prerequisite: plant physiology course. R. L. Obendorf.

Describes the molecular, biochemical, physiological, environmental, and genetic regulation of seed development, maturation, and germination events, including the deposition and mobilization of seed reserves with illustrations from the world's major food and feed seeds. Illustrations extend the principles to practical situations, industrial uses, and food systems for improved health.

**CSS 613(6130) Physiology and Ecology of Yield**

Spring. 3 credits. Prerequisite: plant physiology course (BIOPL 242 or 342) or permission of instructor. T. L. Setter.

Study of environmental constraints on crop-plant productivity from the perspective of key biological processes. Examines acclimation responses and genetic adaptation for temperature, light, water, compacted soil, and mineral nutrient environments. Topics include photosynthesis and nitrogen assimilation, translocation, and partitioning; canopy-scale influences on solar radiation use efficiency; regulation of growth processes in leaf, root, and floral sinks in response to environment; seed set; water transport and stomatal regulation; root growth in flooded and compacted soils; and drought responses.

**CSS 614(6140) Weed Ecology and Management**

Spring. 3 credits. Prerequisite: CSS 315 or equivalent. Offered alternate years.

A. DiTommaso.

Examination of plant ecological principles governing weed population dynamics and weed-crop competitive interactions in different crop and noncrop ecosystems. Explores the application of these fundamentals for the development and implementation of environmentally sound and sustainable integrated weed management strategies. Topics include seed biology and seedbank dynamics, weed demography and spatial variation, weed-crop interference, invasive weed biology, biological weed control, and site-specific weed management.

**[CSS 642(6420) Plant Mineral Nutrition (also BIOPL 642(6420))]**

Spring. 3 credits. Prerequisite: BIOPL 341 or equivalent. Not offered 2006–2007.

L. V. Kochian and R. M. Welch.

For description, see BIOPL 642.]

**CSS 691(6910) Special Topics in Crop Science**

Fall or spring. 1–6 credits. S-U grades optional. Staff.

Study of topics in crop science that are more specialized or different from other courses. Special topics to be offered depend on staff and student interests.

**CSS 820(8200) Master's-Level Thesis Research in Crop Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Thesis research for M.S. candidates.

**CSS 920(9200) Graduate-Level Thesis Research in Crop Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Thesis research for Ph.D. students before "A" exam has been passed.

**CSS 921(9210) Doctoral-Level Dissertation Research in Crop Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Dissertation research for Ph.D. candidates after "A" exam has been passed.

**Environmental Information Science**

**CSS 397(3970) Environmental Microbiology [also BIOMI 397(3970)]**

Spring. 3 credits. Prerequisite: BIOEE 261 or BIOMI 290 or CSS 260 or permission of instructor. Offered alternate years.

E. L. Madsen.

Discusses the biology, behavior, and function of microorganisms in natural environments in relation to past and present environmental conditions on Earth. Also considers the role of microorganisms in ecologically and environmentally significant processes through discussion of specific topics such as elemental cycles, nutrient cycling, transformation of pollutant chemicals, wastewater treatment, and environmental biotechnology.

**CSS 410(4100) The GMO Debate: Environmental Impacts**

Spring. 3 credits. Prerequisite: BIO G 109 or equivalent. D. Buckley and P. Hobbs.

This course covers issues pertaining to the agricultural use of genetically modified organisms with emphasis on evaluating their



environmental impact. Students will learn to critically evaluate the risks of benefits associated with the use of GMOs. We will examine the types of GMOs in use and in development, how they are made, and their potential impacts on the environment including: gene flow, non-target effects, horizontal gene transfer, biodiversity effects and the implications of changes in farming practices and chemical inputs.

**CSS 411(4110) Resource Inventory Methods (also CEE 411[4110])**

Spring. 3 credits. Prerequisite: permission of instructor. A. Lembo.

Survey of resource inventory methods applied to field-based studies of environmental systems. Laboratory emphasizes using maps, spatial databases, global positioning systems, and aerospace imagery to discriminate, measure, inventory, and monitor environmental resources.

**CSS 420(4200) Geographic Information Systems**

Fall. 4 credits. Prerequisite: CSS 411 or permission of instructor. A. Lembo.

Principles and applications of geographic information systems for the characterization and assessment of agronomic and environmental resources. Emphasizes methods for accessing, updating, analyzing, and mapping spatial data and information. Considers needs assessment, coordinate systems, database design and maintenance, data transformations, and map accuracy assessment.

**CSS 465(4650) Global Positioning System**

Fall, first five Fri. of semester. 1 credit. Prerequisite: CSS 411 or 420, or equivalent, or permission of instructor. Spring, last five Fri. of semester. 1 credit. Prerequisite: CSS 411 or 420, or equivalent, or permission of instructor. A. Lembo.

Introduction to navigation-grade GPS instruments used in agricultural and environmental science. Topics include instrument familiarization; field-data collection and processing; real-time and post-differential correction; and GPS-GIS integration.

**CSS 485(4850) Problem Solving in Environmental and Agroecosystem Science I**

Fall. 4 credits. Prerequisite: senior standing. CSS 260 or equivalent. P. Baveye.

Capstone experience for seniors, centering on the pluridisciplinary analysis of a specific problem (e.g., a brownfield in Ithaca in fall 2004), with a number of faculty members serving as technical resources and lecturing as needed. Involves field trips, in-depth discussions of data assembled before the course, gathering of relevant scientific information (in groups), and report writing. Students are expected to work approximately 15 hours per week on a range of assignments. The course is conceived as the first of a sequence of two complementary courses, but it can be taken alone.

**CSS 486(4860) Problem Solving in Environmental and Agroecosystem Science II**

Spring. 4 credits. Prerequisite: senior standing. CSS 485. P. Baveye.

Capstone experience for seniors, in continuation of CSS 485. Students work in groups to carry out the laboratory measurements identified in the fall, with

faculty members serving as technical support and lecturing as needed. Students are expected to work approximately 15 hours per week on a range of laboratory measurements. The results of these measurements are discussed as they become available and are combined with the rest of the assembled information to come up with recommendations about the management of the targeted problem (e.g., in spring 2005, a brownfield in Ithaca).

**CSS 620(6200) Spatial Modeling and Analysis**

Spring. 3 credits. Prerequisites: CSS 420, 461, or permission of instructor. A. Lembo.

Theory and practice in the development, integration, and visualization of spatial data for resource inventory, environmental process modeling, land classification, and evaluation. Emphasizes application and evaluation of advanced spatial analytical methods applied to environmental systems and databases of interest to the student.

**CSS 621(6210) Applications of Space-Time Statistics**

Spring. 2 credits. Prerequisite: STBTRY 601 or equivalent. S-U grades only. Offered alternate years; offered after spring break 2007. H. Van Es.

Introduction to space-time statistics with applications in agriculture and environmental management. Topics include geostatistics, temporal statistics, sampling, experimental design, state-space analysis, data mining, and fuzzy logic. Focuses on landscape-scale processes and a user's perspective.

**CSS 660(6600) Remote Sensing Fundamentals (also CEE 610[6100])**

Fall. 3 credits. Prerequisite: permission of instructor. W. D. Philpot.

Introduces equipment and methods used in obtaining information about earth resources and the environment from aircraft or satellite. Covers sensors, sensor and ground-data acquisition, data analysis and interpretation, and project design.

**[CSS 675(6750) Modeling the Soil-Plant-Atmosphere System (also EAS 675[6750])**

Spring. 3 credits. Prerequisite: CSS 483 or equivalent. Offered alternate years. S. J. Riha.

Introduction to the structure and use of soil-plant-atmosphere models. Topics include modeling plant physiology, morphology, and development; potential crop production and crop production limited by moisture and nutrient availability; plant-plant competition; and land surface processes as well as model data requirements, validation, and scale. Discusses use of soil-plant-atmosphere models for teaching, research, extension, and policy formation.]

**CSS 694(6940) Special Topics in Environmental Information Science**

Fall or spring. 1-6 credits. S-U grades optional. Staff.

Study of topics in environmental science that are more specialized or different from other courses. Special topics covered depend on staff and student interests.

**CSS 860(8600) Master's-Level Thesis Research in Environmental Information Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Thesis research for master's students.

**CSS 960(9600) Graduate-Level Dissertation Research in Environmental Information Science**

Fall or spring. TBA. S-U grades only. Graduate faculty.

Dissertation research for Ph.D. students before "A" exam has been passed.

**CSS 961(9610) Doctoral-Level Dissertation Research in Environmental Information Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Dissertation research for Ph.D. candidates after "A" exam has been passed.

**Soil Science**

**CSS 260(2600) Soil Science**

Fall. 4 credits. S-U grades optional. J. Russell-Anelli.

Designed for students interested in a comprehensive introduction to soil science from both an environmental and plant management perspective. Divided into three units: (1) soil information unit introduces students to soil characterization, testing, mapping, classification, GIS, and land evaluation. (2) soil management unit addresses fertility, pest management, water, and microclimate, as well as erosion, conservation, pollution, and soil health. (3) unit on the role of soils in ecosystems considers topics such as biodiversity, soils as sinks and sources of greenhouse gases, and the impact of soils on land use. Labs are initially field-oriented with an emphasis on learning practical skills needed to evaluate and manage soils. Subsequent labs focus on accessing, interpreting, and applying soil information.

**[CSS 362(3620) Soil Morphology**

Fall. 1 credit. Prerequisite: undergraduate standing. Recommended for sophomores and juniors. One all-day field trip required. Not offered 2006-2007. J. Russell-Anelli.

Presents the principles for field identification of soil properties, profiles, and landscapes. A series of soil pits are examined, described, classified, and interpreted in the field.]

**CSS 363(3630) Soil Genesis, Classification, and Survey**

Fall. 4 credits. Prerequisite: CSS 260. One all-day field trip required. J. Russell-Anelli.

Discusses factors and processes of soil formation on which soil survey is based. Practices principles of field identification, classification, survey, and interpretation in a field setting. Provides an overview of soil databases, their content, development, and use for site evaluation and land classification.

**CSS 365(3650) Environmental Chemistry: Soil, Air, and Water**

Spring. 3 credits. Prerequisites: CHEM 207-208 or CHEM 206. M. B. McBride.

Overview of the chemical processes that control the fluxes, concentrations, and bioavailability of nutrients and pollutants in soil, air, and water. Gives particular attention to soil's function as a filter for contaminants. Describes the history of environmental contamination by xenobiotics and heavy metals, with emphasis on behavior and properties of pollutants that pose the greatest risk to human and ecological health.

**CSS 372(3720) Nutrient Management in Agroecosystems**

Spring. 4 credits. Prerequisite: CSS 260 or permission of instructor. Graduate students should enroll in CSS 472. J. Lehmann.

Familiarizes students with the basic concepts of soil fertility and biogeochemistry and how soil and environmental properties affect nutrient availability and cycling. Discussion focuses on the way organic farming and soil conservation affect the fate of nutrients in agroecosystems. Emphasizes how nutrient management can be improved without creating environmental hazards. Students have hands-on training in analytical procedures and expand knowledge in discussion groups and through oral as well as poster presentations.

**CSS 412(4120) Whole-Farm Nutrient Management (also AN SC 412[4120])**

Spring. 2- or 4-credit option. Prerequisite: AN SC 411; junior, senior, or graduate standing. Offered as two modules. Enrollment in Module 1 for first half of semester required (2 credits); consists of crop and manure nutrient management planning; no prerequisites for CALS students. Enrollment in Module 2 for second half of semester optional (additional 2 credits). M. E. VanAmburgh and Q. M. Ketterings.

For description, see AN SC 412.

**[CSS 421(4210) Soil and Water Management**

Fall. 4 credits. Prerequisite: CSS 260. S-U grades optional. Not offered 2006–2007. H. M. van Es.

Introduces students to the principles of soil and water interaction and to the effects of human intervention. Examines aspects of soil and water management, including hydrology, soil erosion and conservation, water and soil quality, contaminant movement, tillage, and soil compaction. Discusses case studies and policy approaches from both the United States and abroad.]

**CSS 466(4660) Soil Ecology (also HORT 466[4660])**

Spring. 4 credits, with lab. Prerequisite: one year of biology or ecology and CSS 260 or permission of instructor. J. E. Thies.

Discover the wonder of life underground. In this course, you will study the amazing diversity of soil organisms along with their multifaceted functions in terrestrial ecosystems. The fundamental principles and features of biologically-mediated processes in the soil and the functions of soil biota in both managed and unmanaged ecosystems will be highlighted. Special topics include: beneficial symbioses, biological control of plant pathogens, biogeochemistry of unique habitats, bioremediation and composting of organic wastes, among others. Laboratory focuses on molecular activities and traditional methods for assessing the abundance, activity, and diversity of soil organisms.

**[CSS 471(4710) Properties and Appraisal of Soils of the Tropics**

Spring. 3 credits. Prerequisite: CSS 260 or equivalent. S-U grades optional. No auditors. Not offered 2006–2007. A. VanWambeke.

Examines the conditions in which soils form, and considers ecological, geological, and vegetational factors that produce the diversity that exists among them. The major kinds of soils are recognized, their management properties described, and methods to

alleviate the constraints to crop production and preservation of the environment are examined. Topics include the identification of soils, and their functions in sustaining traditional farming systems and advanced technological packages. The course pursues these themes reviewing the most recent sources of information generated in tropical countries and published in Latin-American, French, and English journals. The last part of the course gives special attention to salt-affected soils, paddy rice cultivation, and the characteristics of acid-sulfate soils. Lectures include slides of soils, landscapes, and cropping systems. The course is available on a compact disk in Mann Library.]

**CSS 472(4720) Nutrient Management and Research in Agroecosystems**

Spring. 4 credits. Prerequisite: CSS 260 or permission of instructor. J. Lehmann.

Familiarizes students with the basic concepts of soil fertility and biogeochemistry and how soil and environmental properties affect nutrient availability and cycling. Discussion focuses on the way organic farming and soil conservation affect the fate of nutrients in agroecosystems. Emphasizes the way nutrient management can be improved without creating environmental hazards. Gives students hands-on training in analytical procedures and expand knowledge in discussion groups and through oral as well as poster presentations. The laboratory experiments conclude with a final paper.

**[CSS 483(4830) Environmental Biophysics (also EAS 483[4830])**

Spring. 3 credits. Prerequisite: CSS 260 or equivalent or permission of instructor. Offered alternate years; next offered 2007–2008. S. J. Riha.

Introduction to basic principles of energy and mass transfer and storage in soil-plant systems. Covers energy budgets; soil heat flow; water movement in saturated and unsaturated soils; evapotranspiration; and water, gas, and nutrient dynamics in the soil-plant-atmosphere continuum. Considers applications to agronomic and environmental problems and instrument design and use through discussion and problems sets.]

**[CSS 663(6630) Pedology**

Spring. 3 credits. Prerequisite: CSS 361 or permission of instructor. Offered alternate years; not offered 2006–2007. J. Russell-Anelli.

Weathering, reactions, and processes of soil genesis; principles of soil classification and the rationale and use of soil taxonomy; development and significance of major groups of soils of the world.]

**[CSS 666(6660) Applied Plant-Microbe Interactions**

Fall. 4 credits. Prerequisite: CSS 466 or equivalent or permission of instructor. Offered alternate years; next offered 2007–2008. J. E. Thies.

This is a discussion and laboratory-based course that focuses on the nature of microbial interactions with plants, and concentrates largely on bacterial and fungal associations. Students will investigate symbiotic, associative, endophytic, and pathogenic interactions. The main aim of this subject is to help the students improve their professional practice within the content area. Students will learn to examine the primary literature, present research reports, write and review proposals, conduct a small independent-research project,

and report on the outcomes in conference and journal formats. Class discussions will explore the nature of the rhizosphere and phyllosphere environments as a habitat for microorganisms and the ecology of the organisms residing there through readings in the primary literature. In laboratory, all students will conduct an independent research project, aligned with their interests, in which they develop testable hypotheses and conduct experiments using relevant, modern methods.]

**CSS 667(6670) Advanced Soil Physics**

Spring. 3 credits. Prerequisites: one year of college physics and CSS 483 or permission of instructor. S-U grades optional. Offered alternate years. P. C. Baveye.

Acquaints students with advanced topics in soil physics in a number of areas, including the statics and thermodynamics of soil water, the physics of swelling-shrinking soils, the transport of water and solutes in heterogeneous soils, the measurement of soil physical parameters, and the effect of spatial/temporal heterogeneity of soils on their physical characteristics. The format of the course, based in most years on weekly, individual tutorials, allows different topics to be covered, depending on the interest(s) of the students. If a group of students expresses interest, the course also can involve reflection on the detailed design of one or more laboratory or field experiments related to soil physics.

**CSS 669(6690) Organic Matter—Soils, Sediments, and Waters**

Spring. 3 credits. Prerequisites: CSS 260 and CHEM 357–358 or equivalent. J. M. Duxbury.

Discussion of current concepts on the chemical nature, dynamics, and properties of natural organics and organo-mineral associations in terrestrial and aquatic environments. Includes a modeling project of soil carbon dynamics in natural or agricultural ecosystems.

**[CSS 671(6710) Soil Chemistry**

Fall. 3 credits. Prerequisite: one year of physical chemistry or permission of instructor. Offered alternate years; not offered 2006–2007. M. B. McBride.

Detailed examination of the structure and surface chemistry of colloidal particles important to the function of soils. Emphasizes ion exchange; mineral-solution equilibria; and adsorption reactions of silicate clays, oxides, and organic matter. Describes the sorption behavior of environmental contaminants in soils, particularly metals and xenobiotics.]

**CSS 672(6720) Nutrient Cycling in Natural and Managed Ecosystems**

Fall. 3 credits. Prerequisite: CSS 372 or NTRES 321 or BIOEE 478, or permission of instructor. Offered alternate years. J. Lehmann.

Covers nutrient cycling in soil and the interface between the soil and the biosphere, atmosphere, and hydrosphere. Examines the biogeochemistry of nutrient elements in natural ecosystems, disturbed or degraded ecosystems, and agricultural systems, including pollution in watersheds. Students develop independent projects, present a research proposal, and conduct field research that culminates in a presentation and a paper in publishable format.

**CSS 684(6840) Topics in Soil Microbial Ecology**

Fall. 1 credit. S-U grades. Offered alternate years. Discussion. D. Buckley.

Seminar and discussion course dealing with current topics in soil microbial ecology including: Community ecology and diversity, microbial biogeography, biogeochemistry, plant-microbe interactions, microbial feedbacks on plant communities, gene exchange and evolution in soils, soil microbial genomics, and relationships between structure and function of microbial communities in soil systems.

**CSS 693(6930) Special Topics in Soil Science**

Fall, spring, or summer. 1-6 credits. S-U grades optional.

Study of topics in soil science that are more specialized or different from other courses. Special topics covered depend on staff and student interests.

**CSS 696(6960) Seminar: Organic Inputs in Tropical Soils and Agroforestry (also NTRES/IARD 696(6960))**

Fall, spring. 1 credit sec 2. S-U grades only. E. Fernandes and L. Fisher.

A variety of speakers present seminars on agroecological perspectives for (primarily international) sustainable development. Students are required to prepare a synopsis of each seminar.

**CSS 880(8880) Master's-Level Thesis Research in Soil Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Thesis research for master's students.

**CSS 980(9800) Graduate-Level Dissertation Research in Soil Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Dissertation research for Ph.D. students before "A" exam has been passed.

**CSS 981(9810) Doctoral-Level Dissertation Research in Soil Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Dissertation research for Ph.D. candidates after "A" exam has been passed.

**DEVELOPMENT SOCIOLOGY**

M. J. Pfeffer, chair (133A Warren Hall, 255-1676); D. L. Brown, P. R. Eberts, P. Eloundou-Enyegue, S. Feldman, J. D. Francis, C. C. Geisler, A. Gonzales, D. T. Gurak, T. A. Hirschl, T. A. Lyson, F. Makki, P. D. McMichael, R. L. Mize, L. B. Williams

**Note:** The prefixes for courses in this department were listed as RSOC in previous years.

**D SOC 101(1101) Introduction to Sociology (SBA) (KCM) (D)**

Fall or spring. 3 credits. Fall, T. Hirschl; spring, A. Gonzales.

Introduction to theory and research in sociology. Demonstrates how the insights, theories, and methods of sociological analysis can be brought to bear on major issues of social life. A primary goal is to convey a sense of the manner in which sociologists formulate theories and how the collection and analysis

of data are used to evaluate those theories. Provides "hands-on" experience in analyzing sociological issues. Students undertake guided research exercises that involve using computers to analyze actual data. No prior background is presumed; necessary skills are covered in class and section meetings.

**D SOC 111(1201) Development Sociology First-Year Writing Seminar (SBA)**

Fall, spring. 3 credits. Staff.

The department offers first-year writing seminars on a wide range of development sociology topics. Consult John S. Knight Writing Seminar Program brochures for instructors and descriptions.

**D SOC 112(1200) Development Sociology First-Year Writing Seminar (SBA)**

Fall, spring. 3 credits. Staff.

The department offers first-year writing seminars on a wide range of development sociology topics. Consult John S. Knight Writing Seminar Program brochures for instructors and descriptions.

**D SOC 201(2010) Population Dynamics (also SOC 202[2202]) (SBA)**

Spring. 3 credits. Limited to 35 students.

ALS students must enroll in D SOC 201.

S-U grades optional. L. Williams.

Introduction to population studies. First reviews basic concepts and demographic principles and techniques, then focuses on how demographic processes (fertility, mortality, and migration) affect social and economic outcomes.

Discussions cover special topics related to population growth and distribution, including mass education, marriage and family formation, labor force participation, inequality and poverty, women's status, resource allocation, and the environment.

**D SOC 205(2050) International Development (also SOC 206[2206]) (SBA) (HA) (D)**

Spring. 3 credits. Limited to 74 students.

P. McMichael.

Examines new questions concerning development models in the post-Cold War era from a comparative and global perspective on North-South relations. While the focus is the "Third World," the issues confronting it are often global, even when they concern the most basic issue of food security. Using films and various theoretical perspectives, the course examines Southern societies (economies, ecologies, class/gender relations) and the impact of global forces on Southern resources. Such forces include global food systems, new forms of export production, development agencies, multilateral institutions, local bureaucracies, transnational corporations, the debt crisis, and new technologies. Also examines the new global justice movements, such as environmentalism, feminism, and landless workers, peasant, and grassroots activism.

**D SOC 207(2070) Problems of Contemporary Society (also SOC 207[2070]) (SBA)**

For description, see SOC 207.

**D SOC 209(2090) Social Inequality (also SOC 208[2208]) (SBA)**

For description, see SOC 208.

**D SOC 213(2130) Social Indicators, Data Management, and Analysis (SBA)**

Fall. 3 credits. P. Eberts.

Survey of definitions of social indicators and general principles of social indicators research

is illustrated from data on both developed and less-developed countries. Data management and analysis of measures of poverty, level of living, inequality, and quality of life based on census data, household surveys, and key-informant and other low-cost techniques, are examined using personal computers.

**D SOC 214(2140) Research Methods for the Social Sciences (SBA) (KCM)**

Spring. 3 credits. Letter grades only.

J. Francis.

This course introduces students to various approaches to social science research, including observation techniques, unstructured, semi-structured, and structured interviews, experiments and focus groups.

**D SOC 215(2150) Introductory Organizations (also SOC 215[2150]) (SBA)**

For description, see SOC 215.

**D SOC 220(2200) Sociology of Health of Ethnic Minorities (also LSP 220[2200]) (SBA) (D)**

Fall. 3 credits. Limited to 15 students. S-U grades optional. P. A. Parra.

Discusses the health status of minorities in the United States. Explores intragroup diversity such as migration, economic status, and the influence of culture and the environment on health status and access to health care. Although special attention is given to Latino populations, discussion encompasses other minorities who face similar problems.

**D SOC 230(2300) Latino Communities (also LSP 230/AM ST/SOC 231[2300]) (SBA) (CA)**

Spring. 3 credits. R. Mize.

From community sociology perspectives, an analysis of Latino community formation in U.S. urban and rural contexts. A major focus is the predominance of Puerto Ricans and Dominicans in New York, Cubans in South Florida, and Mexicans in the Southwest. The last portion of the course addresses the increasing "Latinization" of new receiving areas and the formation of transnational communities that transcend spatially defined communities.

**D SOC 275(2750) Immigration and a Changing America (D) (SBA) (HA)**

Fall. 3 credits. S-U grades optional.

D. Gurak.

Immigration helped America become the nation that it is today. While many experts thought that immigration's contribution to American history ended in the early 1900s, immigration surged to historic highs in the second half of the 20th century and shows no signs of diminishing in the 21st century. This course examines the economic, social, and policy forces that underlie contemporary U.S. immigration and the impacts that immigrants are having on the American economy and society today. It looks in detail at who the new immigrants are, why they come to America, where they live, and what roles they fill in America.

**D SOC 301(3010) Theories of Society (SBA) (KCM)**

Spring. 3 credits. Limited to 30 students.

Prerequisites: development sociology or sociology course. S-U grades optional.

F. Makki.

Introduction to the "classical" sociological theorists (Marx, Weber, Durkheim) of the late 19th and early 20th century. Also addresses the dramatic social upheavals of the industrialization, capitalism, and rise of

bureaucracy to which these thinkers reacted and the inspiring (and conflicting) visions for the future which they offered. Emphasizes the intellectual history, the influence of the theorists on subsequent sociology, and the potential for relevance to contemporary society.

**D SOC 305(3050) Education, Inequality and Development (SBA)**

Spring. 3 credits. Prerequisite: introductory social science course or permission of instructor. Letter grades. P. Eloundou-Enyegue.

Improvements in formal schooling are often advocated as solutions for a variety of socioeconomic problems in nonindustrial and industrial nations alike. This course critically assesses human capital approaches to development. Topics include (1) the variety and functions of school systems, (2) the individual and macro-level determinants of education, (3) education and socioeconomic stratification, (4) the effects of education on development, and (5) tools for evaluating education projects.

**D SOC 324(3240) Environment and Society (also S&TS 324[3241], SOC 324[3240]) (SBA)**

Fall and spring. 3 credits. Fall, C. Geisler; spring, G. Gillespie.

The main objective is to develop a critical understanding of the dominant trends in modern U.S. environmental thought, such as preservationism, conservationism, deep ecology, social ecology, NIMBYism, risk assessment, ecological modernization, and environmental equity. A second objective is to familiarize students with some major contemporary substantive environmental problems and policies. These topics include air and water quality, public lands management, biodiversity, deforestation, climate change, and ozone depletion. A sociological framework is applied to evaluate interrelationships of substantive and philosophical/theoretical issues.

**D SOC 330(3300) Sociology of Sport (also SOC 330[3300], NES 389[3889]) (SBA)**

Spring. 4 credits. T. Sorek.

For description, see NES 389.

**D SOC 332(3320) Martyrdom in Contemporary Societies (also SOC 332[3320], NES 332[3832]) (SBA)**

For description, see NES 332.

**D SOC 336(3360) Rural Areas in Metropolitan Society (SBA)**

Spring. 3 credits. Prerequisite: social science course. D. Brown.

Analyzes the changing structure and role of small towns and rural areas in developed nations. Focuses on adaptation of rural communities and populations to major trends, including increased societal differentiation and complexity; increased societal interdependence; and rapid social, economic, technological, and ecological change. Considers alternative policies to ameliorate rural problems and/or enhance rural contributions to national development. Students participate in group research projects in rural communities.

**D SOC 340(3400) Agriculture, Food, and Society (SBA) (KCM)**

Fall. 3 credits. S-U grades optional. G. W. Gillespie.

Changing food and agricultural systems reflect the development patterns and social organization of an increasingly global society. Sociological questions include: What are major trends? What drives them? What benefits and costs accrue to people, communities, and ecosystems? How do we evaluate issues? What development strategies might better manifest shared values?

**D SOC 354(3540) Sociology of Contemporary Culture (also S&TS 354[3540], SOC 352[3520]) (SBA) (CA)**

For description, see S&TS 354.

**D SOC 370(3700) Comparative Issues in Social Stratification (also SOC 371[3710]) (D) (SBA)**

Spring. 3 credits. Prerequisite: introductory social science course. P. Eberts.

Reviews both classical and contemporary issues in the comparative social stratification literature. Gives particular attention to the changing configurations of different labor markets, debates on the meaning of new economic constituencies, and the role of gender, race, ethnicity, and sexuality in assessing the patterns, meaning, and experiences of inequality. Throughout the course special attention is given to the importance of understanding how questions of measurement are constructed and employed in understanding social inequality.

**D SOC 375(3750) Comparative U.S. Racial and Ethnic Relations (also AM ST/LSP 375[3750]) (D) (SBA) (HA)**

Spring. 3 credits. Prerequisite: D SOC 101 or permission of instructor. Letter grades only. R. L. Mize.

Comparative historical study of the social construction of race. Examines structures of racism as they influence Latina/o, African American, Native American, and Asian American experiences. Does a critical interrogation of whiteness and ethnic identities. Focuses on historical legacy of institutional and interpersonal racism and its contemporary relevance in terms of political economic, residential, legal, educational, cultural, health, and social-psychological inequalities.

**D SOC 380(4900) Independent Honors Research in Social Science (SBA) (KCM)**

Fall and spring. 1-6 credits; 6 credits max. may be earned in honors program. Prerequisite: requirements for honors program met. J. Francis.

Students should select a faculty advisor and begin proposal development during the junior year. Students must submit written proposals by the third week of the semester of their senior year to the departmental honors committee representative.

**D SOC 410(4100) Health and Survival Inequalities (also SOC 410[4100]) (D) (SBA)**

For description, see SOC 410.

**D SOC 421(4210) Theories of Reproduction (also SOC 421[4210]) (D) (SBA)**

Spring. 4 credits. S-U grades optional. A. Basu.

For description, see SOC 421.

**D SOC 481(4810) Global Conflict and Terrorism (SBA) (KCM)**

Spring. 3 credits. C. Geisler.

Reviews and discusses issues concerning global development and its relationship to

conflict and terrorism. Each class session focuses on a specific topic presented by either a faculty member or a guest speaker leading the discussion and actively engaging the students. The weekly discussion section focuses on discussing in greater depth the reading assignments.

**D SOC 494(4800) Special Topics in Development Sociology (SBA)**

Fall or spring. 4 credits max. S-U grades optional.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**D SOC 497(4901) Independent Study in Development Sociology (SBA)**

Fall or spring. 3 credits, variable; may be repeated for credit. Students must register using independent study form (available in 140 Roberts Hall). S-U grades optional.

Informal study may include a reading course, research experience, or public service experience.

**D SOC 560(5600) Managing Local Environmental Systems: Social Perspectives and Research Bases (SBA) (KCM)**

Fall. 3 credits. J. Francis.

For students with diverse backgrounds: undergrads, grads, people in professional careers, others with interesting environmental-issue identification, resolution, and management. Discussions include ecological, social, economic, and local government perspectives. Via lab exercises throughout the semester, students have opportunities to apply the concepts and principles of these perspectives to analysis of specific local environmental-management problems. Readings, lectures, and a course project are mandatory.

**D SOC 603(6030) Classical Sociological Theory (SBA)**

Fall. 4 credits. Prerequisite: graduate standing. M. J. Pfeffer.

Reviews the main streams of classical sociological thought, focusing on the work of Weber, Durkheim, Marx, and Simmel. Course materials include original texts and secondary literature used to examine the concepts, methods, and explanation in classical sociological thought. Important objectives are to identify the philosophical and conceptual core of the discipline and to critically evaluate the relevance of the classical theories to contemporary social change and development.

**D SOC 606(6060) Sociological Theories of Development (SBA)**

Spring. 3 credits. F. Makki.

Critical examination of a historical range of theories and research in the sociology of development from the postwar period through the present. Major topics include modernization theory, dependency theory, world-system theory, the developmental state, global commodity chains, and globalization. Throughout the course, the concept of development itself is questioned and critiqued both theoretically and in terms of practical challenges from environmental, indigenous, and other social movements.



**[D SOC 608(6080) Demographic Techniques (also PAM 606(6060)) (SBA)]**

Fall. 3 credits. Prerequisite: multivariate statistics or permission of instructor. S-U grades optional. D. Gurak.

Introduction to the methods, measures, and data used in the analysis of human populations. Topics include demographic rates, life-table analysis, cohort vs. period analysis, sources and quality of demographic data, population estimation and projection, and stable population models.

**D SOC 615(6150) Qualitative Research Methods (SBA) (CA)**

Fall. 3 credits. Letter grades only. L. Williams.

Seminar introducing students to a number of qualitative methods of field research in the social sciences. Discusses field observation, archival research, in-depth individual interviews, and focus group interviews. Assesses the strengths and weaknesses of various strategies of field research and consider a range of practical matters such as choice of research site (and sample where appropriate), choice of questions, and issues of validity and reliability. Highlights ethical considerations.

**D SOC 617(6170) Foundations in Social Research: Comparative Epistemologies (SBA) (KCM)**

Fall. 3 credits. Letter grades only. T. Lyson. Seminar designed to introduce graduate students in the social sciences to the variety of epistemological approaches used by social scientists to analyze social change and development. Examines both positivist and nonpositivist approaches. Relates the relationship of quantitative and qualitative methodologies to different epistemologies.

**D SOC 619(6190) Quantitative Research Methods (SBA) (KCM)**

Spring. 4 credits. Prerequisite: statistics course. Letter grades only. J. Francis. Graduate-level course in measurement and analysis of survey, demographic, and observational data. Topics include linear regression, analysis of variance, and analysis of covariance with both continuous and categorically coded variables. Introduces logistic regression and some nonlinear models. Gives special attention to handling ordered and unordered categorical data as these are prevalent in social/demographic data sets. Analyzes data from real surveys like the American National Election Studies and the General Social Surveys using programs like SAS and SPSS. Includes labs and writing programs to analyze these data. Students familiarize themselves with data cleaning, missing data estimation, transformations, subsetting, and other data handling procedures.

**D SOC 620(6200) Sociology of the Community (SBA)**

Fall. 3 credits. D. Brown. Graduate seminar that critically analyzes the intellectual core of community sociology and its theoretical development over time. "Community" as a concept is often reified and rarely critically examined, hence the course begins by clarifying the various ways in which "community" has been conceptualized and operationalized by sociologists. The course provides students with both a grounded conceptual foundation and an overview of multiple strategies for conducting research on community structure and change in the

United States and internationally. Includes a critical examination of the forms and shapes sociological research on the community assumes. Uses a case study approach to examine the assumptions driving the methods and analysis of both contemporary and historical research.

**D SOC 625(6250) State, Economy, and Society (SBA) (HA)**

Spring. 3 credits. P. D. McMichael. Reviews major issues concerning the relations between political and economic institutions and the role of states, markets, firms, social movements, and cultural institutions in the process of social change. Draws theoretical perspectives from classical and modern social theory, including the application of comparative and world/historical methodologies.

**D SOC 641(6410) Politics and Economics of Rural and Regional Development (SBA)**

Spring. 3 credits. Prerequisite: upper-level or graduate standing. T. Lyson. Survey of social, political, and economic factors in local and regional development. Explores theories of community and regional development and underdevelopment. Examines Neoclassical, Marxist, and civil society theories within local and global contexts.

**D SOC 694(6800) Special Topics in Development Sociology (SBA)**

Fall or spring. 4 credits max. S-U grades optional. The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**D SOC 791(7910) Teaching Experience (SBA)**

Fall or spring. 1-3 credits. Prerequisite: graduate standing. S-U grades only. Graduate faculty. Participation in the ongoing teaching program of the department.

**D SOC 800(8900) Master's-Level Thesis Research (SBA)**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty. Thesis research for master's students.

**D SOC 872(8720) Development Sociology (SBA)**

Prerequisite: master's and doctoral degree candidates, permission of graduate field member concerned. S-U grades optional. Graduate faculty.

**D SOC 900(7900) Graduate-Level Thesis Research (SBA)**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty. Thesis research for Ph.D. students only before "A" exam has been passed.

**D SOC 901(9900) Doctoral-Level Thesis Research (SBA)**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty. Thesis research for Ph.D. candidates after "A" exam has been passed.

**Related Courses in Other Departments**

(Others may be added)

Population Dynamics (SOC 205)

Gender Relations, Gender Ideologies, and Social Change (FGSS 524)

**EARTH AND ATMOSPHERIC SCIENCES**

T. E. Jordan, chair (2116 Snee Hall, 255-3596; 254-8737); S. J. Colucci, co-chair; director of undergraduate studies: B. L. Isacks (Science of Earth Systems); M. W. Wysocki (Atmospheric Science); R. W. Allmendinger, W. D. Allmon, C. Andronicos, M. Barazangi, L. D. Brown, L. M. Cathles, J. L. Cisne, K. H. Cook, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, M. Goman, C. H. Greene, D. L. Hysell, B. L. Isacks, R. W. Kay, S. Mahlburg Kay, M. C. Kelley, B. Monger, A. Moore, A. J. Pershing, J. Phipps Morgan, M. Pritchard, S. J. Riha, W. M. White, D. S. Wilks

**General Courses****EAS 121(1121) Introduction to MATLAB (also CIS 121[1121])**

Fall, spring. 2 credits. Corequisite: MATH 111, 191, or equivalent. No programming experience assumed. Staff. For description, see CIS 121.

**EAS 150(1500) FORTRAN Applications in Earth Science**

Spring, seven-week course. 2 credits. Prerequisite: CIS/EAS 121 or equivalent. Letter grades only. A. J. Pershing. Emphasizes the application of scientific computing in the Earth sciences, including data processing and modeling of the Earth, its atmosphere, and oceans. Extends the procedural programming concepts developed in CIS 121/EAS 121 and considers their implementation in high-performance, compiled languages. Topics include the structure and syntax of a FORTRAN program, data input/output, compilation, and debugging.

**EAS 496(4960) Internship Experience**

Fall or spring. 1-2 credits. S-U grades only. Staff. See individual units for requirements.

**EAS 498(4980) Teaching Experience in Earth and Atmospheric Sciences**

Fall, spring. 1-4 credits. S-U grades only. Students must register using independent study form. Staff. The student assists in teaching an EAS course appropriate to his or her previous training. The student meets with a discussion or laboratory section, prepares course materials, grades assignments, and regularly discusses course objectives and teaching techniques with the faculty member in charge of the course.

**Atmospheric Science****EAS 131(1310) Basic Principles of Meteorology**

Fall. 3 credits. M. W. Wysocki. Simplified treatment of the structure of the atmosphere: heat balance of the Earth; general and secondary circulations; air masses, fronts, and cyclones; and hurricanes, thunderstorms, tornadoes, and atmospheric condensation. The optional 1-credit laboratory for the course is offered as EAS 133.



**EAS 133(1330) Basic Meteorology Lab**

Fall. 1 credit. Corequisite: EAS 131.  
M. W. Wysocki.

This course is required for atmospheric science majors, but is optional for other students taking EAS 131.

**EAS 250(2500) Meteorological Observations and Instruments**

Fall. 4 credits. Prerequisite: EAS 131.  
M. W. Wysocki and B. Monger.

Covers methods and principles of meteorological measurements and observations including surface, free-air, and remote systems. Also covers instrument siting, mounting, and protection; instrument response characteristics, calibration, and standardization; and recorders and data logging systems. Laboratory exercises are in observation and data analysis. The course is intended to serve as preparation for Observers Examination.

**EAS 268(2680) Climate and Global Warming**

Spring. 3 credits. Prerequisite: basic college math. S-U grades optional.  
A. T. DeGaetano.

Familiarizes students from a range of disciplines with such contemporary issues in climatology as global warming and El Niño. Introduces the natural greenhouse effect, past climates, and observed and projected climate changes and impacts. Also covers natural climate variations (e.g. El Niño) and their consequences and predictability. Weekly student-led discussions of issues appearing in journals such as *Nature*.

**EAS 296(2960) Forecast Competition**

Fall and spring. 1 credit; students enroll for two consecutive semesters; credit awarded after second semester; may be repeated for credit. Prerequisite: sophomore standing in atmospheric science or permission of instructor. S-U grades only. D. S. Wilks.

Two-semester course providing daily exercise in probabilistic weather forecasting, in which students compete to forecast local weather most skillfully.

**EAS 305(3050) Climate Dynamics**

Fall. 3 credits. Prerequisites: two semesters of calculus and one semester of physics.  
K. H. Cook.

Discusses processes that determine climate and contribute to its change, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Investigates contemporary climate change issues and discusses them in the context of natural variability of the system.

**[EAS 334(3340) Microclimatology**

Spring. 3 credits. Prerequisite: physics course. Next offered 2007–2008.  
D. S. Wilks.]

**EAS 341(3410) Atmospheric Thermodynamics and Hydrostatics**

Fall. 3 credits. Prerequisites: one year of calculus and one semester of physics.  
A. T. DeGaetano.

Introduction to the thermodynamics and hydrostatics of the atmosphere and to the methods of description and quantitative analysis used in meteorology. Topics include thermodynamic processes of dry air, water vapor, and moist air, and concepts of hydrostatics and stability.

**EAS 342(3420) Atmospheric Dynamics (also ASTRO 342(3342))**

Spring. 3 credits. Prerequisites: MATH 192, 213, or equivalent; one year of physics.  
K. H. Cook.

Introduction to the basic equations and techniques used to understand motion in the atmosphere, with an emphasis on the space and time scales typical of storm systems (the synoptic scale). Derives the governing equations of atmospheric flow from first principles and applies them to middle latitude and tropical meteorology. Topics include balanced flow, atmospheric waves, circulation, and vorticity.

**EAS 352(3520) Synoptic Meteorology I**

Spring. 3 credits. Prerequisite: EAS 341.  
Corequisite: EAS 342. M. W. Wysocki.

Study of weather map analysis and forecasting techniques by applying the principles of fluid and heat flow. Strengthens previously introduced meteorological concepts that are applied to forecasting midlatitude synoptic scale weather systems, such as cyclones, anticyclones, jet streams, fronts, and waves.

**[EAS 420(4200) The Linux Supercomputing Environment**

Fall, spring. 3 credits. Prerequisite: EAS 150 or introductory programming. Next offered 2007–2008. M. W. Wysocki.

This course will address the use of computers and software for research. An understanding of basic operating system concepts and computer hardware will tie into a survey of available software packages for programming and data presentation as well as computational techniques such as parallel processing. Students will be required to formulate and conduct a project using tools of their choice and demonstrate in a report and oral presentation that is open to other students and faculty that they have used the Linux supercomputing cluster and acquired significant skills. Undergraduates may work in a team. Graduate students will be expected to conduct an independent project and solve a computational problem in their domain of expertise.]

**EAS 435(4350) Statistical Methods in Meteorology and Climatology**

Fall. 3 credits. Prerequisites: one introductory course each in statistics (e.g., AEM 210) and calculus. D. S. Wilks.

Statistical methods used in climatology, operational weather forecasting, and selected meteorological research applications. Includes statistical characteristics of meteorological data including probability distributions and correlation structures. Covers operational forecasts derived from multiple regression models, including the MOS system and forecast evaluation techniques.

**[EAS 447(4470) Physical Meteorology**

Fall. 3 credits. Prerequisites: one year each of calculus and physics. Next offered 2007–2008. A. T. DeGaetano.]

**EAS 451(4510) Synoptic Meteorology II**

Fall. 3 credits. Prerequisites: EAS 341 and 342. S. J. Colucci.

Structure and dynamics of large-scale midlatitude weather systems, such as cyclones, anticyclones, and waves, with consideration of processes that contribute to temperature changes and precipitation. Lab sessions involve real-time weather forecasting and the computer application of a numerical model of the atmosphere to study selected large-scale midlatitude weather events.

**[EAS 456(4560) Mesoscale Meteorology**

Spring. 3 credits. Prerequisites: EAS 341 or 342 or permission of instructor. Next offered 2007–2008. S. J. Colucci.]

**EAS 457(4570) Atmospheric Air Pollution**

Fall. 3 credits. Prerequisites: EAS 341 or one course in thermodynamics, and one semester of chemistry, or permission of instructor. M. W. Wysocki.

Examines sources, effects, transport, measurement, and controls of air pollution. Discusses the basic principles in each area with an emphasis on their local, regional, and global impacts.

**EAS 470(4700) Weather Forecasting and Analysis**

Spring. 3 credits. Prerequisites: EAS 352 and 451. M. W. Wysocki.

Applied course focusing on weather forecasting and analysis techniques for various regions around the world. Lectures emphasize the application of student's knowledge of atmospheric dynamics, thermodynamics, and computer data analysis, to forecast the development and movement of multiscale weather systems. Students participate in weekly forecast discussions; write daily forecasts that include a synoptic discussion, quantitative precipitation forecasts, and severe weather outlook for the forecast region; and lead class discussion on assigned readings.

**[EAS 483(4830) Environmental Biophysics (also CSS 483(4830))**

Spring. 3 credits. Next offered 2007–2008. S. J. Riha.]

**EAS 487(4870) Introduction to Radar Remote Sensing (also ECE 487(4870))**

Fall. 3 credits. Prerequisite: PHYS 208 or 213 or equivalent, or permission of instructor. D. L. Hysell.

Fundamentals of radar, antennas, and remote sensing. Exposes students to the principles underlying the analysis and design of antennas used for communication and for radar-related applications. Students also encounter both a mathematical and a practical description of how radars function, how their performance can be optimized for different applications, and how signals acquired by them can be processed. The objective is to familiarize students with a wide variety of radars rather than to turn them into practicing radar engineers. Each topic is developed from basic principles so students with a wide variety of backgrounds are able to take the course. Emphasizes radar applications in geophysics, meteorology and atmospheric sciences, and astronomy and space sciences. Gives special attention to radar remote sensing of the Earth from spacecraft.

**EAS 494(4940) Special Topics in Atmospheric Science (undergraduate level)**

Fall or spring. 8 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester starts. The same course is not offered more than twice.

**EAS 497(4970) Individual Study in Atmospheric Science**

Fall or spring. 1-6 credits. S-U grades optional. Students must register using independent study form. Staff.

Topics are arranged at the beginning of the semester for individual study or for group discussions.

**EAS 499(4990) Undergraduate Research in Atmospheric Science**

Fall or spring. Credit TBA. S-U grades only. Students must register using independent study form. Staff.

Independent research on current problems in atmospheric science.

**[EAS 620(6200) The Linux Supercomputing Environment]**

Fall, spring. 3 credits. Prerequisite: EAS 150 or introductory programming. Next offered 2007-2008. M. W. Wysocki.

This course will address the use of computers and software for research. An understanding of basic operating system concepts and computer hardware will tie into a survey of available software packages for programming and data presentation as well as computational techniques such as parallel processing. Students will be required to formulate and conduct a project using tools of their choice and demonstrate in a report and oral presentation that is open to other students and faculty that they have used the Linux supercomputing cluster and acquired significant skills. Undergraduates may work in a team. Graduate students will be expected to conduct an independent project and solve a computational problem in their domain of expertise.]

**[EAS 652(6520) Advanced Atmospheric Dynamics (also ASTRO 652[7652])]**

Spring. 3 credits. Prerequisites: EAS 341 and 342 or equivalents. Next offered 2007-2008. S. J. Colucci.]

**EAS 666(6660) Applied Multivariate Statistics**

Spring. 3 credits. Prerequisites: multivariable calculus, matrix algebra, two statistics courses. D. S. Wilks.

Statistical techniques for multivariable data. Topics include multivariate exploratory data analysis, the multivariate normal distribution, parametric and nonparametric inference about multivariate means, principal component analysis, canonical correlation analysis, discriminant analysis, and cluster analysis. Emphasizes geophysical applications, using primarily atmospheric and oceanographic data as examples, but the development is general enough to be of broader interest.

**[EAS 675(6750) Modeling the Soil-Plant-Atmosphere System (also CSS 675[6750])]**

Spring. 3 credits. Prerequisite: EAS/CSS 483 or equivalent. Next offered 2008-2009. S. J. Riha.]

**EAS 692(6920) Special Topics in Atmospheric Science**

Fall or spring. 1-6 credits. S-U grades optional. Staff.

Study of topics in atmospheric science that are more specialized or different from other courses. Special topics covered depend on staff and student interests.

**EAS 711(7110) Upper Atmospheric and Space Physics**

Fall or spring. 1-6 credits. Seminar course. D. L. Hysell.

**EAS 850(8500) Master's-Level Thesis Research in Atmospheric Science**

Fall or spring. Credit TBA. S-U grades only. Graduate faculty.

Thesis research for atmospheric science master's students.

**EAS 950(9500) Graduate-Level Dissertation Research in Atmospheric Science**

Fall or spring. Credit TBA. S-U grades optional. Graduate faculty.

Dissertation research for atmospheric science Ph.D. students only before "A" exam has been passed.

**EAS 951(9510) Doctoral-Level Dissertation Research in Atmospheric Science**

Fall or spring. Credit TBA. S-U grades optional. Graduate faculty.

Dissertation research for atmospheric science Ph.D. candidates after "A" exam has been passed.

**Science of Earth Systems****Field Study in Hawaii**

Field study is a fundamental aspect of earth system science. Students wishing to increase their field experience may fulfill some of the requirements for the SES major by off-campus study through the Cornell Earth and Environmental Semester program (EES). The EES program is offered during the spring semester and emphasizes field-based education and research. It is based on the island of Hawaii, an outstanding natural laboratory for earth and environmental sciences. Courses that may be applied to the SES major include EAS 240, 322, and 351. The EES program also offers opportunities for internships with various academic, nonprofit, and government organizations. Typically students participate in the EES program during their junior year, although exceptions are possible. For further information on the EES program see [www.geo.cornell.edu/geology/classes/hawaii/course.html](http://www.geo.cornell.edu/geology/classes/hawaii/course.html).

**EAS 101(1101) Introductory Geological Sciences (To Know Earth)**

Fall. 3 credits. Staff.

Designed to enhance an appreciation of the physical world for nonscientists and science majors. Emphasizes natural environments, surface temperatures, dynamic processes such as mountain belts, volcanoes, earthquakes, glaciers, and river systems. Covers interactions of the atmosphere, hydrosphere, biosphere, and lithosphere (Earth system science). Examines water, mineral, and fuel resources and environmental concerns.

**EAS 102(1102) Evolution of the Earth and Life (also BIO G 170[1700])**

Spring. 3 credits. J. L. Cisne.

Earth systems and their evolution; Earth history's astronomical context; plate tectonics, continental drift, and their implications for climate and life; coevolution of life and the atmosphere; precedents for ongoing global change; dinosaurs, mass extinctions, and human ancestry. Includes laboratories on reconstructing geological history and mapping ancient geography. Fossil-collecting on field trips.

**EAS 108(1108) Earth in the News**

Summer. 3 credits. S. L. Losh.

Introduction to physical geology and Earth system science and explores the scientific basis for informed decision making regarding many timely environmental issues including global warming; water pollution and use; geologic hazards such as floods, earthquakes, and volcanoes; fossil fuel distribution and use; and land use. A field trip is taken in the Ithaca area.

**EAS 109(1109) Dinosaurs**

Fall. 1 credit. J. L. Cisne.

Introductory survey course for anyone interested in dinosaurs. Lectures examine the fossil evidence and illustrate how various geological and biological disciplines contribute to understanding dinosaurs and their world.

**EAS 122(1220) Earthquake! (also ENGRI 122[1120])**

Spring. 3 credits. Staff.

Explores the science of natural hazards and strategic resource. Covers techniques for locating and characterizing earthquakes and assessing the damage they cause; methods of using sound waves to image the Earth's interior to search for strategic minerals; and the historical importance of such resources. Includes seismic experiments on campus to probe for groundwater, the new critical environmental resource.

**EAS 154(1540) Introductory Oceanography—Lecture (also BIOEE 154[1540])**

Fall, summer. 3 credits; optional 1-credit lab offered as EAS/BIOEE 155. S-U grades optional. Spring: B. C. Monger and C. H. Greene; summer: B. C. Monger.

Intended for both science and nonscience majors. Cover the basic workings of the ocean including its physics, chemistry, and biology. Following this basic description, the course examines threats to the health of the ocean and the important role the ocean plays in global climate change. Nonscience majors should pay particular attention to this course to fulfill a science requirement, because they learn broadly how the Earth works (physically, chemically, and biologically) in a single nonquantitative class.

**EAS 155(1550) Introductory Oceanography—Laboratory (also BIOEE 155[1550])**

Fall. 1 credit. Corequisite: EAS/BIOEE 154. S-U grades optional. B. C. Monger and C. H. Greene.

Laboratory course covering topics presented in EAS/BIOEE 154.

**EAS 201(2010) Introduction to the Physics and Chemistry of the Earth (also ENGRD 201[2010])**

Fall. 3 credits. Prerequisite: PHYS 112 or 207. J. Phipps Morgan.

Covers formation of the solar system; accretion and evolution of the Earth; the rock cycle: radioactive isotopes and the geological time scale, plate tectonics, rocks and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, and contaminant transport; and the weathering cycle: chemical cycles, CO<sub>2</sub> (weathering), controls on global temperature (CO<sub>2</sub> or ocean currents), and oil and mineral resources.

**EAS 213(2130) Marine and Coastal Geology**

Summer. 4 credits. Prerequisite: introductory geology or ecology course or permission of instructor. Staff.

Special two-week course offered at Cornell's Shoals Marine Laboratory (SML), located on an island near Portsmouth, N.H. For more details, including estimated cost and an application, contact SML office, G14 Stimson Hall, or visit [www.sml.cornell.edu](http://www.sml.cornell.edu).

**EAS 220(2200) The Earth System**

Spring. 4 credits. Prerequisites: MATH 111/191. W. White and C. Greene.

An integrated introduction to the earth system stressing the biological, chemical, geological, and physical interactions among the atmosphere, ocean, and solid earth. Topics covered will include biogeochemical cycles, climate dynamics, and the evolution of the atmosphere, biosphere, cryosphere (ice), hydrosphere (oceans and inland waters), and lithosphere (solid earth).

**EAS 222 (2220) Seminar: Hawaii's Environment**

Fall. 1 credit. A. Moore and C. Greene.

A seminar for students interested in the unique environmental systems of the Hawaiian Islands. This course is designed to bring together students returning from field studies in Hawaii with students interested in going there to study. Through reading and discussion we will explore the geology, biology, ocean, atmosphere, and culture of the Hawaiian environment.

**EAS 240(2400) Field Study of the Earth System**

Spring. 5 credits. Prerequisites: one semester of calculus (MATH 190/191/192 or 111/112) and two semesters of any of the following: PHYS 207/208 or 112/213; CHEM 207/208; BIO G 101/103-102/104 or 105/106 or 109/110 or equivalent course work. A. Moore.

Interdisciplinary field course covering fundamental concepts of the Earth system. Topics include global circulation patterns in the solid Earth, atmosphere and ocean; energy and mass transfer; change and variability of Earth atmosphere and ocean systems; the temporal record of change preserved in the geologic record; Earth/ocean/atmospheric controls on ecosystem processes. The course is project-based with students engaged in hands-on, active learning that takes advantage of local resources.

**EAS 301(3010) Evolution of the Earth System**

Fall. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent.

T. Jordan, S. Riha, and W. Allmon.

Life activities alter the physical and chemical environment, and are altered by that environment. This interaction over very long times constitutes a co-evolution of earth and life. Course uses modern systems, tens of thousand year old systems, and hundreds of million year old systems to illustrate principles, methods of reconstructing deep history, and the context of natural change inherent to life and earth.

**EAS 303(3030) Introduction to Biogeochemistry (also NTRES 303[3030])**

Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, and biology and/or geology course. L. A. Derry and J. Yavitt.

Control and function of the Earth's global biogeochemical cycles. Begins with a review of the basic inorganic and organic chemistry of biologically significant elements, and then considers the biogeochemical cycling of carbon, nutrients, and metals that take place in soil, sediments, rivers, and the oceans. Topics include weathering, acid-base chemistry, biological redox processes, nutrient cycling, trace gas fluxes, bio-active metals, the use of isotopic tracers, controls on atmospheric carbon dioxide, and mathematical models. Interactions between global biogeochemical cycles and other components of the Earth system are discussed.

**EAS 304(3040) Interior of the Earth**

Spring. 3 credits. C. Andronikos.

This class will investigate the geology of the solid earth with emphasis on igneous and metamorphic petrology, structure of the continents and ocean basins, and large scale tectonics. Interaction between deformation, melt generation and metamorphism will be examined as mechanisms by which the crust is differentiated from the underlying mantle. Geophysical and geochemical techniques for probing the deep interior of the earth will be investigated. Plate tectonics will be used as a unifying theme to understand processes operating in the solid earth.

**EAS 315(3150) Geomorphology**

Fall. 3 credits. Prerequisite: geology, hydrology, or soil science course. Two Sat field trips. B. L. Isacks.

Study of the processes that sculpt the Earth's landscapes (above and below sea level) and the nature of those landforms. The point of departure is landforms constructed by Earth's internal processes, as the course examines their modification by physical interaction with the atmosphere and oceans. Also treats depositional landforms that are generated by accumulations of grains or sediment. Laboratory exercises include both field examination of landforms of the Finger Lakes area and computer analysis of satellite images and Digital Elevation Models of examples from around the globe.

**EAS 322(3220) Biogeochemistry of the Hawaiian Islands**

Spring. 4 credits. Prerequisites: enrollment in EES semester in Hawaii; EAS 220, EAS 303. L. Derry.

Field-oriented study of biogeochemical processes and ecosystem interactions across the Hawaiian Islands. Field, class, and laboratory work focus on how landscape age and climate strongly control biogeochemical cycling and ecosystem development in Hawaii. Other topics include succession of ecosystems, evolution of nutrient cycles, and impacts of invasive species. The course is structured around field projects, carried out both as groups and individually.

**[EAS 326(3260) Structural Geology**

Spring. 3 credits. Prerequisite: one semester of calculus plus introductory geology course, or permission of instructor. One weekend field trip. Offered alternate years, next offered 2007-2008. R. W. Allmendinger.]

**[EAS 350(3500) Dynamics of Marine Ecosystems (also BIOEE 350[3500])**

Fall. 3 credits. Prerequisites: one year of calculus and one semester of oceanography (i.e., BIOEE/EAS 154), or permission of instructor. Alternate years; next offered 2007-2008. C. H. Greene and R. W. Howarth.]

**EAS 351(3510) Marine Ecosystems Field Course (also BIOEE 351[3510])**

Spring. 4 credits. Prerequisite: EAS 240.

Recommended: oceanography course.

C. Greene, B. Monger, and C. D. Harvell.

Covers the interactions of physical and biological processes in marine ecosystems. Begins by looking at these processes on ocean-basin to regional scales and work down to the smaller scales relevant to individual organisms. Introduces students to modern techniques of marine-ecosystems research, including remote sensing, oceanographic-survey methods, and experimental marine ecology. This course is field and laboratory intensive with students engaged in hands-on, active learning that takes advantage of local resources.

**EAS 353(3530) Physical Oceanography**

Fall. 3 credits. Prerequisites: MATH 112 or 192, or one year of physics, or permission of instructor. B. C. Monger.

The course covers thermohaline and wind-driven circulation and surface-ocean boundary-layer dynamics. Mathematical expressions for describing conservation of momentum, mass, and heat in a fluid are used to explain the ocean's responses to wind and buoyancy forcing, but the course will emphasize the basic physical principles at play, and not just the mathematical results. Student presentations of recent research papers will elaborate principles learned in the course.

**EAS 355(3550) Mineralogy**

Fall. 4 credits. Prerequisite: EAS 101 or 201 or 220 and CHEM 207/211 or permission of instructor. S. Mahlborg Kay.

Chemical and physical properties and identification of minerals with emphasis on the rock-forming minerals that are the principal constituents of the Earth and nearby planets. Topics include internal and external crystallography, crystal chemistry, introductions to x-ray crystallography and optical mineralogy, and a systematic examination of the structures, chemistry, and occurrence of the rock-forming minerals. Independent project includes use of electron microprobe (EPMA) and x-ray facilities.

**EAS 356(3560) Petrology and Geochemistry**

Spring. 4 credits. Prerequisite: EAS 355.

R. W. Kay.

Principles of phase equilibrium as applied to igneous and metamorphic systems. Includes description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks: geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. Also covers the petrological evolution of the planets.

**[EAS 388(3880) Geophysics and Geotectonics**

Spring. 3 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. Offered alternate years, next offered 2007-2008. M. Pritchard.]

**[EAS 401(4010) Fundamentals of Energy and Mineral Resources]**

Spring. 3 credits. Prerequisites: math through differential equations, physics through electricity and magnetism, CHEM 207, or equivalent. Recommended: introduction to geology. Next offered 2007-2008. L. M. Cathles.]

**[EAS 404(4040) Geodynamics]**

Spring. 3 credits. Prerequisite: calculus and calculus-based physics courses or permission of instructor. J. Phipps Morgan. Quantitative study of the deformation, heat transport, and melting processes that have shaped the evolution of the solid Earth. Familiar physical and chemical principles and concepts are applied to the study of plate tectonics, fluid dynamics, mantle convection, melting, and mountain building.

**[EAS 405(4050) Active Tectonics]**

Spring. 3 credits. Recommended: mechanical background equivalent to EAS 326/388. Offered alternate years. M. Pritchard.

**[EAS 417(4170) Field Mapping in Argentina]**

Summer. 3 credits. Prerequisite: introductory EAS course and EAS 326. S. Mahlburg Kay.

Field mapping course in Argentina that fulfills field requirement for majors with interests in geological sciences and provides a field geological experience for others. Course consists of lectures in Buenos Aires followed by field exercises in the Sierras Pampeanas, Precordillera, and Main Cordillera Ranges of the Argentine Andes in the provinces of San Juan and Mendoza. A variety of exercises use modern techniques in the field mapping of a broad range of variably deformed sedimentary, metamorphic and igneous rocks. The course further provides an introduction to the tectonics and magmatic processes of the central Andes with emphasis on comparable processes in the U.S. Exercises are done in combination with students and faculty of the University of Buenos Aires.

**[EAS 425(4250) European Discovery of Impacts and Explosive Volcanism]**

Spring. 2 credits. Prerequisites: junior, senior, or graduate students with a background in geology and permission of instructor. Offered alternate years, next offered 2007-2008. J. Phipps Morgan.]

**[EAS 434(4340) Reflection Seismology]**

Fall. 3 credits. Prerequisites: MATH 192 and PHYS 208, 213, or equivalent. Offered alternate years. L. D. Brown.

Fundamentals of subsurface imaging by multichannel seismic reflection techniques as used in oil exploration and geohydrological investigations. Covers survey design, acquisition, analysis, processing, and interpretation in both 2-D and 3-D. Includes discussion of related techniques such as seismic refraction analysis, tomographic inversion, vertical seismic profiling, shear wave exploration, and ground-penetrating radar. Lab is keyed to state-of-the-art seismic processing, modeling, and interpretation software from LandMark.

**[EAS 437(4370) Geophysical Field Methods (also ARKEO 437(4370))]**

Fall. 3 credits. Prerequisites: PHYS 213 or 208, or permission of instructor. Offered alternate years, next offered 2007-2008. L. D. Brown.]

**[EAS 453(4530) Advanced Petrology]**

Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years, next offered 2007-2008. R. W. Kay.]

**[EAS 454(4540) Advanced Mineralogy]**

Spring. 3 credits. Prerequisite: EAS 355 or permission of instructor. Offered alternate years. S. M. Kay.

Covers crystallography and crystal chemistry of minerals and the methods of their study. Includes X-ray diffraction, optical methods, and computer simulation of crystal structures. Emphasizes effects of high pressures and temperatures with implications for understanding the Earth's interior.

**[EAS 455(4550) Geochemistry]**

Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years; next offered 2007-2008. W. M. White.]

**[EAS 458(4580) Volcanology]**

Fall. 3 credits. Prerequisite: EAS 356 or equivalent. Offered alternate years. R. W. Kay.

Causes of volcanism, melting in the Earth, and the origin of magmas. Physical volcanology, nature and types of volcanic eruptions and associated deposits, and eruption mechanisms. Volcanic plumbing systems, magma chamber processes, evolution of magma. Volcanism and impact phenomena in the solar system. Volcanic hazard assessment and volcano monitoring. Ore deposits associated with volcanism.

**[EAS 460(4600) Late Quaternary Paleoeecology]**

Fall. 4 credits. M. Goman.

Explores topics in Late Quaternary paleoecology. Broadly divided into two sections: (1) lectures that cover a variety of topics, such as philosophy of paleoecology, radiometric dating methods, and paleoenvironmental proxies; (2) field- and laboratory-based research. The field research provides students with hands-on experience in sediment core collection, while in the laboratory students learn the basics of core description, pollen, and macrofossil analysis.

**[EAS 462(4620) Marine Ecology (also BIOEE 462(4620))]**

Fall. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Offered alternate years. C. D. Harvell and C. H. Greene. For description, see BIOEE 462.

**[EAS 471(4710) Introduction to Groundwater (also BEE 471(4710))]**

Spring. 3 credits. Prerequisite: MATH 293, fluid mechanics or hydrology course. Next offered 2007-2008. T. S. Steenhuis and L. M. Cathles.]

**[EAS 475(4750) Special Topics in Oceanography]**

Fall, spring, summer. 2-6 credits, variable. Prerequisites: one semester of oceanography and permission of instructor. Fall, spring: C. H. Greene; summer: B. C. Monger.

Undergraduate instruction and participation in advanced areas of oceanographic research. Topics change from semester to semester. Contact instructor for further information.

**[EAS 476(4760) Sedimentary Basins: Tectonics and Mechanics]**

Fall. 3 credits. Prerequisite: EAS 301 or permission of instructor. Offered alternate years; next offered 2007-2008. T. E. Jordan.]

**[EAS 478(4780) Advanced Stratigraphy]**

Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.

Covers modern improvements on traditional methods of study of ages and of genetic relations among sedimentary rocks, emphasizing 3-D relationships. Introduces techniques and applications of sequence stratigraphy at scales ranging from beds to entire basins. Considers physical correlation, dating techniques, and time resolution in sedimentary rocks as well as physical controls on the stratigraphic record and numerical modeling.

**[EAS 479(4790) Paleobiology (also BIOEE 479(4790))]**

Fall. 4 credits. Prerequisites: one year of introductory biology and BIOEE 274 or 373 or EAS 375, or permission of instructor. Offered alternate years, next offered 2007-2008. W. D. Allmon.]

**[EAS 481(4810) Senior Survey of Earth Systems]**

Spring, fall. 2 credits. J. Cisne and R. Kay. Weekly seminar for seniors in the Science of Earth Systems major on current topics in Earth system science. Readings, presentations, and discussions will focus on results from the recent literature, including how to analyze a scientific paper, and exploration of connections across the subdisciplines in the field. The course will serve as both a review of key concepts, and a vehicle to explore developing concepts in the field.

**[EAS 491-492(4910-4920) Undergraduate Research]**

Fall, spring. 1 to 4 credits. Fill out form at 2124 Snee Hall. Staff.

Introduction to the techniques and philosophy of research in geological sciences and an opportunity for undergraduates to participate in current faculty research projects. Topics chosen in consultation with, and guided by, a faculty member. A short written report is required, and outstanding projects are prepared for publication.

**[EAS 496(4960) Internship Experience]**

2 credits. Prerequisite: EAS 240. A. Moore. During the last 3.5 weeks of the semester students carry out a service-learning project with a local NGO, environmental business, government agency, research lab, or educational facility. Projects are carefully designed with the student, sponsoring agency, and faculty member. A final report is required.

**[EAS 498(4980) Teaching Experience in Earth and Atmospheric Sciences]**

Fall, spring. 1-4 credits. S-U grades only. Students must register using independent study form. Staff.

**[EAS 500(5000) Design Project in Geohydrology]**

Fall, spring. 3-12 credits. Alternative to industrial project for M.Eng. students choosing geohydrology option. May continue over two or more semesters. Not offered 2006-2007. L. M. Cathles.]



**[EAS 502(5020) Case Histories in Groundwater Analysis]**

Spring. 4 credits. Next offered 2007–2008.  
L. M. Cathles.]

**[EAS 505(5050) Fluid Dynamics in the Earth Sciences]**

Spring. 3 credits. Prerequisites: MATH through 294, PHYS through 208/214 or permission of instructor. Next offered 2007–2008. L. Cathles, D. Hysell, J. Phipps Morgan, M. Pritchard, and M. Wysocki.]

**EAS 575(5750) Planetary Atmospheres (also ASTRO 575[6575])**

Fall. 4 credits. Prerequisites: undergraduate physics, vector calculus. Offered alternate years. P. Gierasch.

Introduction to radiative transfer in emitting and scattering atmospheres. Radiative energy balance and radiative equilibrium. Structures of the atmospheres in the solar system. Introduction to motions in atmospheres. Planetary examples of balanced flows. Mesoscale waves, wave absorption and wave accelerations. Planetary waves. The influence of wave accelerations on thermal structure and composition. Introduction to atmospheric chemistry. Dynamical transports. Observations. At the level of Andrews, *Atmospheric Physics*.

**EAS 577(5770) Planetary Surface Processes (also ASTRO 577[6577])**

Spring. 3 or 4 credits. J. Bell.

Survey of processes involved in the formation and evolution of the surfaces of solar system bodies. Surface morphology and landforms of terrestrial planets, planetary satellites, asteroids, and comets. Fundamentals of impact cratering, volcanism, tectonism, and erosion as applied to planetary surfaces, with significant emphasis on terrestrial field examples as analogs and study sites. Basic introduction to physical, geochemical, and "space" weathering of planetary surfaces. Basic introduction to field methods and remote sensing techniques and data sets (terrestrial, spacecraft). Students enrolled in the course can participate in an optional field trip over Spring Break to a "classic" planetary surface process analog field site (e.g., Meteor Crater, Amboy, White Sands, Hawaii, Grand Canyon, Death Valley) for 1 additional credit. Grading based on participation in discussions, critical literature reviews, and final project/presentation.

**EAS 578(5780) Planet Formation and Evolution (also ASTRO 578[6578])**

Fall. 4 credits. Prerequisites: familiarity with elementary physics and math or permission of instructor. Offered alternate years. J.-L. Margot and M. Pritchard.

For description, see ASTRO 578.

**EAS 622(6220) Advanced Structural Geology I**

Fall. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. R. W. Allmendinger and C. Andronikos.

Stress-strain theory and application: advanced techniques of structural analysis. Topics include finite and incremental strain measurement; microstructure, preferred orientation, and TEM analysis; and pressure solution and cleavage development; and experimental deformation. Applications to deformation of unconsolidated sediments, brittle and brittle-ductile deformation of supracrustal strata, and ductile deformation of high-grade metamorphic rocks. Kinematic

analysis of shear zones and folds in these regimes.

**[EAS 624(6240) Advanced Structural Geology II]**

Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years, next offered 2007–2008. R. W. Allmendinger.]

**[EAS 628(6280) Geology of Orogenic Belts]**

Spring. 3 credits. Prerequisite: permission of instructor. Next offered 2007–2008. S. M. Kay.]

**EAS 641(6410) Analysis of Biogeochemical Systems**

Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. L. A. Derry.

Covers dynamics of biogeochemical systems; kinetic treatment of biogeochemical cycles; box models, residence time, response time; analytical and numerical solutions of model systems; Eigen-analysis of linear systems; feedback and nonlinear cases, problems of uncertainties in natural systems; modeling software such as MATLAB; and applications to current research of participants or from recent literature.

**EAS 656(6560) Isotope Geochemistry**

Fall. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.

Nucleosynthetic processes and the isotopic abundance of the elements; geochronology and cosmochronology using radioactive decay schemes, including U-Pb, Rb-Sr, Sm-Nd, K-Ar, U-series isotopes, and cosmogenic isotopes such as  $^{14}\text{C}$  and  $^{36}\text{Cl}$ . Use of radiogenic and stable isotopes in petrology and their application to study of the evolution of the crust and mantle. Isotopic evidence regarding the formation of the Earth and the solar system. Stable isotopes and their use in geothermometry, ore petrogenesis, paleontology, and the global climate system.

**EAS 693(6930) Special Topics in Geological Sciences**

1–3 var. credits. Fall or spring. S–U grades optional. Staff.

Study of specialized advanced topics in the Earth Sciences through readings from the scientific literature, seminars, and discussions.

**EAS 700–799(7000–7990) Seminars and Special Work**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.

Advanced work on original investigations in earth and atmospheric sciences. Topics change from semester to semester. Contact appropriate professor for more information.

**EAS 722(7220) Advanced Topics in Structural Geology**

R. W. Allmendinger.

**EAS 731(7310) Advanced Topics in Remote Sensing and Geophysics**

M. Pritchard.

**EAS 733(7330) Advanced Topics in Geodynamics**

Spring. J. Phipps Morgan.

**EAS 750(7550) Remote Satellite Sensing in Biological Oceanography**

Summer. B. C. Monger.

**EAS 751(7510) Petrology and Geochemistry**

R. W. Kay.

**EAS 755(7550) Advanced Topics in Tectonics and Geochemistry**

J. Phipps Morgan.

**EAS 757(7570) Current Research in Petrology and Geochemistry**

S. Mahlborg Kay.

**EAS 762(7620) Advanced Topics in Paleobiology**

W. D. Allmon.

**EAS 771(7710) Advanced Topics in Sedimentology and Stratigraphy**

T. E. Jordan.

**EAS 773(7730) Paleobiology**

J. L. Cisne.

**EAS 775(7750) Advanced Topics in Oceanography**

C. H. Greene.

**EAS 780(7800) Earthquake Record Reading**

Fall. M. Barazangi.

**EAS 781(7810) Exploration Geophysics**

L. D. Brown.

**EAS 783(7830) Advanced Topics in Geophysics**

B. L. Isacks.

**EAS 793(7930) Andes-Himalaya Seminar**

S. Mahlborg Kay, R. W. Allmendinger, B. L. Isacks, and T. E. Jordan.

**EAS 795(7950) Low Temperature Geochemistry**

L. A. Derry.

**EAS 796(7960) Geochemistry of the Solid Earth**

W. M. White.

**EAS 797(7970) Fluid-Rock Interactions**

L. M. Cathles.

**EAS 799(7990) Soil, Water, and Geology Seminar**

Spring. L. M. Cathles and T. S. Steenhuis.

**EDUCATION**

R. S. Caffarella, chair (435 Kennedy Hall, 255-2207); G. J. Applebee, W. G. Camp, M. Constan, B. A. Crawford, B. Heath-Camp, M. M. Kroma, T. Park, S. J. Peters, S. C. Piliero, R. Ripple, V. N. Rockcastle, D. E. Schrader, J. W. Sipple, D. J. Trumbull, T. Tucker, S. A. Villenas, D. G. Way, A. L. Wilson

**EDUC 115(1150) Introductory College Mathematics**

Fall. 4 credits. Does not count toward graduation credit in College of Arts and Sciences. Lab TBA. S. Piliero.

Designed for students wishing to fulfill distribution requirements and/or prepare for study in calculus. Offers a multi-representational approach to topics in precalculus and calculus, stressing conceptual understanding, problem solving, and applications in a technology-enhanced environment. Considerable emphasis is placed on numerical, graphical, and symbolic representations of functions and



their transformations. Students use graphing calculators in a collaborative lab setting.

**[EDUC 151(1510) Engaging Diversity: Multicultural Issues in Education and Society (D)]**

Fall or spring. 3 credits. S-U grades optional. Lec. Staff.

Explores diversity issues that affect students e.g., example, race, culture, gender, and class in the context of modern American society. Through selected readings and course activities, students recognize the strengths of a diverse community and acquire the knowledge and skills necessary for living and working in it. The focus is on critical thinking about the differences in our society, and the strategies we need for cross-cultural interactions.

**EDUC 220(2200) Community Learning and Service Partnership (CLASP)**

Fall only. 2 credits. Prerequisite: permission of instructor. Students must commit to taking EDUC 221 the following spring. S-U grades optional. A. Wilson.

In this service-learning course, students partner with Cornell service staff to accomplish a variety of learning goals selected by the employees. Students are introduced to the field of adult basic education and the principles of the Community Learning and Service Partnership (CLASP). Seminars examine the issues of learning through service and reflection, adult teaching philosophy and practice, and empowerment through education. Students must commit to continuing their service by taking EDUC 221 the following spring semester.

**EDUC 221(2210) Community Learning and Service Partnership (CLASP)**

Spring only. 2 credits. Prerequisites: EDUC 220 and permission of instructor. S-U grades optional. A. Wilson.

Continues the field experience and curriculum begun in EDUC 220. Students work with Cornell service staff to accomplish a variety of learning goals selected by the employees. Students receive in-service training and support. Seminars examine the impact of gender, race, and social class on learning and educational opportunity.

**EDUC 240(2400) The Art of Teaching**

Fall and spring. 3 credits. B. Heath-Camp. Exploratory course designed for students of all backgrounds and interests who have a desire to learn more about teaching. Teaching takes place in a variety of contexts from the family to the workplace and this course endeavors to examine the elements of teaching that transcend the typical school-teaching environment. Designed to guide students in reflecting upon their experiences to help them better understand the decisions they make as teachers. Students have the opportunity to pursue their own interests through a teaching fieldwork assignment. Possible field experiences range from large group to tutorial situations, from preschool to adult education, from traditional school subject matters to recreational and occupational areas, and from school-based to nonformal situations. The course work and readings are designed to build on these experiences throughout the semester and provide concepts and skills to apply in the field.

**EDUC 271(2710) Social and Political Context of American Education (HA) (SBA) (D)**

Fall. 3 credits. Disc. J. W. Sipple.

Examines the goals, roles, inputs, and outcomes of schooling in American society and the policy environment in which schools operate. Analyzes controversies and tensions (e.g., equity, market forces, state control) surrounding public education at local, state, and federal levels. Includes current and historical, urban and rural issues and problems.

**EDUC 271.1(2710.1) Social and Political Context of American Education Optional Section.**

Fall. 1 credit. Optional sec for 1 credit. Must be taken with EDUC 271 Social and Political Context of American Education. J. Sipple.

**EDUC 331(3310) Careers in Agriculture, Extension, and Adult Education**

Fall. 3 credits. Letter grades only. G. J. Applebee.

Designed to examine program development, methodologies, leadership, evaluation, and implementation in three areas of teaching: adult education, cooperative extension, and agricultural education. The course provides an historical perspective and an introduction to the organization and scope of programs. Students examine career opportunities and characteristics of the professions addressed. Course activities include a class project, field observations, and experiences during arranged times.

**EDUC 335(3350) Youth Organizations (CA)**

Fall. 3 credits. T. Park.

Visionary, creative, and competent leaders are essential for youth organizations. Class participants learn how to facilitate both youth and adult volunteer leadership development. They examine factors affecting membership, purposes, design, operation, and administration of youth organizations. The course provides students with in-depth learning-by-doing experience of how youth organizations function. Requires field experience with a recognized youth organization.

**EDUC 380(3800) Independent Honors Research in Social Science**

Fall or spring. 1-6 credits; max. 6 credits may be earned in honors program. Prerequisite: requirements for honors program met. S-U grades optional. Staff.

**EDUC 401(4010) Our Physical Environment**

Fall. 3 credits. Prerequisite: permission of instructor. Lab fee: approx. \$10. V. N. Rockcastle.

Practical, relatively nonmathematical study of some basic relationships and physical interactions in the environment, with emphasis on physics and earth science. Pays attention to analysis for understanding and techniques for teaching. Includes an individual research project. Useful for teachers, environmental educators, and those for whom physical science seems difficult or uninviting.

**EDUC 404(4040) Learning and Teaching I**

Fall. 4 credits. Prerequisite: admission to Cornell Teacher Education program or permission of instructor. Letter grades. D. Trumbull.

Designed to foster development of pedagogical and reflective understanding crucial to good teaching. Students explore what it means to understand and teach through examining key disciplinary topics,

which requires rethinking disciplinary knowledge, assessment of learning, and motivation. Required fieldwork (4 hours weekly) focuses on learners' understandings and classroom structures.

**EDUC 405(4050) Learning and Teaching II**

Spring. 4 credits. Prerequisite: EDUC 404 or permission of instructor. Letter grades. W. Camp, B. A. Crawford, and S. Piliero.

Important part of a sequence of courses and experiences intended to lead to excellence in science, agricultural science, and mathematics teaching. Prospective teachers develop understanding and skills in effective planning, instruction, and assessment of students studying agricultural science, mathematics, and science in middle and high school. The course is intended to integrate theory and practice associated with learning and teaching in school classroom settings and includes a minimum of 40 hours of fieldwork in area classrooms.

**EDUC 411(4110) Educational Psychology (KCM) (CA) (D)**

Fall. 3 credits. Prerequisite: PSYCH 101 or permission of instructor. S-U grades optional. D. E. Schrader.

Educational psychology is the application of psychological concepts to educational settings. This course examines the dynamic interaction between people as teachers and learners, schools as social and learning environments, and the sociocultural contexts that influence learning. The focus is on those interactions in cognitive, epistemic, social, moral, and personal domains in educational contexts.

**EDUC 411.1(4110.1) Educational Psychology Optional Section**

Fall. 1 credit. Limited to 16 students. Optional sec for 1 credit. Must be taken with EDUC 411 Educational Psychology. D. Schrader.

**EDUC 420(4200) Field Experience**

Fall or spring. 1-4 credits. Undergraduates must attach to their course enrollment material written permission from faculty member who will supervise work and assign grade. S-U grades optional. Staff. Students may engage in planned, semiprofessional, or professional practice in an educational enterprise. Each student prepares a plan of action including rationale, purposes, and procedures and arranges with a faculty member to supervise and evaluate their field experience.

**EDUC 441(4410) Language, Literacy, and Schooling**

Spring. 3 or 4 credits. Lab TBA. Staff. Foundation for literacy activities in secondary education. Examines current research, policy, and practice relating to the acquisition of first and second languages, the dynamics of literacy in school contexts, and the development of academic language proficiency. The fourth credit hour requires a practical project based on fieldwork.

**[EDUC 448(4480) Instruction for Students with Disabilities (D)]**

Summer. 3 credits. Prerequisite: educational psychology or introductory psychology course, or permission of instructor. S-U grades optional. Lec TBA. three hours weekly. Staff.

Provides preservice middle and secondary school teachers a comprehensive overview of disability law, functional limitations caused by disabling conditions, and classroom strategies

to provide academic accommodations/adjustments to meet the needs of students with disabilities. Focuses on specific classroom and curriculum strategies for adapting instruction to meet the needs of students with disabilities.]

**EDUC 450(4500) Education Technology**

Fall. 3 credits. Letter grades. Staff.  
Gives future educators the skills necessary to use current technology in educational settings. Focuses on examining how applying technology in the classroom can be used to enhance students' understanding of course content. Course participants compile an electronic portfolio demonstrating skills developed throughout the semester. A quarter of the class time is lecture and discussion focused on the current use of technology in the classroom. The remainder of the time is spent in lab completing hands-on projects.]

**EDUC 451(4510) Multicultural Issues in Education (also AM ST/LSP 451) (D)**

Fall. 3 credits. Letter grades. S. Villenas.  
Explores issues pertaining to teaching and learning in multicultural classrooms in American schools. Examines events that have shaped contemporary American society, the educational policies and practices that affect the cultural diversity that has emerged, and the teacher's role in dealing with cross-cultural issues in the classroom.

**EDUC 452(4520) Multicultural Issues in Secondary Education (D)**

Fall. 1 credit. Prerequisites: EDUC 451 and permission of instructor. Letter grades. Staff.

Students spend two out-of-class hours a week in a classroom setting in the Ithaca school community and write a project on culturally responsive teaching based on their experience.

**EDUC 459(4590) Educational innovations in Africa and the Diaspora (also AS&RC 459(4601)) (D)**

Fall. 3 credits; 4 in College of Arts and Sciences. N. Assié-Lumumba.  
Deals with educational innovations geared to promoting equal opportunity based on gender, race and class, in Africa and the African Diaspora. After introducing the concepts and theories of education and innovations and the stages of innovation as planned change, the course focus on concrete cases and different types of educational innovations. Selected case studies, in the United States, include the creation and expansion of historically black institutions with a focus on Tuskegee Institute (now Tuskegee University), Lincoln University, Spelman College, and the Westside Preparatory School in Chicago. The African cases studied include African languages for instruction in Nigeria, science education also in Nigeria, Ujamaa and education for self-reliance in Tanzania, classroom action research in Lesotho, Information Communication Technologies (ICTs) in African higher education with a focus on African Virtual Universities (AVU), the application of the Global Development Learning Network (GDLN) in Côte d'Ivoire, and OnLine learning in South Africa.

**EDUC 463(4630) Policies, Practices, and Critical Issues of Distance Learning in Developing Countries**

Spring. 3 credits. S-U grades optional. N. Assié-Lumumba.

Distance learning is increasingly being adopted to respond to the high demand for education in developing countries. This course critically analyzes distance education for the general population as well as specific social and professional categories. A typology of the ICTs (information and communication technologies) used and the different forms of virtual learning institutions are examined. Case studies include single-mode and dual-mode institutions in Africa, Asia, and Latin American countries and also eLearning programs designed in industrial countries for developing countries.

**EDUC 471(4710) The Roots of Modern American Schooling: 1890-1960**

Summer. 3 credits. Letter grades. J. Sipple and S. Campbell.

Critically analyzes several competing intellectual currents in the socio-historical formation of the US public education system from 1890 through 1960. Students will use elements of sociological theory as lenses to understand and consider a key period of history in the formation of American public education. They will gain a deeper, and more critical, understanding of their own education experiences and how their experiences fit into the broader social tapestry of US public education.

**EDUC 494(4940) Special Topics in Education**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and will be advertised by the department before the semester starts. Courses offered under this number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**EDUC 497(4970) Individual Study in Education**

Fall or spring. 1-3 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). Staff.

A student may, with approval of a faculty advisor, study a problem or topic not covered in a regular course or may undertake tutorial study of an independent nature in an area of educational interest.

**EDUC 498(4980) Undergraduate Teaching**

Fall or spring. 1 or 2 credits; 4 credits max. during undergraduate career. Prerequisite: GPA of at least 2.7. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Participating students assist in teaching a course allied with their education and experience. Students are expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

**EDUC 499(4990) Undergraduate Research**

Fall or spring. 6 credits max. during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Prerequisite: junior or senior standing; GPA at least 2.7. Students must register using

independent study form (available in 140 Roberts Hall). Staff.

Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

**EDUC 502(5020) Education and Development in Africa (also AS&RC 502(5020))**

Spring. 3 credits; 4 in College of Arts and Sciences. S-U grades optional. N. Assié-Lumumba.

Examines the relationship between education and individual and national development. Besides human capital theory, different paradigms of development, including modernization and dependency theories, and Third World Forum, are examined. Issues discussed include schooling and nonformal education; the role of primary, secondary, and higher education in development; and the issues related to employment, national migration and international brain drain, language, equity in access, output, and outcome based on social class, ethnicity, race, gender, and nationality. Finally, the information and communication technologies (ICTs), indigenous knowledge systems, and the role of higher education in the national, regional, and international contexts and cooperation are discussed.

**EDUC 503(5030) Diversity in the Classroom (D)**

Fall, spring, or summer. 1 credit for each seminar. Prerequisite: admission to CTE program. S-U grades optional. Disc TBA. S. Villenas.

Builds on knowledge of literacy and diversity gained from course work and field activities in the CTE program. Students review literacy development, cultural diversity, learning style preferences, fieldwork experiences, and strategies for accommodating difference in teaching.

**EDUC 532(5320) Educational Programs in Agricultural Science**

Fall. 3 credits. W. Camp.  
Overview of the organization and planning processes necessary to operate a successful agricultural science education program in the public schools. Topics include local needs assessments, agricultural advisory boards, community-partnering strategies, program planning, course development, sequencing instruction, professional development. Fieldwork provides experience with New York agricultural education students, teachers, and programs.

**EDUC 535(5350) Youth Organizations for Agricultural Science Education**

Spring. 3 credits. Prerequisite: senior or graduate standing in Agricultural Science Education. Letter grades only. T. Park.  
Provides future agriculture educators a comprehensive overview of the components of an agriculture education program including supervised agricultural experience (SAE) and FFA. Students examine factors affecting membership, purpose, design, operation, and administration of career and technical student organizations and FFA organization, structure, and functions on national, state, and local levels.

**EDUC 544 (5440) Curriculum and Instruction**

Spring. 3 credits. S-U or letter grades.  
B. Heath-Camp.

The focus of this curriculum and instructional planning course will be on the concepts and principles for developing curriculum and the processes for delivering curriculum. Experiences will be designed to assist in identifying the educational needs of clients/students, selecting curriculum content, designing curricula, and delivering the curriculum.

**EDUC 548(5480) Effective College Teaching**

Spring. 1-3 credits. S-U grades optional.  
D. Way.

Designed to help participants become more effective college teachers. Examines the basic principle of learning, identifies different learning styles, and explores a variety of teaching techniques, methods, and technologies. Participants also learn how to design a course and improve their effectiveness as teachers.

**EDUC 571(5710) Social and Political Context of American Education (HA) (SBA) (D)**

Fall. 3 credits. Prerequisites: admission to Cornell Teacher Education Program or permission of instructor. J. W. Sipple.

Examines the goals, roles, inputs, and outcomes of schooling in American society, and the policy environment in which schools operate. Analyzes controversies and tensions (e.g., equity, market forces, state control) surrounding public education at local, state, and federal levels. Includes current and historical, urban and rural issues and problems.

**EDUC 571.1(5710.0) Social and Political Context of American Education Required Discussion Section**

Fall. 1 credit. Required sec for 1 credit. Must be taken with EDUC 571 Social and Political Context of American Education. J. Sipple.

**EDUC 578(5780) International Teaching Assistant Development Program (ITADP) Training Course: Cross-Cultural Classroom Dynamics, Pronunciation, and Language, Video Teaching Practicum**

Fall and spring. 2 credits. S-U grades only. TBA. ITADP staff.

Designed for first-time international teaching assistants from countries in which English is not the first language. Focuses on three areas: cross-cultural classroom dynamics, video teaching practicum, and language—enhancing communicative competence in English. Through small-group seminars and individual conferences, the ITADP helps international teaching assistants develop their linguistic and pedagogical skills as they gain sensitivity to the dynamics of U.S. classrooms.

**EDUC 579(5790) Further Training for International Teaching Assistants**

Fall, spring, summer. 2 credits. Prerequisite: EDUC 578. S-U grades optional. Lec, three contact hours per week. ITADP staff.

Designed for international teaching assistants from countries in which English is not the first language and who have completed EDUC 578, the ITADP follow-up course provides further instruction and practice in oral English and pedagogical skills.

**EDUC 601(6010) Secondary Agriculture, Science, and Mathematics Teaching Practicum**

Fall or spring. 6 credits. Prerequisite: graduate students enrolled in Cornell Teacher Education Program; permission of instructor. S-U grades only. S. C. Piliero, D. J. Trumbull, B. A. Crawford, W. Camp, and T. Park.

Supervised student teaching in agriculture, mathematics or science at the secondary level. Program includes teaching in a local school for 14 weeks.

**EDUC 602(6020) Practicum Seminar**

Fall or spring. 9 credits. Corequisite: EDUC 601 or permission of instructor. W. Camp, B. A. Crawford, D. J. Trumbull, S. C. Piliero, and T. Park.

Begins with full-day sessions of intensive consideration of theoretical frameworks relevant to all aspects of student teaching. Assignments and an online seminar during the semester require students to use those theories to develop and evaluate teaching materials and practices. Students complete an extensive portfolio documenting their work.

**EDUC 614(6140) Gender, Context, and Epistemological Development (also FGSS 624[6240]) (D)**

Fall. 3 credits. S-U grades optional.  
D. E. Schrader.

Insight into how individuals make sense of knowledge is essential to teaching and learning. This course examines theories of personal epistemology and their implications for educating students across the life span. Places particular emphasis on the role of gender and contextual influences on the development of thought and on metacognitive development.

**EDUC 616(6160) Moral Psychology and Education**

Fall. 3 credits. Prerequisites: EDUC 411, graduate standing or permission of instructor. S-U or letter grades. Offered alternate years beginning 2007-2008.  
D. Schrader.

Seminar exploring moral psychology from cognitive developmental, social contextual, normative, and feminist perspectives. Topics vary by semester, yet all semesters discuss theoretical and empirical studies of the development of moral reasoning, gender differences, cultural context, the relationship between moral judgment and moral action, the development of the self in relation to others and to society, and moral education. Emphasis is on development in adolescence through adulthood.

**EDUC 617(6170) Psychology of Adolescence in Case Study**

Spring. 3 credits. Prerequisite: any one of the following: EDUC 411, HD 617, or permission of instructor. S-U or letter grades. D. Schrader.

This course addresses the physical, cognitive, emotional, self, social, and moral changes in adolescence, and how interactions in family, peer group, and societal contexts affect development. A case study methodological approach is used extensively. Students engage in empirical research outside of class time, using methods learned in class.

**EDUC 620(6200) Internship In Education**

Fall or spring. 1-6 credits. S-U grades optional. Each student, before course enrollment, must obtain approval of faculty member who will assume responsibility for supervising work. Staff.

Opportunity for practical experience in educational professions development.

**[EDUC 621(6210) Work-Experience Coordinator Certification Course I]**

Summer. 3 credits. Prerequisite: EDUC 622. S-U grades optional. Staff.

First of a two-course sequence designed to develop the competencies needed for certification as a coordinator of diversified cooperative work experience programs. Focuses on the history and philosophy, types, operation, and evaluation of work-experience programs including articulation with JPTA and VESID. Requires field interviews.]

**[EDUC 622(6220) Work-Experience Coordinator Certification Course II]**

Summer. 3 credits. Prerequisite: EDUC 621. Staff.

Second course for certification as a diversified cooperative work experience coordinator combines course work and directed field experience leading to the planning, development, and approval of a work-experience program in a local educational agency. Development of a philosophy and policy statement, budget, curriculum for related instruction, annual work plan by function, promotional materials, and all program forms for Board of Education approval required.]

**EDUC 630[6300] Special Problems in Agricultural, Extension, and Adult Education**

Fall or spring; may also be offered in summer. 1-3 credits. S-U grades optional. Staff.

Provides an opportunity for graduate-level study of individually selected problems and issues in agricultural, extension, and adult education.

**[EDUC 632[6320] Teaching Agricultural, Extension, and Adult Education]**

Summer. 3 credits. Prerequisite: introductory teaching methods course or permission of instructor. Staff.

Focuses on the selection, use, and evaluation of methods and materials for teaching. Covers methods for group and informal instruction. Provides an opportunity for students to develop teaching competence based on their individual needs and interests. Develops self-evaluation skills. Class project on the development of instructional materials required.]

**[EDUC 633[6330] Program Planning in Adult and Extension Education]**

Spring. 3 credits. S-U grades optional. Offered alternate years. A. Wilson.

Examines current social and economic conditions affecting agricultural, extension, and adult education. Applies principles, objectives, strategies, and sources of information to program planning. Participants have an opportunity to observe ongoing programs in agricultural, extension, and adult education and to pursue individual interests in program development and improvement.]

**[EDUC 635(6350) Experiential Learning]**

Fall. 2 credits. Prerequisite: for undergraduates, permission of instructor. S-U grades optional. Staff.

Participants explore various dimensions of scholar and practitioner thinking about the understanding and practice of experiential learning. Theoretical perspectives on experiential education, reflective practice, and a critical learning systems perspective are explored through readings and applied assignments. The instructor introduces methods of facilitation designed to encourage inquiry and dialogue for improvement of both nonformal and formal educational activities. The course process is intended to engage participants in reflective dialogue—nurturing emergence of learning community elements.]

**[EDUC 645(6450) Curriculum for a Diverse and Technological Society**

Spring. 3 credits. Letter grades only. Disc TBA. Staff.

Examines basic curriculum concepts, principles, and theories. Gives special emphasis to the ways diversity and technology drive changes in the development of curriculum. Each student chooses a particular curriculum for analysis as a project. Within that context, theoretical perspectives on curriculum and the basic elements of any curriculum are discussed.]

**EDUC 661(6610) Administration Leadership and Organizational Change**

Fall. 3 credits. J. W. Sipple.

Perspectives on the administration of educational organizations. Considers social science, legal and ethical theories, and their application to both public schools and higher education. Intended for students who are considering careers as educational administrators, as well as for those who want to further their understanding of educational organizations.

**EDUC 662(6620) Evaluation Design**

Spring. 3 credits. Prerequisite: survey of research methods (or other graduate level class in research methods), statistics. S-U grades only. M. A. Conatas.

This course is designed to introduce graduate students to the principles and practices of program evaluation. It addresses practical realities and political features of a range of evaluation designs that may be used to support decision making related to educational, social, and community-based programs. Students who enroll in the class will become familiar with the technical characteristics, practical realities, and political features of a range of evaluation designs that may be used to support decision making related to educational, social, and community-based programs. Course readings, class discussions, and assignments will support the development of the proposal.

**EDUC 664(6640) Methods for Interpretive Research**

Spring. 3 credits. Prerequisites: course in research methods/research design. S-U or letter grades. D. J. Trumbull.

Course addresses the assumptions undergirding interpretive research and explores five methodological approaches. These approaches attend to the complex interactions between the researcher, the researched, and the context. Students carry out an actual study for the course, allowing them to experience doing actual research.

**EDUC 671(6710) American School Reform: Organizational and Sociological Perspectives**

Spring. 3 credits. S-U grades optional. J. W. Sipple.

For individuals interested in the role of schools in society and in organizational behavior and public policy. This seminar investigates the sociological functions of schooling, including the stability of school organization given the long history of policy initiatives designed to reform schools. The focus is American K-12 public education, though issues of pre-K, private, and post-secondary education are covered.

**[EDUC 680(6800) Foundations of Adult and Extension Education**

Fall. 3 credits. Limited to 20 students. S-U grades optional. Offered alternate years. A. Wilson.

Analysis of alternative purposes, nature, and scope of extension, adult, and continuing education programs in the United States and abroad, with emphasis on the relationship of programs to historical, cultural, political, and social settings. Examines definitions, conceptual controversies, philosophical issues, and current research directions through a seminar approach.]

**EDUC 682(6820) Community Education and Development**

Fall. 3 credits. Limited to 25 students. Letter grades only. S. Peters.

Critical study of the democratic purposes and practices of educators in community and economic development, with a special focus on the role of education in community organizing. Key philosophies and traditions of community education and development are analyzed in their historical, cultural, social, and political context, with an eye toward implications for contemporary practice.

**EDUC 683(6830) Adult Education and Globalization: Comparative Perspectives**

Spring. 3 credits. S-U grades optional. M. Kroma.

Examines the interconnections between particular economic and political systems as key to understanding the relationships of adult education to society. Employing a critical framework, the course explores emerging local, regional and national responses in adult education that are planting seeds of change and creativity in ways that are nurturing new forms of educational life in the context of globalization. Particular attention is paid to nodes of social analyses that explore the relationship between adult education and social structural factors, including gender, race and class, to inform a sense of place and social location.

**EDUC 685(6850) Training and Development: Theory and Practice (also IARD 685(6850))**

Spring. 4 credits. S-U grades optional. M. Kroma.

Prepares professionals to design, administer and facilitate training programs responsive to the challenges of sustainability in our world system. Focuses on the theory and practice of training for the development of human resources in small farm agriculture, rural health and nutrition and literacy. Through in-depth discursive critiques of selected readings, students develop insights into the range of methods and strategies employed in situation analysis, the analysis of socioeconomic,

sociocultural, and sociopolitical contexts of training programs; facilitation of participatory training programs for the development of human resources in small holder agriculture, rural health and nutrition, and community building. The specific role of training/education in larger change-promoting systems is also explored. The course is appropriate for persons likely to be playing professional roles as educator-trainers, scientists, administrators, and social organizers in rural and agricultural development programs in international as well as domestic contexts.

**EDUC 694(6940) Special Topics in Education**

Fall, spring, or summer. 1-3 credits. Prerequisite: permission of instructor. S-U grades optional. Staff.

Topics TBA.

**EDUC 700(7000) Directed Readings**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For study that predominantly involves library research and independent study.

**EDUC 701(7010) Empirical Research**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For study that primarily involves collection and analysis of research data.

**EDUC 702(7020) Practicum**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For study that predominantly involves field experience in community settings.

**EDUC 703(7030) Teaching Assistantship**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For students assisting faculty with instruction. Does not apply to work for which students receive financial compensation.

**EDUC 704(7040) Research Assistantship**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For students assisting faculty with research. Does not apply to work for which students receive financial compensation.

**EDUC 705(7050) Extension Assistantship**

Fall or spring. 6 credits, variable. Prerequisite: graduate standing; permission of instructor. S-U grades optional. Staff.

For students assisting faculty with extension activities. Does not apply to work for which students receive financial compensation.

**EDUC 718(7180) Adult Learning and Development**

Spring. 3 credits. R. Caffarella.

Seminar provides an opportunity for students to review and critique the seminal and current scholarly work in learning in adulthood. Emphasis is placed on three ways of framing adult learning: psychological, social, and cultural. Specific content areas, which vary by semester, are also explored (for example, transformational learning, experiential learning, intelligence and aging, non-western perspectives of learning, spiritual learning). Implications of this knowledge base relevant to the practice of educating adults in formal and non-formal settings, such as educational institutions, community based-setting, health



care, and the workplace, and through informal learning situations are also discussed.

**[EDUC 730(7300) Seminar in Agricultural, Extension, and Adult Education]**

Spring. 3 credits. S-U grades optional. S. Peters.

Emphasizes current problems and research in agricultural, extension, and adult education. Includes discussion and analysis of student and staff research.]

**EDUC 762(7620) Comparative and International Education**

Fall. 3 credits. S-U grades optional. N. Assie-Lumumba.

Seminar that critically analyzes education conceived both as a universal social institution and a reflection of cultural, economic, and political dynamics of the local and global contexts. The analysis focuses on policies, organization, and the functioning of education in industrial, new/emerging economies, and developing countries. Specific case studies are drawn from different countries.

**EDUC 783(7830) Farmer-Centered Research and Extension (also IARD 783(7830))**

Fall. 3 credits. S-U grades optional. M. Kroma.

Forum for discussion and critical analyses of participatory research and extension approaches in agriculture and natural resource management in the complex and diverse environments characteristic of many developing countries. Theoretical and philosophical arguments that underpin participatory research and extension, as well as current tools and techniques for facilitating participation and social learning are examined. Case studies and individual projects related to farmer-centered research and extension provide a focus for analyses. The course also explores and pays special attention to the challenges and opportunities related to institutionalization of participatory research and extension for sustainable agriculture and natural resource management.

**EDUC 800(8900) Master's-Level Thesis Research**

Fall or spring. Credit TBA. Each student, before course enrollment, must obtain approval of faculty member who will assume responsibility for guiding work. S-U grades optional. Times TBA. Staff.

**EDUC 900(9900) Doctoral-Level Thesis Research**

Fall or spring. Credit TBA. Each student, before course enrollment, must obtain approval of faculty member who will assume responsibility for guiding work. S-U grades optional. Times TBA. Staff.

Doctoral or other research and development projects for Ph.D. students.

## ENTOMOLOGY

J. P. Nyrop, chair (2130 Comstock Hall, 255-7723); A. M. Agnello, A. Agrawal, N. W. Calderone, B. N. Danforth, A. DiTommaso, T. Eisner, G. M. English-Loeb, P. P. Feeny, C. Gilbert, A. E. Hajek, L. C. Harrington, G. W. Hudler, B. P. Lazzaro, J. K. Liebherr, C. Linn, J. E. Losey, M. Luckow, D. Pimentel, L. S. Rayor, J. P. Sanderson, J. G. Scott, E. J. Shields, J. S. Thaler, W. M. Tingey, P. A. Weston

## Courses by Subject

Apiculture: 260, 264  
Behavior: 215, 315, 325, 394, 471, 662  
Conservation: 344  
Ecology: 369, 452, 455, 470, 672  
Introductory courses: 201, 210, 212, 215, 241  
Medical and veterinary entomology: 210, 352, 652  
Morphology: 322  
Outreach: 335, 336  
Pathology: 463, 670  
Pest management: 241, 277, 420, 441, 443, 444, 477, 644, 670  
Physiology, development, and toxicology: 370, 394, 400, 483, 490, 685  
Systematics: 331, 333, 440, 453, 634, 635

**Note:** Class meeting times are accurate at the time of publication. If changes occur, the department will provide new information as soon as possible. Check the web site for updates.

**ENTOM 201(2010) Alien Empire: Bizarre Biology of Bugs**

Spring. 2 or 3 credits. Limited to 200 students. S-U grades optional. Optional field trips, required lab demonstrations. Staff.

Insects are the most abundant and diverse animals on earth. This course explores the bizarre biology of insects by examining their evolutionary history, anatomy, development, feeding habits, life-history strategies, behavior, and their interactions with humans (both positive and negative) through history. Optional field trips and one open lab provide hands-on opportunities for examining these amazing animals. The 3 credit option will involve an additional (1 hour) discussion section per week plus additional weekly readings.

**[ENTOM 210(2100) Plagues and People]**

Fall. 2 or 3 credits. Prerequisites: introductory biology or permission of instructor. Offered alternate years; next offered 2007-2008. L. C. Harrington.

Human diseases transmitted by insects and related forms (arthropods) have affected human lives and society through history. This course focuses on the pathogens, parasites, and arthropods causing human plagues. Those plagues that have had the greatest impact on human culture and expression are emphasized. Lectures are supplemented with readings and films. Also addresses emerging diseases, bioterrorism, and future plagues. Students taking the course for 3 credits participate in readings, presentations/discussions each week (on Fridays), weekly readings quizzes, and have a comprehensive final project.]

**ENTOM 212(2120) Insect Biology**

Fall. 4 credits. Pre- or corequisites: BIO G 101-102 or equivalent. Lec, lab. Lab fee: \$40. C. Gilbert.

Introduces the science of entomology by focusing on basic principles of systematics, morphology, physiology, behavior, and ecology of insects. The laboratory in early fall includes field trips to collect and study insects in the natural environment. Requires a collection emphasizing ecological, behavioral, and taxonomic categories.

**ENTOM 215(2150) Spider Biology: Life on a Silken Thread**

Fall. 2 credits. Prerequisite: introductory biology or permission of instructor. S-U grades optional. Lec. L. S. Rayor.

Introduction to the fascinating world of spiders. Explores evolution, ecology, behavior, and physiology of spiders and their close kin from a modern perspective. Topics include identification of major spider families, spiders' unique use of silk, risky courtship, predatory behavior, diverse life styles, social spiders, and potential use in IPM.

**ENTOM 241(2410) Insect Pest Management for Practitioners**

Spring. 3 credits. Limited to 18 students. Prerequisites: BIO G 101-102 or equivalent. Lec, lab/disc. W. M. Tingey.

Introduction to insect pest management in plant or animal protection for those preparing for careers in extension, service, and production. Emphasizes pest monitoring, sight identification, diagnosis, decision-making, and management tactics for the major groups of insect and arthropod pests affecting field, forage, and vegetable crops: floriculture, woody ornamentals, and turf; urban environments and public health; veterinary, dairy, livestock, and poultry. Five off-campus laboratory field trips with demonstrations of pest management decision-making, pest-monitoring tools, and pesticide-application equipment.

**ENTOM 260(2600) Biology of the Honey Bee**

Fall. 2 credits. Lec. Offered alternate years; not offered 2007-2008. N. W. Calderone.

Introduces students to the life history, physiology, and behavior of honey bees, as well as to the fundamentals of practical beekeeping. Reviews classical and contemporary research on the dance language, chemical communication, behavioral genetics, division of labor, and evolution of social behavior. Also includes lectures on pollination of agricultural crops, honey and beeswax, bees in ancient and modern rituals, Africanized honey bees, and insect politics.

**ENTOM 264(2640) Practical Beekeeping**

Fall. 1 credit. Limited to 20 students. Pre- or corequisite: ENTOM 260. Lab. Offered alternate years; not offered 2007-2008. N. W. Calderone.

Consists of 14 laboratory sessions that acquaint students with practical methods of colony management. Laboratories involve hands-on work with honey bee colonies and equipment. Topics include management of bees for apple pollination, honey harvesting and processing, and disease identification/control. The class makes a number of field trips to commercial beekeeping operations. Students conduct simple experiments to demonstrate color perception by bees, as well as the chemical basis for swarming, nest guarding, and mating.

**ENTOM 277(2770) Natural Enemies and Invasive Species**

Spring. 2-3 credits. S-U grades optional. Lec., lab, demonstration; optional field trip. Optional disc session offered for 1 credit. A. E. Hajek and J. P. Nyrop.

The purpose of this course is for students to learn about biological control and the looming problems caused by invasive species. These topics are obviously grounded in biology; however, they have social, economic, and philosophical links. Many projects on biological control and invasive species are conducted on the Cornell campus; examples of research will be provided, including talks by guest lecturers. Subjects covered will include basic concepts of biological control



and biological invasion. These subjects fit well together because one of the first lines of defense against invasive species is use of biological control agents. Invasive species impact agriculture but also increasingly affect and can permanently change natural systems. Natural enemies used for biological control that will be discussed include predators, parasitoids, pathogens, herbivores and antagonists to control vertebrate, invertebrate, and microbial pests and weeds.

#### **ENTOM 315(3150) Spider Biology**

Fall. 3 credits. Prerequisite: introductory biology or permission of instructor. Letter grades only. Lec. L. S. Rayor.

In-depth introduction to the fascinating world of spiders and their relatives. Meets concurrently with ENTOM 215 (2 credits). Students in ENTOM 315 meet for another hour with additional coverage of current topics in arachnology and developing spider identification skills. Entomology majors and biology majors in the Insect Biology Program of Study should take ENTOM 315 rather than 215. Students may not take both ENTOM 215 and 315 for credit.

#### **ENTOM 322(3220) Comparative Insect Morphology**

Spring. 4 credits. Prerequisite: ENTOM 212 or 241. Lec, lab. Offered alternate years; not offered 2007–2008. B. N. Danforth.

Provides a detailed introduction to the external and internal anatomy of insects. Lectures introduce basic concepts in insect morphology, such as the organization of the insect body plan and organ systems, functional morphology, homology, phylogeny, modularity, and development. The lab introduces students to the basic methods of insect microdissection, specimen preparation, and scientific illustration. High-quality, publishable illustrations are produced based on student artwork.

#### **ENTOM 325(3250) Insect Behavior**

Spring. 3 credits. Prerequisite: introductory biology and either ENTOM 212 or BIONB 221. Lec. Offered alternate years; not offered 2007–2008. L. S. Rayor.

Insects are the most diverse organisms on earth, with equally diverse behavior. This course explores the behavior of insects, ranging from the individual sensory and physiological mechanisms that are the basis of insect behavior, to the behavioral dynamics of foraging, courtship, parental care, and social behavior. Topics include insect learning, perceptual abilities, host finding strategies, predation, pollination, and examination of current issues in insect behavior.

#### **[ENTOM 331(3310) Introductory Insect Systematics**

Spring. 4 credits. Prerequisite: ENTOM 212. Lab fee: \$50. Offered alternate years; not offered 2006–2007; next offered 2007–2008. Staff.

Introduction to the classification, evolutionary history, and distribution of insects. Includes lab practice in the identification of orders, families, and representative genera of insects; methods of collection, preservation, and study. Lectures cover theory and practice of insect systematics and major features of insect evolution. Insect collections required.]

#### **[ENTOM 333(3330) Maggots, Grubs, and Cutworms: Larval Insect Biology**

Spring. 3 credits. Prerequisites: ENTOM 212 or permission of instructor. S-U grades optional. Offered alternate years; next offered 2007–2008. J. K. Liebherr.

The evolutionary history of the Holometabola has been greatly informed by attributes of their larvae. This course introduces students to the biology, anatomy, and natural history of holometabolous insect larvae. The lab includes field sampling, curation of field-collected specimens, and identification of unknowns. Development of a small larval collection required.]

#### **ENTOM 335(3350) Naturalist Outreach Practicum**

Fall. 3 credits. Prerequisite: introductory biology. S-U or letter grades. L. S. Rayor.

Learn the skills to do effective scientific outreach. This interdisciplinary course combines lectures on topics relevant to teaching about natural history, with more pedagogic lectures on developing and presenting scientific inquiry-based presentations. The course emphasizes developing different approaches to effectively communicate science at different scales from classroom settings, through museum programs, to large outreach events. Students participate in the Naturalist Speakers Bureau to provide lively multimedia presentations in classrooms throughout the region. With feedback from peers and instructors, students develop their own biological presentations, display materials, and teacher resource guides.

#### **ENTOM 336(3360) Naturalist Outreach in Biology**

Fall. 1–2 credits, variable. Prerequisite: ENTOM 335. S-U or letter grades. L. S. Rayor.

Students enrolled in the Naturalist Outreach Practicum will serve as members of the Naturalist Speakers Bureau to provide lively multimedia presentations on the ecology and behavior of organisms to second through H.S. classrooms throughout the region. With feedback from peers and instructors, students develop their own science-based presentation, display materials, and teacher resource guides. For students who have already taken Naturalist Outreach Practicum (ENTOM 335) who wish to continue doing scientific outreach. This course can be taken twice.

#### **[ENTOM 344(3440) Insect Conservation Biology**

Spring. 3 credits. Prerequisite: entomology or conservation biology course or permission of instructor. S-U grades optional. Lec. Offered alternate years; next offered 2007–2008. J. E. Losey.

In-depth look at the concepts and issues surrounding the conservation of insects and other invertebrates. Topics include sampling rare populations; insect conservation genetics; the role of phylogeny in determining conservation priorities; refuge design; saving individual species; plus the unique political, social, and ethical aspects of insect conservation and preservation of their ecological services (i.e., pollination, decomposition, pest suppression, and insectivore food sources).]

#### **ENTOM 352(3520) Medical and Veterinary Entomology**

Fall. 3 credits. Prerequisites: BIO G 101–102 or permission of instructor. S-U grades optional. Offered alternate years; not offered 2007–2008; next offered 2008–2009. L. C. Harrington.

Diseases resulting from arthropod-borne pathogens (such as malaria, West Nile virus, dengue, and yellow fever) cause considerable human and animal suffering and death worldwide. This course explores the impact of vector-borne disease and provides a comprehensive overview of the fields of medical and veterinary entomology. The goal is to encourage an understanding of evolutionary and ecological issues associated with disease transmission. Undergraduate and graduate students from entomology as well as other disciplines including pre-medical and veterinary students are encouraged to enroll.

#### **ENTOM 353(3530) Lab in Medical and Veterinary Entomology**

Fall. 1 credit. Prerequisites: ENTOM 352 at the same time or have taken another Medical/Veterinary Entomology course. S-U grades optional. L. C. Harrington.

The laboratory compliments the lecture course, ENTOM 352. Includes field trips, collection and identification and arthropods of medical/veterinary importance, and hands-on experience with modern laboratory research methods.

#### **ENTOM 369(3690) Chemical Ecology (also BIOEE/BIONB 369[3690])**

Spring. 3 credits. Prerequisites: one semester of introductory biology for majors or nonmajors and one semester of introductory chemistry for majors or nonmajors or equivalents, or permission of instructor. S-U grades optional. Lec. A. Agrawal, G. Jander, A. Kessler, and J. Thaler.

For description, see BIOEE 369.

#### **ENTOM 370(3700) Pesticides, the Environment, and Human Health (also TOX 370[3700])**

Fall. 2 credits. Prerequisites: BIO G 101–102 or equivalent. Lec. Offered alternate years; not offered 2007–2008. J. G. Scott.

Survey of the different types of pesticides, their uses, properties, and effects on the environment. Discusses the risks, benefits, regulation, politics, and current controversies associated with pesticide use and genetically modified crops.

#### **ENTOM 394(3940) Circadian Rhythms (also BIOGD/BIONB/PL PA 394[3940])**

Fall. 2 credits. Prerequisite: 200-level biology course. S-U grades optional. Lec. K. Lee (even years) and J. Ewer (odd years).

Explores a fundamental feature of living organisms from all kingdoms: how the cellular 24-hour biological clock operates and influences biological activities. Covers fundamental properties of biological rhythms and cellular and molecular structure of circadian oscillators in many organisms, including cyanobacteria, fungi, insects, plants, reptiles, birds, and mammals (including humans).

**[ENTOM 400(4000) Insect Development (also BIOGD 402[4020])]**

Spring. 4 credits. Prerequisite: ENTOM 212 or BIOGD 281 or permission of instructor. S-U grades optional. Lec, lab. Offered alternate years; not offered 2006-2007. Staff.

Emphasizes the mechanisms that underlie embryonic and post-embryonic developmental processes of insects. The portion of the course on embryonic development leans heavily on knowledge obtained from *Drosophila* but also covers more classical studies as well as recent advances exploring the molecular basis for the evolution of body plan. The post-embryonic development portion covers the control of growth, molting, and metamorphosis. The lab uses modern techniques to illustrate developmental events at the organismal and cellular level. The discussion section involves the analysis and presentation of primary research papers.]

**[ENTOM 420(4200) Grape Pest Management (also PL PA 420[4200])]**

Fall. 3 credits. Prerequisites: PL PA 301, ENTOM 241, or permission of instructors. S-U or letter grades. Lec and lab. Not offered 2007-2008. W. Wilcox, G. English-Loeb, and A. Landers.

For description see, PL PA 420.

**[ENTOM 440(4400) Phylogenetic Systematics (also BIOPL 440[4400])]**

Spring. 4 credits. Prerequisites: intro biology or permission of instructor. Lec and lab. Not offered 2007-2008. K. Nixon. For description, see BIOPL 440.

**[ENTOM 443(4430) Entomology and Pathology of Trees and Shrubs (also PL PA 443[4430])]**

Fall. 4 credits. Prerequisites: ENTOM 212 or equivalent and PL PA 241 or equivalent. S-U grades optional. Offered alternate years; not offered 2007-2008. P. A. Weston and G. W. Hudler.

For students preparing for careers in horticulture, urban forestry, pest management, and natural history/science education. Deals with the nature, diagnosis, assessment, and management of insect and disease pests on trees and shrubs in forests, urban landscapes, Christmas tree plantations, and other sites where intensive pest management is practiced.

**[ENTOM 444(4440) Integrated Pest Management (also CSS 444[4440])]**

Fall. 4 credits. Prerequisite: introductory biology or permission of instructor. Lec. Next offered 2007-2008. J. E. Losey and A. DiTommaso.

Lectures integrate the principles of pest control, ecology, and economics in the management of pests across multiple systems. Labs consist of exercises to reinforce concepts presented in lecture and demonstrate pest monitoring techniques and the application of computer technology to management problems.]

**[ENTOM 453(4530) Principles and Practice of Historical Biogeography (also BIOPL 453[4530])]**

Fall. 3 credits. Prerequisite: systematics course or permission of instructor. S-U grades optional. Lec, lab. Offered alternate years, next offered 2007-2008. J. K. Liebherr and M. Luckow.

Survey of techniques in historical biogeography, and the development of modern biogeographic theory in the context of classical, ecological, and phylogenetic

analytical methods. Presents geological and paleontological aspects of biogeography and discusses large-scale biogeographic patterns. Labs focus on computer applications and discussion of controversial issues.]

**[ENTOM 455(4550) Insect Ecology (also BIOEE 455[4550])]**

Fall. 4 credits. Recommended: ENTOM 212 or BIOEE 261 or permission of instructor. S-U grades optional. Offered alternate years; not offered 2007-2008. J. S. Thaler.

Focuses on individual and population aspects of insect ecology as well as some topics in community and ecosystem ecology. Stresses the importance of interactions with the biotic and abiotic environment stressed. Laboratory includes indoor and outdoor field trips illustrating the major concepts in insect ecology as well as experimental techniques.

**[ENTOM 463(4630) Invertebrate Pathology]**

Spring. 4 credits. Prerequisites: one year introductory biology. S-U grades optional. Lec, lab. Offered alternate years; next offered 2007-2008. A. E. Hajek.

Lecture presents principles of pathology as applied to invertebrates. Topics include noninfectious and infectious diseases caused by viruses, bacteria, fungi, protozoa, and nematodes, epizootiology of insect diseases, and use of pathogens for control. Lab involves a diversity of pathogens and hosts using techniques such as microinjection, electrophoresis, immunoassay, density gradient centrifugation, soil extraction, and computer simulation.]

**[ENTOM 470(4700) Ecological Genetics]**

Spring. 3 credits. Prerequisites: BIOEE 278 or permission of instructor. S-U grades optional. Offered alternate years; not offered 2007-2008. B. P. Lazzaro.

Focuses on the application of population genetic concepts in ecological or applied contexts. Emphasizes measuring adaptation in natural populations, detecting the effects of population demography, and determining the genetic basis of quantitative traits. Draws examples from primary research on animals and plants to illustrate experimental techniques and methods of data analysis on single-gene, multi-locus and genome-wide scales.

**[ENTOM 483(4830) Insect Physiology]**

Fall. 4 credits. Prerequisite: ENTOM 212 or permission of instructor. Lec, lab. Offered alternate years; next offered 2007-2008. C. Gilbert.

Introduction to the often unique ways in which insects have met their basic needs. Examines each organ system with emphasis on basic principles and specific examples. Also introduces students to some common methods used in physiological research and to the critical reading of scientific literature.]

**[ENTOM 490(4900) Toxicology of Insecticides (also TOX 490[4900])]**

Spring. 3 credits. Prerequisite: general chemistry course. S-U grades optional. Lec. Offered alternate years; not offered 2007-2008. J. G. Scott.

History, metabolism, and mechanism of action of genetically modified, synthetic, and naturally occurring insecticides. Discusses insecticide resistance, resistance management, and new approaches to insect control with genetically modified organisms.

**[ENTOM 494(4940) Special Topics in Entomology]**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not to be offered more than twice under this number.

**[ENTOM 497(4970) Individual Study in Entomology]**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). Staff.

**[ENTOM 498(4980) Undergraduate Teaching]**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Undergraduate teaching assistance in an entomology course by agreement with the instructor. Participating students assist in teaching a course allied with their education and experience. Students are expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

**[ENTOM 634(6340) Special Topics in Systematic Entomology]**

Fall or spring; on demand. 2-4 credits.

Prerequisite: permission of instructor. Staff. Lectures on the classification, evolution, and bionomics of selected taxa, with accompanying laboratory studies on identification and comparative morphology. Collections sometimes required.

**[ENTOM 635(6350) Insect Molecular Systematics]**

Spring. 2 credits. Prerequisite: permission of instructor. Offered alternate years; next offered 2007-2008. B. N. Danforth.

Analysis of DNA sequence variation can provide a powerful tool for resolving problems in insect systematics, from species-level taxonomic decisions to higher-level (ordinal) relationships. This course introduces students, through readings of the primary literature, to the basic methods of insect molecular systematics, including DNA extraction, gel electrophoresis, PCR, DNA purification, and DNA sequencing (manual and automated). Results are analyzed using available computer programs. Students are encouraged to collect preliminary data for thesis or post-doctoral research.]

**[ENTOM 652(6520) Seminar in Medical Entomology]**

Fall. 1 credit. Prerequisite: permission of instructor or ENTOM 352. Disc TBA. L. C. Harrington.

Addresses a variety of topics in the field of medical entomology. Weekly discussions of key papers on topics chosen by participating students and faculty.

**[ENTOM 662(6620) Insect Behavior Seminar]**

Spring. 2 credits. Prerequisites: permission of instructor or ENTOM 212 and BIONB 221 or equivalents. S-U grades optional. Offered alternate years; next offered 2007–2008. C. Gilbert.]

**ENTOM 670(6700) Seminar on Biological Control**

Fall. 1 credit. Prerequisite: ENTOM 277, 440, or 463 or permission of instructor. S-U grades optional. Offered alternate years; not offered 2007–2008. A. E. Hajek.

Upper-level seminar series in biological control covering topics chosen by participating students and faculty. Weekly discussion groups with each participant presenting at least one oral report based on independent reading or research focusing on a central theme for the semester.

**ENTOM 685(6850) Seminar in Insect Physiology**

Spring. 1 credit. Prerequisite: permission of instructor. S-U grades optional. Offered alternate years; not offered 2007–2008. C. Gilbert.

**ENTOM 707(7070) Individual Study for Graduate Students**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. Not for thesis research. Staff.

**ENTOM 709(7090) Teaching Entomology**

Credit TBA. Staff.

Teaching entomology or for extension training.

**ENTOM 767(7670) Current Topics in Entomology**

Fall and spring. 1 credit. Requirement for first- and second-year entomology graduate students. S-U grades only. Staff.

After the Jugatae seminar, the students taking the course discuss the seminar and additional papers with the speakers from 4:30 to 5:30 in 2123 Comstock Hall.

**ENTOM 800(8000) Master's-Level Thesis Research**

Fall and spring. 15 credits per semester if taking no classes; if taking other courses, use ENTOM 800 to bring yourself up to a total of 15 credits. Prerequisite: permission of instructor. S-U grades optional. Staff.

Research at the master's level.

**ENTOM 900(9000) Doctoral-Level Thesis Research**

Fall and spring. 15 credits per semester if taking no classes; if taking other courses, use ENTOM 900 to bring yourself up to a total of 15 credits. Prerequisite: permission of instructor. S-U grades optional. Staff.

Research at the doctoral level.

**Jugatae Seminar**

Fall and spring.

Seminar conducted by Jugatae, the entomology club of Cornell University, to discuss topics of interest to its members and guests. All interested undergraduate and graduate students are encouraged to attend.

**FOOD SCIENCE**

J. H. Hotchkiss, chair (114 Stocking Hall, 255-7912); T. E. Acree, K. J. Arnink, D. M. Barbano, C. A. Batt, K. J. Boor, J. W. Brady, D. P. Brown, J. M. Brown, R. B. Gravani, T. Henick-Kling, H. T. Lawless, C. Y. Lee, R. H. Liu, D. D. Miller, C. I. Moraru, S. J. Mulvaney, J. M. Regenstein, S. S. H. Rizvi, K. J. Siebert, M. Wiedmann

**FD SC 101(1010) Science and Technology of Foods**

Fall. 1 credit. S-U grades only.

J. H. Hotchkiss and staff.

Explores the application of science and technology to foods. Lectures elucidate the role of engineering, biotechnology, chemistry, biochemistry, nutrition, toxicology, and microbiology in supplying the world with safe and nutritious food. An overview of food science as a discipline and career choice is given.

**FD SC 102(1020) Exploring Food Processing**

Spring. 1 credit. S-U grades only. Five field trips. D. P. Brown.

Series of seminars on current technological and regulatory developments in food science. Field trips to five commercial food manufacturing/processing plants are used to illustrate the application of current technologies. A course project, using the Food Science Alumni Network, is required.

**FD SC 104(1040) Wines and Vines (also HORT 104[1040])**

Spring. 3 credits, with lab. Limited to 30 students. Priority given to students in enology or viticulture program. Letter grades only. K. Arnink and I. Merwin.

An introduction to grape cultivation and winemaking history, regions and practices, wine chemistry and microbiology. Sensory evaluations of wines illustrate components and processes that determine wine flavors. Lab sessions include experiments, local vineyard and winery visits, and discussion of selected readings.

**FD SC 150(1500) Food Choices and Issues**

Spring. 2 credits. S-U grades optional.

R. B. Gravani and D. D. Miller.

Strategies for making healthier food choices through a deeper understanding of the scientific principles and concepts that form the basis for current dietary guidelines. Food safety regulations are discussed. Topics include the U.S. food system; relationships between diet and health; food processing; food safety; and selected contemporary issues relating to nutrition, food quality, and safety. Each student will conduct a nutritional analysis of her or his personal diet.

**FD SC 151(1510) Food and Health: Current Issues and Controversies**

Spring. 1 credit. Limited to 25 students.

Pre- or corequisites: FD SC 150 or permission of instructors. S-U grades only. R. B. Gravani and D. D. Miller.

Discussion-based course designed to explore current issues and controversies that involve relationships between food and health. A required reading from the popular press or the scientific literature is assigned each week. S-U grades are based on attendance, overall participation, and the oral presentation. Topics may include the obesity epidemic, food irradiation, food safety, plant sterols, heart disease, eating disorders, functional

foods, dietary supplements, food regulations, genetically modified foods, and other current issues. Several class discussions are held at a Cornell dining facility on selected Wednesday evenings during the semester.

**FD SC 200(2000) Introductory Food Science**

Fall. 3 credits. Prerequisite: college-level courses in chemistry and biology. Letter grades only. J. H. Hotchkiss.

Comprehensive introduction to the principles and practice of food science and technology. Topics include chemistry of foods; nutritional significance; food formulation, preservation and processing; microbiology and fermentations; composition and processing of food commodities; and contemporary issues including food safety, regulation, and world food needs. Stresses interrelationships between the chemical, physical, nutritional, and quality properties of foods as affected by formulation, processing, and packaging.

**FD SC 210(2100) Food Analysis**

Spring. 3 credits. Limited to 24 students. Prerequisite: CHEM 208 or equivalent. Lec. lab. R. H. Liu and staff.

Introduces basic analytical techniques for food analysis and other biological analysis. Emphasizes fundamental principles of analytical chemistry, basic laboratory techniques, and modern instrumental methods. Discusses gravimetric, volumetric, and spectrophotometric methods, gas chromatography (GC), high-performance liquid chromatography (HPLC), infrared spectra (IR), and atomic absorption spectrometry.

**FD SC 230(2300) Sophomore Seminar: Functional Foods; Where Food Science and Nutrition Meet (also NS 230[2300])**

Spring. 2 credits. Limited to 15 students; priority given to sophomores who have completed two first-year writing seminars and introductory course in either food science or nutritional sciences. S. J. Mulvaney and R. Parker.

Functional foods are foods whose nutrient composition has been modified to achieve targeted health outcomes. This course explores the interface where nutritional science and food science can work together to design and produce foods to meet certain health goals using a case study approach. Each case study involves interdisciplinary discussion, and a writing assignment that includes both technical (e.g., scientific basis for diet-health claims) and nontechnical (e.g., personal experience and opinions related to functional foods) content.

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**FD SC 250(2500) Kosher and Halal Food Regulations (D)**

Spring. 2 credits. Prerequisite: at least sophomore standing. S-U grades optional. J. M. Regenstein.

Comprehensive introduction to kosher and halal foods in the American food industry with some coverage of home practices. Examines the kosher food laws, their origin, and their application in modern food processing. Describes the nature of the kosher supervision industry in America. Also examines Halal laws and explores the interactions between the two communities. Reviews current food-related issues in both communities, including recent court decisions. May also consider some aspects of ethnic foods.

**FD SC 290(2900) Meat Science (also AN SC 290(2900))**

Fall. 2 or 3 credits; lec only—2 credits; lec plus lab—3 credits; lab cannot be taken without lec. Letter grades only. D. E. Shaw.

Introduction to meat science through a study of the structure, composition, and function of muscle and its conversion to meat. Also studies properties of fresh and processed meat, microbiology, preservations, nutritive value, inspection, and sanitation. Lab exercises include anatomy, meat-animal slaughter, meat cutting, wholesale and retail cut identification, processing, inspection, grading, quality control, and meat merchandising. An all-day field trip to commercial meat plants may be taken.

**FD SC 321(3210) Food Engineering Principles**

Fall. 3 credits. Prerequisites: FD SC 200 and introductory physics. Letter grades only. S. S. H. Rizvi.

Introduces the engineering principles underlying food processes and equipment. Topics include thermodynamics, mass and energy balance, fluid mechanics, heat and mass transport, refrigeration and psychrometrics.

**FD SC 351(3510) Milk Quality**

Fall. 1 credit. Prerequisite: AN SC 250 or equivalent or permission of instructor. Letter grades only. M. Wiedmann.

Focuses on the effects of on-farm and animal husbandry practices on milk and dairy food quality and safety. Significant parts of class focus on discussion and critical analysis of the assigned reading materials, questions, and hot topics.

**FD SC 394(3940) Applied and Food Microbiology (also BIOMI 394(3940))**

Fall. 3 credits. Prerequisites: BIOMI 290–291. C. A. Batt.

Microorganisms play a central role in a variety of food, agricultural, and environmental processes. This course presents a comprehensive survey of the roles that microorganisms play in industrial/biotechnological processes as well as their importance in the safety and production of foods. Reviews issues related to the biochemistry, genetics, and physiology of microorganisms important in these processes. A 2-credit core section on food microbiology is complemented by a 1-credit section on industrial/biotechnological applications.

**FD SC 395(3950) Food Microbiology Laboratory**

Fall. 2 credits. Prerequisite: BIOMI 291 or equivalent. Letter grades only. Staff. Work includes study of the physiological characteristics of representative food microorganisms, practice in using general

and rapid methods for microbiological testing and control of food products, and practice in the application of a systematic approach to controlling the safety of foods, or addressing a food safety issue.

**FD SC 396(3960) Food Safety Assurance**

Spring. 2 credits. Prerequisite: BIOMI 290 or permission of instructor. Offered alternate years; not offered 2007–2008. R. B. Gravano.

Provides information on procedures to control biological, chemical, and physical hazards and assure the safety of foods. Topics include discussions on the Hazard Analysis Critical Control Point (HACCP) concept, good manufacturing practices, prerequisite programs, and the application of current technologies in reducing the risk of foodborne illnesses. Uses case studies and class projects to demonstrate and apply the key principles discussed.

**FD SC 400(4000) Current Topics in Food Science and Technology**

Spring. 1 credit. S-U grades only. S. J. Mulvaney.

Discussion of current topics in food science. Topics vary and are chosen from scientific literature and popular press.

**FD SC 401(4010) Concepts of Product Development**

Spring. 2 credits. Prerequisite: FD SC 200 or equivalent. Letter grades only. Offered alternate years; not offered 2007–2008. J. H. Hotchkiss.

Discussion of the sequence of events in developing and marketing new food products. Topics include food formulation, packaging and labeling, food additive and ingredient regulations, taste panels, market testing, market research, and patents.

**FD SC 402(4020) Agriculture in Developing Nations I (also IARD 402(4020))**

Fall. 2 credits. T. W. Tucker and R. W. Blake (Mexico sec); K. V. Raman and W. R. Coffman (India sec).

Acquaints students with the major issues and problems in international agriculture and rural development and demonstrates how problems in development are being addressed in the Gulf Region of Mexico and India. The lectures/discussions establish the global and regional contexts for sustainable agricultural development and focus on development challenges in Latin America and Asia through cases in southern Mexico and India. This course may be taken as a stand-alone survey course in international agriculture and rural development. However, it is primarily a preparatory course for participants selected to participate in the spring semester course Agriculture in the Developing Nations II (IARD 602), which includes concurrent field trips to the Gulf Region of Mexico and India during the January intersession.

**FD SC 405(4050) Managing Food Waste Without Trashing the Environment**

Spring. 2 credits. Prerequisite: FD SC 200 or equivalent. Letter grades only. Lec, lab. Offered alternate years; not offered 2007–2008. J. M. Regenstein.

Examines the various waste streams generated by food plants, institutional feeders, supermarkets, and restaurants. What is the role of waste minimization? What technologies can control or remediate the problems? What are the disposal, composting, and recycling options? What are the legal requirements

locally, state-wide, and nationally that affect various food waste processes? This course serves as a general introduction to available waste management technologies and to policy issues faced by a wide range of businesses and production plants.

**FD SC 406(4060) Dairy and Food Fermentations**

Fall. 2 credits. Prerequisite: BIOMI 290. Letter grades only. M. Wiedmann.

Lecture course covering the basic principles of fermentation, the microbiology of food fermentations (including the physiology and genetics of fermentative microorganisms), starter cultures and their preparations and applications, as well as specific examples of food fermentations. Selected textbook readings are supplemented with papers from peer-reviewed journals. Significant parts of class focus on discussion and critical analysis of the assigned reading materials.

**FD SC 410(4100) Sensory Evaluation of Food**

Fall. 2–3 credits; 1 lab credit. Lec and lab required for undergraduate food science majors. Prerequisite: statistics course. Letter grades only. H. T. Lawless.

Topics include the sensory evaluation methods used to test the flavor, appearance, and texture of foods by quantitative description and simple difference testing; consumer testing for product acceptability; sensory tests in quality control; strategic product research; and product development. Presents the psychological principles in sensory testing and statistical methods for sensory data analysis. The lab provides first-hand experience in organizing and conducting sensory tests and an introduction to online data collection and analysis.

**[FD SC 415(4150) Principles of Food Packaging]**

Spring. 3 credits. Letter grades only. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. H. Hotchkiss.

Discusses the chemical and physical properties and manufacture of the basic materials used to construct packaging. Presents the influence of packaging on shelf life. Emphasizes newer packaging technologies and materials. Briefly presents economics, design, and regulation of food packaging.]

**FD SC 417(4170) Food Chemistry I**

Spring. 3 credits. Prerequisites: CHEM 257 or BIOBM 330 or 331. S-U or letter grades. J. W. Brady.

Covers the chemistry of foods and food ingredients. Discusses the chemical and physical properties of water, proteins, lipids, carbohydrates, and other food components and additives in the context of their interactions and functional roles in foods.

**FD SC 418(4180) Food Chemistry II**

Fall. 3 credits. Prerequisite: FD SC 417. S-U or letter grades. C. Y. Lee, C. I. Moraru, and J. M. Regenstein.

Discusses the chemical composition of several food groups (such as meats, fruits, and vegetable, dairy) and describes the chemical reactions and changes that take place during processing and storage, as well their effects on the quality and nutritional characteristics of these foods.



**FD SC 419(4190) Food Chemistry Laboratory**

Spring. 2 credits. Prerequisites: BIOBM 330 or 331 or CHEM 257 or equivalent.

Corequisite: FD SC 417. D. D. Miller.

Deals with the chemical properties of food components and changes they undergo in processing and storage. Stresses relationships between the chemical composition of foods and functional, nutritional, and sensory properties. Introduces lab techniques commonly used in food research. Requires a lab research project that involves writing a research proposal for the project, conducting laboratory research to test hypotheses described in the proposal, analyzing the data, and writing a paper following the format used by the *Journal of Food Science*.

**FD SC 423(4230) Physical Principles of Food Preservation and Manufacturing**

Fall. 3 credits. Prerequisite: FD SC 321. Letter grades only. Lec, disc.

S. J. Mulvaney.

Emphasizes the fundamental principles that underlie much of food preservation and manufacturing. Uses a systems analysis approach to make connections between the chemical and physical changes that occur in food processing and their impact on food quality. Topics include materials properties of foods, heat processing, freezing, concentration, and drying. Selected products serve as case studies for more complex manufactured foods.

**FD SC 425(4250) Unit Operations and Dairy Foods Processing**

Spring. 3 credits. Prerequisites: FD SC 321, 394, 417, 418, and 423. Letter grades only. Lec, lab. C. I. Moraru.

Combined lecture-laboratory course focusing on principles and practices fundamental to modern dairy foods processing. Structured in two parts. The first part deals with the main unit operations used in dairy processing (i.e., pasteurization, sterilization, centrifugal separation, homogenization, membrane separation, concentration, and drying) and the second part focuses on the science and technology that underpins the manufacture of main classes of dairy products (i.e., fluid milk, milk powder, ice cream, butter, and cheese). Laboratories are conducted in a food processing pilot plant facility, which allows students to gain hands-on experience in operating pilot plant equipment and the manufacture of safe, high quality dairy products. One field trip to operating dairy plants in the area is scheduled during the semester.

**FD SC 430(4300) Understanding Wine and Beer**

Spring. 3 credits. Prerequisites: introductory biology and chemistry or permission of instructor; age 21 by first day of class (Jan. 22, 2007). S-U grades optional. T. E. Acree, T. Henick-Kling, and K. J. Siebert.

Introduction to wine and beer appreciation through the study of fermentation biology, product composition, and sensory perception. Uses samples of wines and beers to illustrate the sensory properties, microbiological processes, and chemical components that determine quality. Students learn to recognize the major features of wine and beer that determine sensory quality and know the processes that produced them. Topics include the psychology and chemistry of

bouquet, taste, and aroma; the microbiology of fermentation and spoilage; the sensory properties of wines from different grape varieties, viticultural practices, and wine-making techniques; and the effects of brewing raw materials and processing procedures on beer quality.

**[FD SC 450(4500) Fundamentals of Food Law**

Spring. 2 credits. Letter grades only.

Offered alternate years; not offered 2006–2007; next offered 2007–2008.

J. M. Regenstein.

Introduction to the complex array of federal and state statutes and regulations that control the processing, packaging, labeling, and distribution of food, including aspects of safety and nutritive value. Emphasizes the Food and Drug Administration and U.S. Department of Agriculture regulations but also refers to other regulatory agencies. Emphasizes how a food or agricultural professional interacts with the U.S. legal system during legislative action, regulatory rule making, and with respect to compliance.]

**FD SC 456(4560) Advanced Concepts in Sensory Evaluation**

Spring. 2 credits. Prerequisite: FD SC 410.

S-U grades optional. Offered alternate years; not offered 2007–2008.

H. T. Lawless.

Readings and discussions of primary source materials in sensory evaluation, including recent advances in sensory methods, historical perspectives, psychophysics, perceptual biases, and multivariate statistical approaches to sensory data. Students conduct a major independent research project on a current issue in sensory evaluation.

**FD SC 480(4800) Global Seminar: Building Sustainable Environments and Secure Food Systems for a Modern World (also NTRES/IARD 480(4800))**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing. J. Lassoie and D. Miller.

Modernization has led to development pressures that have increasingly disrupted natural systems, leading to widespread concerns about the long-term viability of important environmental services, including those critical to food security worldwide. This multidisciplinary course uses case studies to explore interrelationships among social, economic, and environmental factors basic to sustainable development. Cases examine contemporary issues such as population growth, genetically modified foods, biodiversity, sustainable marine fisheries, water quality, global warming, and global responsibility. Cornell faculty members lead discussions in each of the major topic areas. In addition, students participate in discussions and debates with students from Sweden, Costa Rica, Honduras, South Africa, and Australia through live interactive videoconferences and electronic discussion boards.

**FD SC 494(4940) Special Topics in Food Science**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department

curriculum committee, and the same course is not offered more than twice under this number.

**FD SC 497(4970) Individual Study in Food Science**

Fall or spring. 3 credits max. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). S-U grades optional. Staff.

May include individual tutorial study, a special topic selected by a professor or a group of students, or selected lectures of a course already offered. Since topics vary, the course may be repeated for credit.

**FD SC 498(4980) Undergraduate Teaching Experience**

Fall or spring. 3 credits max. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). S-U grades only. Staff.

Students assist in teaching a course appropriate to their previous training and experience. Students meet with a discussion or laboratory section and regularly discuss objectives with the course instructor.

**FD SC 499(4990) Undergraduate Research in Food Science**

Fall or spring. 4 credits max; may be repeated for credit. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Students conduct original research directed by a food science faculty member.

**FD SC 599(5990) Research for Lausanne Exchange Students**

Fall/spring. 10 credits max. Prerequisite: permission of instructor. S-U grades optional. Staff.

Undergraduate senior thesis research for Lausanne exchange students only. Students conduct original research directed by a food science faculty member, then write and present a final report to the faculties of both Cornell University and the University of Lausanne.

**FD SC 600(6000) Seminar in Food Science**

Fall and spring. 1 credit. S-U grades only. Requirement for all graduate students in field of food science and technology; highly recommended for graduate students minoring in food science and technology. Staff.

Weekly seminar series on contemporary topics and issues in the field of food science and technology. Representatives from academia, industry, and government provide presentations on a wide variety of topics. Graduate students in the field of food science and technology may use the forum to present their required thesis research seminar.

**FD SC 602(6020) Agriculture in Developing Nations II (also IARD 602(6020))**

Spring, field trips to Gulf Region of Mexico (sec 1) and India (sec 2) during Jan. intersession. 3 credits. Prerequisites: IARD 402 and (or) permission of instructors. Cost of field study trip (including airfare, local transportation, and lodging; some merit and need based financial aid may be available): approx. \$2,500. R. W. Blake, T. W. Tucker, and C. F. Nicholson (Mexico); K. V. Raman and W. R. Coffman (India).

For description, see IARD 602.



**FD SC 604(6040) Chemistry of Dairy Products**

Fall. 2 credits. Limited to 16 students.

Prerequisites: introductory organic and biochemistry, food chemistry, and dairy foods processing courses or permission of instructor. Letter grades only. Offered alternate years; not offered 2007-2008.

D. M. Barbano.

Detailed study of milk constituents and their properties. Covers the chemical and physical changes that occur in dairy products before, during, and after processing. Emphasizes current research in dairy chemistry.

**[FD SC 607(6070) Advanced Food Microbiology**

Spring. 2 credits. Prerequisites: BIOMI 290, FD SC 394. Letter grades only. Offered alternate years; not offered 2006-2007; next offered 2007-2008. M. Wiedmann.

Explores advanced topics in food microbiology. Places major emphasis on critical evaluation of current literature and on microbiological concepts that affect food microbiology. Specific areas covered include microbial ecology of foods, rapid detection and typing methods for foodborne pathogens, microbial modeling, pathogenesis of foodborne diseases, and food applications of genetic engineering. Some guest lectures may be arranged to provide an introduction to other advanced food microbiology topics (e.g., risk assessment).

**FD SC 608(6080) Chemometric Methods in Food Science**

Fall. 2 credits. Prerequisites: basic statistics and chemistry course or permission of instructor. S-U grades optional. Offered alternate years; not offered 2007-2008. K. J. Siebert.

Food science applications using multivariate statistical methods (chemometrics) include extracting information from large data sets, modeling molecular and product properties, optimizing analytical methods and processing operations, discerning relationships between product composition and sensory properties, identifying cultivars or species, and detecting adulteration. The techniques covered are also applicable to many other problems in biology and chemistry.

**[FD SC 616(6160) Flavors—Analysis and Applications**

Spring. 2 credits. S-U grades optional. Lec, disc. Offered alternate years; not offered 2006-2007; next offered 2007-2008.

H. T. Lawless and T. E. Acree.

Advanced course in sensory and instrumental analysis of flavors, flavor chemistry, and flavor applications in foods for food scientists and those in related fields concerned with human food perception and consumption. Surveys taste, aroma and volatile flavors, and trigeminal stimuli from the perspectives of chemical structures, methods of analysis, uses and interactions in food systems. Also discusses recent advances in the physiology of taste and smell.

**[FD SC 620(6200) Food Carbohydrates (also NS 620[6200])**

Spring. 2 credits. Prerequisite: qualified seniors and graduate students, BIOBM 330 or equivalent. Offered alternate years; not offered 2006-2007; next offered 2007-2008.

B. A. Lewis and J. W. Brady.

Considers the chemistry of carbohydrates, including sugars, starches, pectins, hemicelluloses, gums, and other complex

carbohydrates. Emphasizes the intrinsic chemistry and functionality in food systems and the changes occurring during food processing and storage.]

**FD SC 621(6210) Food Lipids**

Fall. 2 credits. Prerequisite: basic biochemistry course. Letter grades only. Offered alternate years; not offered 2007-2008. R. H. Liu.

Describes the physical, chemical, biochemical, and functional properties of lipids. Emphasizes lipid oxidation, emulsions, and functional foods associated with lipids.

**[FD SC 622(6220) Nutraceuticals and Functional Foods**

Fall. 2 credits. Prerequisites: biochemistry course equivalent to BIOBM 330 and one year college biology or permission of instructor. Letter grades only. Offered alternate years; not offered 2006-2007; next offered 2007-2008. R. H. Liu.

Covers nutraceuticals and functional foods, natural bioactive compounds, antioxidants, and dietary supplements, botanicals and herbs in disease prevention and health promotion. Emphasizes the mechanisms of action and scientific evidence of efficacy of nutraceuticals and functional foods. Also discusses biomarkers, safety and efficacy testing, and regulations for nutraceuticals and functional foods.]

**[FD SC 664(6640) Food Polymer Science: Principles and Applications**

Spring. 2 credits. Prerequisites: introductory chemistry and physics. Offered alternate years; not offered 2006-2007; next offered 2007-2008. S. J. Mulvaney.

Integrates polymer science, chemistry, and materials science principles as the basis for characterization of the physical properties of biopolymer materials of interest to the food industry. Emphasizes unique aspects of food materials, e.g., plasticization by water, physical gelation, transient networks, and effects of thermal treatments on material properties. Problems and case studies based on proteins, starches, gelatin, and other hydrocolloids relevant to food systems.]

**FD SC 665(6650) Food and Bioprocessing Systems**

Spring. 2 credits. Prerequisite: FD SC 423. Letter grades only. Lec, disc. Offered alternate years; not offered 2007-2008. S. H. Rizvi, S. J. Mulvaney, and C. I. Moraru.

Fundamental and quantitative analyses of current and emerging techniques used in the processing of foods and related biological materials. Topics include thermal processes, extrusion, supercritical fluids processing, membrane separation, high-pressure processing, pulsed electric field processing, ultraviolet and pulsed light treatment.

**FD SC 694(6940) Special Topics in Food Science**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**FD SC 695(6950) Current Readings in Food Science**

Fall and spring. 1 credit; may be taken multiple times. Graduate students in food science strongly encouraged to enroll. Prerequisite: 300- to 400-level course relevant to chosen topic. S-U grades only. Staff.

Seminar series on current topics chosen by participating faculty members and students on a rotating basis. Format consists of weekly discussion groups with each participant presenting at least one oral report based on independent reading. Multiple sections focusing on different topics may be taught in any given semester. Topics include food microbiology and food safety; food chemistry; packaging; food engineering. Interested students should contact the designated instructor(s) for each semester.

**FD SC 698(6980) Graduate Teaching Experience**

Fall and spring. 1 to 3 credits. S-U grades only. Staff.

Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of field faculty members. The experience may include leading discussion sections; preparing, assisting in, or teaching lectures and laboratories; and tutoring.

**FD SC 800(8000) Master's-Level Thesis Research**

Fall or spring. Credit TBA; max. 12.

Prerequisite: master's candidates; permission of Special Committee chair. S-U grades only. Graduate faculty.

**FD SC 900(9000) Graduate-Level Thesis Research**

Fall or spring. Credit TBA; max. 12.

Prerequisite: doctoral students who have not passed "A" exam; permission of Special Committee chair. S-U grades only. Graduate faculty.

**FD SC 901(9010) Doctoral-Level Thesis Research**

Fall or spring. Credit TBA. Maximum of 12 credits. Prerequisite: doctoral students who have passed "A" exam; permission of Special Committee chair. S-U grades only. Graduate faculty.

**HORTICULTURE**

M. P. Pritts, chair (134A Plant Science Bldg., 255-1778); N. L. Bassuk, R. R. Bellinder, M. P. Bridgen, L. Cheng, L. E. Drinkwater, M. Eames-Sheavly, S. Gan, G. L. Good, D. E. Halseth, I. A. Merwin, W. B. Miller, J. Mt. Pleasant, K. W. Mudge, A. M. Petrovic, D. A. Rakow, A. Rangarajan, F. S. Rossi, C. B. Watkins, L. A. Weston, T. H. Whitlow, H. C. Wien, D. W. Wolfe

**HORT 101(1110) Horticultural Science and Systems**

Fall. 4 credits. I. A. Merwin.

Science and technology of horticultural plants grown for foods and beverages and ornamental, landscape, or recreational purposes. Lectures, labs, and field trips involve natural history and evolution of horticultural plants, botany and physiology, sustainable management of soil, water and plant nutrition, breeding and propagation, ecological and landscape functions, and

integrated design and management of horticultural plantings and production systems.

### **HORT 102(1120) Hands-On Horticulture**

Spring. 2 credits. Nominal materials fee.

M. P. Pritts.

The objective is to instill in students a lifelong appreciation for how gardening can enhance individual well-being through aesthetics, culinary experiences, and mastery of techniques. Emphasizes hands-on learning and practice of key gardening skills and techniques in the greenhouse and the field, such as landscape management, garden design, propagation, pruning, grafting, pest management, and flower arrangement. There is one Saturday field trip at the end of the semester to visit gardens in the local area.

### **HORT 104(1040) Introduction to Wines and Vines (also FD SC 104(1040))**

Spring. 3 credits. Letter grades only.

K. J. Arnink and I. A. Merwin.

For description, see FD SC 104.

### **HORT 201(2010) The Art of Horticulture I: Plants and Gardens as a Subject of Art**

Fall. 2–3 credits. Fee for materials: \$35.

M. Eames-Sheavly.

Part of a HORT 201 and 203 sequence, this experiential course considers plants and gardens as a subject of art. Students explore basic drawing techniques, botanical-illustration methods, watercolor, and photography. The course addresses the natural history and symbolic use of plants in fine art. Students critically reflect on course content in journals and explore the work of garden writers.

### **[HORT 203(2030) The Art of Horticulture II: Plants Used in Art or as Artforms]**

Spring. 2 credits. Fee for materials: \$40.

M. Eames-Sheavly.

Part of a HORT 201 and 203 sequence, this experiential course focuses on plant materials used to create art or manipulated as artforms. Acquaints students with a range of topics such as the use of plants in fibers and dyes; floral design; and living-sculpture practices such as topiary, bonsai, turfworks, and tree sculpture. Students create a final project focused on these or related methods.]

### **[HORT 215(2150) Sophomore Seminar: Nonfiction Adventure Writing: Reclaiming the Scientist's Voice]**

Spring. 4 credits. Limited to 15 students.

Letter grades only. Not offered 2006–2007; next offered 2007–2008. T. H. Whitlow.

Classroom discussion, adventures in the field and lab provide raw material for writing individual narratives.

Sponsored by the John S. Knight Institute's Sophomore Seminars Program.]

### **[HORT 220(2200) Practicing Sustainable Land Care]**

Fall. 2–3 credits; 1 additional credit for student projects by permission of instructor. Offered odd years; not offered 2006–2007; next offered 2007–2008.

L. E. Drinkwater.

Experiential course emphasizing interdisciplinary, ecosystem-based approaches to land management and food production.]

### **HORT 235(2350) Plants and Human Well-Being (CA) (HA)**

Spring. 3 credits. J. Mt. Pleasant and

S. M. Skelly.

Examines the beneficial effects of plants on human cultures, communities and individuals.

Areas of focus include: impacts of community gardens, green space, and farmer's markets; use of plants for pollution control, economic development, conflict resolution, and tourism; how plants benefit individuals, in terms of adult cognition, K–12 education, mental health, and personal empowerment. Laboratories include field trips and exercises to allow students to analyze and evaluate plant-based initiatives in many phases of contemporary life.

### **HORT 243(2430) Taxonomy of Cultivated Plants (also BIOPL 243(2430))**

Fall. 4 credits. Prerequisite: one year introductory biology or written permission of instructor. May not be taken for credit after BIOPL 248. Offered even years.

M. A. Luckow.

For description, see BIOPL 243.

### **HORT 300(3000) Herbaceous Plant Materials**

Fall. 3 credits. Cost of field trip: \$75.

W. B. Miller.

Identification, use, characteristics, and garden cultural requirements of annual and herbaceous perennial plants, especially those used in northern climates. Practical gardening experiences at selected campus locations. Field trips to nearby specialty nurseries.

### **HORT 310(3100) Production and Marketing of Greenhouse Crops**

Spring. 4 credits. Letter grades only. Cost of required three-day field trip: approx. \$130. Offered odd years. W. B. Miller.

Covers basics of establishing a greenhouse operation, growing crops in optimized environments, and serving niche or mass markets. Discusses technology basics including structures and equipment, systems for heating and cooling, lighting, irrigating and fertilizing, materials handling; environmental stewardship and integrated pest management; and production management. Also covers world centers of greenhouse crop production; culture of cut, pot, bedding, vegetable, and fruit crops in greenhouses, emphasizing predictive harvesting through environmental, physical, and chemical management of growth and development. Each student grows one or more crops.

### **[HORT 317(3170) Seed Science and Technology (also CSS 317(3170))]**

Fall. 3 credits. Prerequisite: BIOPL 241 or equivalent course approved by instructor. Letter grades only. Not offered 2006–2007; next offered 2007–2008. A. G. Taylor, Geneva Experiment Station.

Study of the principles and practices involved in seed production, conditioning, storage, quality management, seed enhancements, and stand establishment.]

### **HORT 330(3300) Turfgrass-ing the Landscape**

Spring. 3 credits. Prerequisite: CSS 260' or permission of instructor. Letter grades only.

F. S. Rossi and A. M. Petrovic.

Proposal, siting, specification, installation, establishment, and management of turfgrass areas. Emphasizes commercial locations including lawns, sports fields, and golf courses. Case study projects are a major aspect of the course.

### **HORT 391(3910) Woody Plant Identification and Use I**

Fall. 2 credits. Limited enrollment.

Prerequisite: permission of instructor. Letter grades only. N. L. Bassuk.

Module of HORT/LA 491 covering the identification of approximately 200 woody trees, shrubs, and vines in leaf and their use in the landscape. Students desiring a more comprehensive course that covers site assessment, soil modification, design, plant specifications and landscape establishment principles and techniques should take HORT/LA 491 or the 491–492 sequence.

### **HORT 392(3920) Woody Plant Identification and Use II**

Spring. 2 credits. Limited enrollment.

Prerequisite: permission of instructor. Letter grades only. N. L. Bassuk.

Module of HORT/LA 492 covering the identification of approximately 160 evergreen trees and shrubs and deciduous plants using winter identification. HORT 391 (fall module) need not be taken before taking HORT 392 (spring module). Students also assist in the establishment of a new landscape on campus.

### **HORT 400(4000) Principles of Plant Propagation**

Spring. 3 credits. Prerequisites: BIOPL 242 and 244 or another plant physiology course or permission of instructor. Offered odd years. K. W. Mudge.

Asexual (vegetative) propagation including cutting, graftage, tissue culture, layering, and specialized vegetative reproductive structures and sexual (seed) propagation. Stresses physiological, environmental, and anatomical principles and industry applications in lecture, and hands-on skills in laboratories. Examples include both temperate and tropical horticultural, agronomic, and forestry crops.

### **[HORT 401(4010) The How, When, and Why of Grafting—A Distance Learning Approach]**

Spring, 10 weeks. 2 credits. Lec, autotutorial (web); lab, greenhouse/autotutorial (web/CD); disc, web; one introductory face-to-face meeting. Offered even years; not offered 2006–2007; next offered 2007–2008. K. W. Mudge.

Web/CD-based autotutorial approach to the principles and hands-on practices of grafting and budding as applied to plant propagation.]

### **[HORT 420(4200) Nursery-Crop Production]**

Fall. 3 credits. Prerequisite: HORT 400 or permission of instructor. Cost of field trips: \$75. Offered odd years; next offered 2007–2008. K. W. Mudge.

Principles and practices of commercial nursery crop production. Term project required. Includes field trips to commercial nurseries.]

### **[HORT 425(4250) Postharvest Biology of Horticultural Crops]**

Fall. 3 credits. Offered odd years; not offered 2006–2007; next offered 2007–2008. S. Gan.

Study of the biological processes controlling physical and chemical changes in harvested yet living horticultural crops or their parts.]

### **HORT 426(4260) Practicum in Forest Farming as an Agroforestry System (also NTRES/CSS 426(4260))**

Fall. 2 credits. Prerequisite: junior, senior, or graduate standing or permission of instructor. Offered even years.

K. W. Mudge, P. Hobbs, and L. E. Buck. Students actively take part in the restoration of a 70-year-old nut grove. The MacDaniel's Nut Grove is being developed as a multipurpose forest-farming teaching, research, and extension site. Hands-on activities include:

site evaluation and planning, temperate-nut harvest and variety evaluation, mushroom culture, small-fruit and fruit-tree culture, and medicinal-herb culture. Outdoor activities are integrated with selected readings via an online discussion board.

**HORT 435(4350) The Care of Woody and Herbaceous Plants in the Landscape**

Fall. 3 credits. Prerequisites: HORT 300 and 491 or permission of instructor. Cost of required field trip: \$75. Letter grades only. Offered even years. R. Weir, III. Study of the practices involved in the maintenance of ornamental plants in the landscape. The major emphasis is on post-planting techniques, including water and fertilization management, weed and invasive plant control, pruning and general tree care. Bidding and estimating for maintenance programs, as well as budget management, are also covered. Labs have a hands-on focus. Guest lecturers address special topics.]

**HORT 440(4400) Restoration Ecology**

Fall. 5 credits. Prerequisite: upper division or graduate standing and permission of instructor. Letter grades only. Lec, lab, plus several weekends. T. H. Whitlow.

Draws concepts from ecology, hydrology, soil science, and conservation biology and applies these in both principle and practice to the rapidly evolving field of restoration ecology. Through lectures, reading, and discussion, site visits to active restoration sites, and a real world class project, students learn and practice skills needed to develop restoration plans for a variety of situations.

**HORT 442(4420) Berry Crops: Culture and Management**

Fall. 3 credits. Offered even years. M. P. Pritts. Study of the evolution, breeding history, and physiology of strawberries, raspberries, blackberries, blueberries, and other minor small fruit crops, and of cultural practices that influence productivity, fruit quality, and pest damage. Considers marketing and economics and discusses alternate production practices for both commercial and home gardeners. Frequent field trips enhance classroom activities.

**HORT 443(4430) Viticulture and Vineyard Management—I**

Fall. 3 credits. Prerequisites: BIO G 101/103, 102/104, BIOPL 241, CSS 260, BIOPL 242/244 or equivalents. Letter grades only. A. N. Lakso and M. C. Goffinet.

First-semester course in commercial grape production with an emphasis on the problems of production in cold climates. Students examine environmental factors favoring production and quality, soils, and the anatomical and physiological basis for vineyard management decision-making. Laboratory exercises and field trips offer hands-on experience.

**HORT 444(4440) Viticulture and Vineyard Management—II**

Spring. 3 credits. Pre- or corequisites: HORT 443 and PL BR 225 or equivalent. Letter grades only. A. N. Lakso, B. I. Reisch, P. Cousins, and C. Owens. Second-semester course in commercial grape production with an emphasis on the problems of production in cold climates. Students examine the genetics of the vine, and learn principles of vineyard establishment.

propagation, pruning and training, and conservation. Laboratory exercises and field trips offer hands-on experience.

**[HORT 445(4450) Ecological Orchard Management**

Spring. 3 credits. Prerequisite: introductory biology. Recommended: previous horticulture/plant science courses. S-U grades optional. Offered even years; not offered 2006-2007; next offered 2007-2008. I. A. Merwin.

The ecology and technology of deciduous tree-fruit production. Emphasizes the agroecology of perennial crop systems, with labs providing hands-on experience in orchard management.]

**[HORT 449(4490) Green Signals and Triggers—The Plant Hormones (also BIOPL 449[4490])**

Fall. 1 or 2 credits. Prerequisites: introductory biology and BIOPL 242 or 342 or permission of instructor. S-U grades optional. Offered odd years; not offered 2006-2007; next offered 2007-2008. P. J. Davies.

For description, see BIOPL 449.]

**HORT 450(4500) Principles of Vegetable Production**

Fall. 3 credits. Prerequisite: HORT 101, CSS 260, or equivalent. Letter grades only. Two Sat. field trips; students responsible for cost of their meals. Offered even years. R. R. Bellinder and S. Reiners.

Commercial vegetable production from variety selection to postharvest. Topics include: crop physiology and culture, soil and pest management, stand establishment, marketing, and history of production. Term project required. Field trips to large scale conventional, small, diversified, and organic farms are planned early in semester.

**[HORT 455(4550) Mineral Nutrition of Crops and Landscape Plants (also CSS 455[4550])**

Spring. 3-5 credits. Prerequisite: CSS 260 and BIOPL 242, or equivalent. Offered even years; not offered 2006-2007; next offered 2007-2008. H. C. Wien and staff.

Modular course on principles of plant mineral nutrition and nutrient management for agronomic crops, vegetables, floriculture, and fruit crops.]

**[HORT 460(4600) Plant-Plant Interactions**

Spring. 3 credits. Prerequisite: any crop production or plant ecology course or permission of instructor. Offered even years; not offered 2006-2007; next offered 2007-2008. D. W. Wolfe.

Uses our basic understanding of plant ecology and physiology to evaluate the mechanisms by which plants interact with each other in natural and managed ecosystems.]

**HORT 462(4620) Physiology of Vegetables and Flowers**

Spring. 4 credits. Prerequisite: BIOPL 242 or equivalent. Offered odd years. H. C. Wien.

Study of the physiological principles that govern growth, development, and production of reproductive structures of vegetable crops and herbaceous ornamental plants. Emphasizes processes of flower induction, fruit and seed set, and the balance of vegetative and reproductive growth, especially in perennials. Practical hands-on greenhouse experiments and small group discussions illustrate the lecture material.

**HORT 466(4660) Soil Ecology (also CSS 466[4660])**

Spring. 4 credits, with lab. Prerequisite: one year of biology or ecology and CSS 260 or permission of instructor. J. E. Thies. For description, see CSS 466.

**HORT 473(4730) Ecology of Agricultural Systems (also BIOEE 473[4730])**

Fall. 3 credits. Prerequisite: BIOEE 261 or permission of instructor. S-U grades optional. During first six weeks, R meetings may run later due to field trips. L. E. Drinkwater and A. G. Power. For description, see BIOEE 273.

**[HORT 480(4800) Plantations Lecture Series**

Fall, 12 weeks. 1 credit. S-U grades only. Not offered 2006-2007. D. A. Rakow. Introductory class, 10 lectures, and a final evaluation session. Each week, lectures feature prominent speakers on a broad range of popular horticultural, natural-science, and human-cultural themes.]

**HORT 485(4850) Public Garden Management**

Spring. 3 credits. Prerequisites: HORT 300 or 301; HORT 230 or 335. Cost of two-and-a-half-day field trip to botanical gardens and arboreta: approx. \$85. Offered odd years. D. A. Rakow and S. M. Skelly. Explores the history of public gardens, types of contemporary public gardens, and the operation of botanical gardens and arboreta. Includes separate units on collections curation, design of collections, management of landscapes and natural areas, educational programming, interpretive programs, research, financial management, and staffing.

**HORT 491(4910) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also LA 491[4910])**

Fall. 4 credits. Limited to 48 students. Prerequisite: horticulture or landscape architecture majors or permission of instructor. Preregistration required. N. L. Bassuk and P. J. Trowbridge.

Focuses on the identification, uses, and establishment of woody plants in urban and garden settings. By understanding the environmental limitations to plant growth, students can critically assess potential planting sites, select appropriate trees, shrubs, vines, and ground covers for a given site, and learn about the principles and practices of site amelioration and plant establishment. Design followed by written specifications and graphic details is produced to implement these practices. A project where students implement what they have learned by creating a new landscape serves to integrate theory, principles, and practices. No prior design experience necessary.

**HORT 492(4920) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also LA 492[4920])**

Spring. 4 credits. Limited to 48 students. Prerequisite: passing grade in HORT/LA 491; horticulture or landscape architecture majors or permission of instructors. Preregistration required. N. L. Bassuk and P. J. Trowbridge.

Second half of course focusing on the winter identification, uses, and establishment of woody plants in urban and garden settings. Issues of site assessment and soil remediation

are emphasized in addition to soil volume calculations, drainage and surface detailing, and planting techniques. Students critically assess potential planting sites, and select appropriate trees, shrubs, vines, and ground covers for a given site. Design for specific sites followed by written specifications and graphic details are produced to implement these proposals. Students implement, in a hands-on manner, site remediation and planting techniques they have learned by creating new landscapes that serve to integrate theory, principles, and practices. Together, HORT/LA 491 and 492 constitute an integrated course.

#### **HORT 494(4940) Special Topics in Horticulture**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings may vary by semester, and will be advertised before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

#### **HORT 495(4950) Undergraduate Seminar—Current Topics in Horticulture**

Fall and spring. 1 credit; may be taken four times for 1 credit per semester. Graduate students should enroll in HORT 600. S-U grades only. L. Cheng.

Undergraduate participation in weekly departmental seminar series.

#### **HORT 496(4960) Internship in Horticulture**

Fall or spring. Variable credit. Prerequisite: permission of student's advisor in advance of participation in internship programs. S-U grades optional. Students must register using individual study form (available in 140 Roberts Hall) signed by faculty member who will supervise study and assign grade. Staff.

#### **HORT 497(4970) Individual Study in Horticulture**

Fall or spring. Variable credit. Prerequisite: permission of instructor(s). S-U grades optional. Students must register using individual study form (available in 140 Roberts Hall).

Individual study in horticultural sciences under the direction of one or more faculty members. Staff.

#### **HORT 498(4980) Undergraduate Teaching Experience**

Fall or spring. Variable credit. Prerequisites: previous enrollment in course to be taught or equivalent, and written permission of instructor. S-U grades optional. Students must register using individual study form (available in 140 Roberts Hall). Staff.

Designed to give qualified undergraduate students teaching experience through actual involvement in planning and teaching horticultural sciences courses under the supervision of departmental faculty members. May include leading discussion sections; preparing, assisting in, or teaching laboratories; and tutoring.

#### **HORT 499(4990) Undergraduate Research**

Fall or spring. Variable credit. Prerequisite: permission of instructor. S-U grades optional. Students must register using individual study form (available in 140 Roberts Hall.) Staff.

Undergraduate research projects in horticultural sciences.

#### **HORT 500(5000) Master of Professional Studies (Agriculture) Project**

Fall or spring. 1–6 credits; 6 credits max. toward M.P.S. (agriculture) degree. Requirement for M.P.S. (agriculture) candidates in respective graduate fields of horticulture. S-U grades optional. Staff.

Comprehensive project emphasizing the application of principles and practices to professional horticultural teaching, extension, and research programs and situations.

#### **HORT 600(6000) Seminar in Horticulture**

Fall and spring. 1 credit. Requirement for graduate students majoring or minoring in horticulture. Undergraduate students enroll in HORT 495. S-U grades only. L. Cheng.

Weekly seminars consisting of graduate student research project reports, faculty research topics, as well as guest speakers from other universities and/or industry.

#### **[HORT 615(6150) Quantitative Methods in Horticultural Research**

Spring, weeks 1–7. 2 credits. Prerequisite: BTRY 601, 602, or permission of instructor. S-U grades only. Offered even years; not offered 2006–2007; next offered 2007–2008. D. W. Wolfe.

Provides experience in applying statistics principles to real-world agricultural research problems. Uses examples of lab, greenhouse, and field studies from the published literature.]

#### **[HORT 617(6170) Advanced Analytical Methods for Plant Systems**

Spring. 3 credits. Prerequisite: one year of general chemistry, one semester of organic chemistry, plant physiology. Letter grades only. Offered even years; not offered 2006–2007; next offered 2007–2008. Staff.

Principles and practical applications of selected laboratory methods in the plant and environmental sciences. Emphasizes enhancement of laboratory technique and problem-solving skills.]

#### **HORT 618(6180) Breeding for Pest Resistance (also PL BR 618[6180])**

Fall. 2 credits. Prerequisites: BIOGD 281 and PL BR 403 or equivalents. Highly recommended: introductory plant pathology and/or entomology course. Letter grades only. Offered even years. P. D. Griffiths.

For description, see PL BR 618.

#### **HORT 625(6250) Advanced Postharvest Biology**

Fall. 1–3 credits, variable. Offered even years. Coordinators: S. Gan and C. B. Watkins.

#### **Sec 01 Advanced Postharvest Physiology. 1 credit. (12 lec). S. Gan.**

Emphasizes the physiological and biochemical aspects of growth and maturation, ripening, and senescence of harvested horticultural plant parts.

#### **Sec 02 Plant Senescence (also BIOPL 483.06). 1 credit. (12 lec). S. Gan.**

Introduces molecular, genetics, and genomics approaches in plant senescence and

postharvest research. Topics include gene expression, regulation, and function associated with physiological and biochemical changes in senescing, maturing, and/or ripening plants or parts. Also discusses genetic manipulation of senescence/ripening processes.

#### **Sec 03 Advanced Postharvest Technology. 1 credit. (12 lec). C. B. Watkins.**

Emphasizes advanced existing and emerging technology and practice for handling, monitoring, and storage of horticultural crops after harvest.

#### **HORT 635(6350) Tools for Thought**

Fall. 1 credit. Prerequisite: graduate standing. S-U grades only. T. H. Whitlow.

Discusses readings from Kuhn, Waddington, Wilson, Lewontin, and others emphasizing application of the philosophy of science to the real-world practices of scientists.

#### **HORT 636(6360) Current Topics in Horticulture**

Fall or spring. 1 credit. S-U grades only. One hour per week. Staff.

Seminar series on current topics chosen by participating students and faculty members, on a rotating basis. Format consists of weekly discussion groups, with each participant presenting at least one oral report based on independent reading and/or experimentation relating to the chosen topic. Interested students should contact the designated instructor(s) for each semester.

#### **[HORT 640(6400) New Directions in Public Horticulture**

Spring. 1 credit. Offered even years; not offered 2006–2007; next offered 2007–2008. D. A. Rakow and S. M. Skelly.

Designed to introduce students to a range of current issues facing public gardens through a set of required readings. Discussions based on readings and personal experiences.]

#### **HORT 694(6940) Special Topics in Horticulture**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committees, and the same course is not offered more than twice under this number.

#### **HORT 700(7000) Graduate Teaching Experience**

Fall or spring. Variable credit. Prerequisite: permission of instructor; graduate standing. Undergraduates should enroll in HORT 498. S-U grades optional. Staff.

Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of departmental faculty members. May include leading discussion sections; preparing, assisting in, or teaching lectures and laboratories; and tutoring.

#### **HORT 800(8000) Thesis Research, Master of Science**

Fall or spring. Credit TBA. S-U grades only.

#### **HORT 900(9000) Thesis Research, Doctor of Philosophy**

Fall or spring. Credit TBA. S-U grades only.



## INTERNATIONAL AGRICULTURE AND RURAL DEVELOPMENT

### IARD 300(3000) Perspectives in International Agriculture and Rural Development

Fall. 2 credits. R. Everett and R. Nelson. Forum to discuss both contemporary and future world food issues and the need for an integrated, multidisciplinary team approach in helping farmers and rural development planners adjust to the ever-changing food needs of the world.

### IARD 314(3140) Tropical Cropping Systems: Biodiversity, Social, and Environmental Impacts (also CSS 314(3140))

Fall. 3 credits. Prerequisite: introductory crop science, soil science, or biology course or permission of instructor.

P. Hobbs. Characterization and discussion of traditional shifting cultivation, lowland rice-based systems, upland cereal-based systems, smallholder mixed farming including root crops and livestock, plantation fruit and oil crop systems, and agroforestry. In addition to species diversity and domestication, factors such as climate, land quality, soil management, land tenure, labor, and markets are considered. Evaluates the effect of tropical cropping systems on the environment.

### IARD 402(4020) Agriculture in Developing Nations I (also FD SC 402(4020))

Fall. 2 credits. T. W. Tucker and R. W. Blake (Mexico sec); K. V. Raman and W. R. Coffman (India sec).

Acquaint students with the major issues and problems in international agriculture and rural development and to demonstrate how problems in development are being addressed in the Gulf Region of Mexico and India. The lectures/discussions establish the global and regional contexts for sustainable agricultural development and focus on development challenges in Latin America and Asia through cases in southern Mexico and India. This course may be taken as a stand-alone survey course in international agriculture and rural development. However, it is primarily a preparatory course for participants selected to participate in the spring semester course Agriculture in the Developing Nations II (IARD 602), which includes concurrent field trips to the Gulf Region of Mexico and India during the January intersession.

### IARD 403(4030) Traditional Agriculture in Developing Countries (also CSS 403(4030))

Fall. 1 credit. S-U grades only. P. Hobbs. Today, perhaps more than half of the world's arable land is farmed by traditional farmers. They developed sustainable agriculture practices that allowed them to produce food and fiber for millennia with few outside inputs. Many of these practices have been forgotten in developed countries but are still used by many traditional, subsistence, or partially subsistence farmers in developing countries. This course examines traditional systems from several disciplinary points of view.

### IARD 404(4040) Crop Evolution, Domestication, and Diversity [also PL BR/BIOPL 404(4040)]

Spring. 2 credits. Prerequisite: BIOGD 281 or PL BR 225 or permission of instructor. S-U grades optional. S. Kresovich.

Evolution, domestication, and breeding of crop plants have molded the current diversity we conserve and use. Based on advances in systematics and molecular genetics, this course presents an integrated approach to understanding and describing diversity of agricultural and horticultural species. Underlying ethical, legal, and social issues affecting conservation and use also are addressed.

### IARD 480(4800) Global Seminar: Building Sustainable Environments and Secure Food Systems for a Modern World (also NTRES/FD SC 480(4800))

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing. Letter grades. J. Lassoie and D. Miller.

For description, see NTRES 480.

### IARD 494(4940) Special Topics in International Agriculture (also IARD 694(6940))

Fall, spring, summer. 1-3 credits. S-U grades optional. Staff.

The department teaches "trial" courses, and special topics not covered in other courses, at the undergraduate level, under this number. Offerings vary by semester, and will be advertised by the department. Courses offered under the number are approved by the department curriculum committee, and the same course is not offered more than twice under this number.

### IARD 496(4960) International Internship

Fall, spring. 1-6 credits. Prerequisite: submission of approved internship form (see CALS internship policy guidelines). S-U grades optional. Staff.

International internship, supervised by a faculty member who is directly involved in determining both the course content and in evaluating a student's work. The student researches and initiates an appropriate international internship and negotiates a learning contract with the faculty supervisor, stating the conditions of the work assignment, supervision, and reporting.

### IARD 497(4970) Independent Study in IARD

Fall and spring. 1-3 credits. Prerequisite: permission of instructor. S-U or letter grades. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Allows students the opportunity to investigate special interests that are not treated in regularly scheduled courses. The student develops a plan of study to pursue under the direction of a faculty member.

### IARD 598(5980) International Development M.P.S. Project Paper

Fall and spring. 1-6 credits; max. 6 credits may be applied toward M.P.S. degree. Prerequisite: M.P.S. candidates in field of international development (ID). S-U grades only. N. Uphoff.

Problem-solving project entailing either fieldwork and/or library work. The aim of the project is to give students supervised experience in dealing intellectually and analytically with a professional problem related to a substantive area of international development.

### IARD 599(5990) International Agriculture and Rural Development M.P.S. Project Paper

Fall and spring. 1-6 credits; maximum of 6 credits may be applied toward M.P.S. degree requirements. Prerequisite: M.P.S. candidates in field of international agriculture and rural development (IARD). S-U grades only. S. Kyle.

Problem-solving project entailing either fieldwork and/or library work. The aim of the project is to give students supervised experience in dealing intellectually and analytically with a professional problem related to a substantive area of international agriculture and rural development.

### IARD 602(6020) Agriculture in Developing Nations II (also FD SC 602(6020))

Spring, field trips to Gulf Region of Mexico (sec 1) and India (sec 2) during Jan. intersession. 3 credits. Prerequisites: IARD 402 and (or) permission of instructors. Cost of field-study trip (including airfare, local transportation, and lodging; some merit and need-based financial aid may be available): approx. \$2,500. R. W. Blake, T. W. Tucker and C. F. Nicholson (Mexico); K. V. Raman and W. R. Coffman (India).

Designed to provide students with an opportunity to observe agricultural development in tropical Mexico or India and to promote interdisciplinary exchange among faculty, staff, students and their Mexican and Indian counterparts. A two-week field-study trip in January is followed by discussions, written projects and oral presentations dealing with problems in food, agriculture and livestock production in the context of social and economic conditions of the Gulf Region of Mexico and India.

### IARD 603(6030) Planning and Management of Agriculture and Rural Development (also GOVT 692(6927))

Spring. 4 credits. N. T. Uphoff and T. W. Tucker.

Reviews experience and approaches in agricultural and rural development in a range of developing countries, with particular attention to contemporary issues of participation, decentralization, local institutions, capacity-building, civil society, social capital, and empowerment. Case studies from Asia, Africa, and Latin America.

### IARD 612(6120) Patents, Plants, and Profits: Intellectual Property Management for Scientists and Entrepreneurs (also PL BR 612(6120))

Spring. 2 credits. Prerequisite: senior or graduate standing. S-U grades optional. A. F. Krattiger and R. D. Kryder.

For description, see PL BR 612.

### IARD 620(6200) Rural Livelihoods and Biological Resources: Technologies and Institutions

Fall, spring. 1-2 credits. S-U grades only. Biweekly. C. Barrett and A. Pell.

Seminar exploring issues that straddle the boundaries of the biological and social sciences as they relate to rural livelihoods, food security, and the management of biological resources. Students taking the 1-credit option participate in seminars and panels. Students taking the 2-credit option must also participate in a group project.



**IARD 685(6850) Training and Development: Theory and Practice (also EDUC 685[6850])**

Spring. 4 credits. S-U grades optional.  
M. Kroma.

Analysis, design, and administration of training programs for the development of human resources in small-farm agriculture, rural health and nutrition, literacy as nonformal education, and general community development. Designed for scientists, administrators, educator-trainers, and social organizers in rural and agricultural development programs in the United States and abroad.

**IARD 694(6940) Graduate Special Topics in IARD**

Fall or spring. 1-4 credits. S-U or letter grades. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**IARD 696(6960) Agroecological Perspectives for Sustainable Development (also NTRES/CSS 696[6960])**

Fall, spring. 1 credit. S-U grades only.  
L. Fisher and L. Buck.

A variety of speakers present seminars on agroecological topics relating to sustainable development throughout the world. Students are required to prepare a synopsis of each seminar.

**IARD 697-698(6970-6980) International Development M.P.S. Seminar**

Fall, spring. 1 credit. S-U grades only.  
N. Uphoff.

For M.P.S. students to discuss important issues in international development and to prepare them to write their project papers. Specific content varies.

**IARD 699(6990) International Agriculture and Rural Development M.P.S. Project Seminar**

Fall, spring. 1 credit. Prerequisite: required for, and limited to, M.P.S. IARD students or permission of instructor. S-U grades only.  
S. C. Kyle.

Provides students with the opportunity to develop and present their special projects. Also serves as a forum for discussion of current issues in low-income agricultural and rural development, with particular attention to interdisciplinary complexities.

**IARD 783(7830) Farmer-Centered Research and Extension (also EDUC 783[7830])**

Fall. 3 credits. S-U or letter grades.  
M. Kroma and T. Tucker.

Introduction to participatory traditions in farming systems research, extension, evaluation of rural development, technology generation, gender analysis, participatory rural appraisal, and documentation of local and indigenous knowledge of community-based development. Case studies of farmer-centered research and extension provide a focus for analysis. Appropriate roles of researchers and extensionists as partners with farmers are examined. A major contribution of farmer-centered research and extensions is its potential to legitimize people's knowledge by

enhancing their capacity to critically analyze their own problems, to conduct their own research, and to empower them to take direct action to solve those problems.

**Related Courses in Other Departments**

In addition to international agriculture and rural development (IARD) courses, many other courses have an international focus. The following are suggested relevant courses:

**Applied Economics and Management**

International Trade and Finance (AEM 230)

\*International Agribusiness Study Trip (AEM 329)

International Trade Policy (AEM 430)

\*Food Marketing Colloquium (AEM 446/447)

Global Marketing Strategy (AEM 449)

Seminar on International Trade Policy: Agriculture, Resources, and Development (AEM 730)

**Agriculture and Life Sciences**

Global Seminar (NTRES 480/FD SC 480/IARD 480)

**Animal Science**

Livestock in Tropical Farming Systems (AN SC 400)

Tropical Forages (AN SC 403)

**Asian Studies**

Southeast Asia Seminar: Country Seminar (ASIAN 601)

**Biology**

Biology of the Neotropics (BIOEE 405)

Food, Agriculture, and Society (BIOEE 469)

The Healing Forest (BIOPL 348)

**City and Regional Planning**

Seminar in International Planning (CRP 671)

Seminar in Project Planning in Developing Countries (CRP 675)

**Crop and Soil Science**

Properties and Appraisal of Soils of the Tropics (CSS 471)

Tropical Cropping Systems (CSS/IARD 314)

**Development Sociology**

Comparative Issues in Social Stratification (D SOC 370)

Education, Inequality, and Development (D SOC 305)

International Development (D SOC 205)

Population Dynamics (D SOC 201)

Social Indicators, Data Management, and Analysis (D SOC 213)

Sociological Theories of Development (D SOC 606)

**Education**

Farmer-Centered Research and Extension (EDUC/IARD 783)

**Natural Resources**

Global Ecology and Management (NTRES 322)

Environmental Governance (NTRES 331)

International Conservation: Communities and the Management of the World's Natural Resources (NTRES 434)

Seminar in Ecoagriculture (NTRES 694)

**Nutritional Science**

Nutritional Problems in Developing Nations (NS 306)

Integrating Food Systems and Human Needs (NS 380)

National and International Food Economics (NS 457)

International Nutrition Problems, Policy, and Programs (NS 680)

**Plant Breeding**

Plants, Genes, and Global Food Production (PL BR 201)

Crop Evolution, Domestication, and Diversity (PL BR 404)

\*Includes overseas travel

**INFORMATION SCIENCE**

C. Cardie, director; J. Abowd, W. Y. Arms, G. Bailey, K. Bala, M. Barazangi, L. Blume, R. Caruana, R. Constable, D. Easley, S. Edelman, E. Friedman, G. Gay, J. Gehrke, T. Gillespie, P. Ginsparg, C. Gomes, J. Halpern, J. Hancock, A. Hedge, D. Huttenlocher, T. Joachims, J. Kleinberg, L. Lee, A. E. Leiponen, B. Lust, M. Macy, P. Martin, T. Pinch, R. Prentice, M. Rooth, D. Seber, B. Selman, P. Sengers, D. Shmoys, M. Spivey, D. Strang, E. Tardos, E. Wagner, J. Walther, S. Wicker, D. Williamson, C. Yuan

**INFO 130(1300) Introductory Design and Programming for the Web (also COM S 130[1300])**

Fall. 3 credits.  
For description, see COM S 130 in CIS section.

**INFO 172(1700) Computation, Information, and Intelligence (also COGST 172, COM S 172[1700], ENGRI 172[1700])**

Fall. 3 credits. Prerequisites: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100.  
For description, see COM S 172 in CIS section.

**INFO 204(2040) Networks (also ECON 204[2040], SOC 204[2120]) (SBA)**

Spring. 4 credits.  
For description, see ECON 204.

**INFO 214(2140) Cognitive Psychology (also COGST/PSYCH 214[2140]) (KCM)**

Fall. 3 credits. Limited to 175 students.  
Prerequisite: sophomore standing.  
Graduate students: see INFO 614, PSYCH 614, or COGST 501.  
For description, see PSYCH 214.

**INFO 230(2300) Intermediate Design and Programming for the Web (also COM S 230[2300])**

Spring. 3 credits. Prerequisite: COM S/INFO 130 or equivalent.  
For description, see COM S 230 in CIS section.

**INFO 245(2450) Psychology of Social Computing (also COMM 245[2450])**

Fall. 3 credits.

For description, see COMM 245.

**INFO 292(2921) Inventing an Information Society (also AM ST 292[2980], ECE/ENGRG 298[2980], HIST 292[2920], S&TS 292[2921])**

Spring. 3 credits; may not be taken for credit after ECE/ENGRG 198.

For description, see ENGRG 298.

**INFO 295(2950) Mathematical Methods for Information Science**

Fall. 4 credits. Corequisite: MATH 231 or equivalent.

For description, see INFO 295 in CIS section.

**INFO 330(3300) Data-Driven Web Applications (also COM S 330[3300])**

Fall. 3 credits. Prerequisites: COM S/ENGRD 211.

For description, see COM S 330 in CIS section.

**INFO 345(3450) Human-Computer Interaction Design (also COMM 345[3450])**

Spring. 3 credits.

For description, see COMM 345.

**INFO 349(3491) Media Technologies (also COMM 349[3490], S&TS 349[3491])**

Spring. 3 credits.

For description, see S&amp;TS 349.

**INFO 355(3551) Computers: From the 17th Century to the Dot.com Boom (also S&TS 355[3551])**

Fall. 4 credits.

For description, see S&amp;TS 355.

**[INFO 356(3561) Computing Cultures (also S&TS 356[3561]) (CA)]**

Spring. 4 credits. Not offered 2006-2007; next offered 2007-2008.

For description, see S&amp;TS 356.]

**INFO 372(3720) Explorations in Artificial Intelligence**

Spring. 3 credits. Prerequisites: MATH 111 or equivalent, information science approved statistics course, and COM S 211 or permission of instructor.

For description, see INFO 372 in CIS section.

**[INFO 387(3871) The Automatic Lifestyle: Consumer Culture and Technology (also S&TS 387[3871])]**

Spring. 4 credits. Not offered 2006-2007; next offered 2007-2008.

For description, see S&amp;TS 387.]

**[INFO 429(4290) Copyright in the Digital Age (also COMM 429[4290]) (CA)]**

Fall. 3 credits. Not offered 2006-2007; next offered 2007-2008.

For description, see COMM 429.]

**INFO 430(4300) Information Retrieval (also COM S 430[4300])**

Fall. 3 credits. Prerequisite: COM S/ENGRD 211 or equivalent.

For description, see COM S 430 in CIS section.

**INFO 431(4302) Web Information Systems (also COM S 431[4310])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

For description, see COM S 431 in CIS section.

**INFO 435(4350) Seminar on Applications of Information Science (also INFO 635[6350])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent; experience in using information systems.

For description, see INFO 435 in CIS section.

**INFO 440(4400) Advanced Human-Computer Interaction Design (also COMM 440[4400])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

For description, see COMM 440.

**INFO 445(4450) Seminar in Computer-Mediated Communication (also COMM 445[4450])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

For description, see COMM 445.

**INFO 447(4470) Social and Economic Data (also ILRLE 447[4470])**

Spring. 4 credits. Prerequisites: one semester of calculus, IS statistics requirement, at least one upper-level social science course, or permission of instructor.

For description, see INFO 447 in CIS section.

**INFO 450(4500) Language and Technology (also COMM 450[4500])**

Spring. 3 credits. Prerequisites: COMM 240 or 245 or permission of instructor.

For description, see COMM 450.

**INFO 490(4900) Independent Reading and Research**

Fall, spring. 1-4 credits.

Independent reading and research for undergraduates.

**INFO 491(4910) Teaching in Information Science, Systems, and Technology**

Fall, spring. Variable credit.

Involves working as a TA in a course in the information science, systems, and technology major.

**INFO 515(5150) Culture, Law, and Politics of the Internet**

Fall. 4 credits.

For description, see INFO 515 in CIS section.

**INFO 530(5300) The Architecture of Large-Scale Information Systems (also COM S 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or COM S 432.

For description, see COM S 530 in CIS section.

**INFO 614(6140) Cognitive Psychology (also COGST 614, PSYCH 614[6140])**

Fall. 5 credits. Two components: PSYCH 214 (3 credits) and COGST 501 (2 credits). Intended for graduate students; undergraduates opting for 5 credits should enroll simultaneously in PSYCH 214 and COGST 501.

For description, see PSYCH 614.

**INFO 630(6300) Human Language Technology (also COM S 630[6300])**

Spring. 4 credits. Prerequisite: basic knowledge of linear algebra and probability theory; basic programming skills.

For description, see COM S 630 in CIS section.

**INFO 634(6341) Information Technology in Sociocultural Context (also S&TS 634[6341])**

Spring. 4 credits. Prerequisite: permission of instructor.

For description, see S&amp;TS 634.

**INFO 635(6390) Seminar on Applications of Information Science (also INFO 435[4350])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent, and experience in using information systems. Undergraduates and master's students should enroll in INFO 435; Ph.D. students should enroll in INFO 635.

For description, see INFO 635 in CIS section.

**INFO 640(6400) Human-Computer Interaction Design (also COMM 640[6400])**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 640.

**INFO 645(6450) Seminar in Computer-Mediated Communication (also COMM 645[6450])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 645.

**INFO 648(6648) Speech Synthesis by Rule (also LING 648[6648])**

Spring. 4 credits. Prerequisite: LING 401, 419, or permission of instructor.

For description, see LING 648.

**INFO 650(6500) Language and Technology (also COMM 650[6500])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 650.

**INFO 685(6850) The Structure of Information Networks (also COM S 685[6850])**

Fall or spring. 4 credits. Prerequisite: COM S 482.

For description, see COM S 685 in CIS section.

**INFO 709(7090) IS Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in information science.

**INFO 747(7400) Social and Economic Data (GR-RDC) (also ILRLE 740[7400])**

Spring. 4 credits. Limited to Ph.D. and research master's students.

For description, see INFO 747 in CIS section.

**INFO 790(7900) Independent Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Independent research for M.Eng. students and pre-A exam Ph.D. students.

**INFO 990(9900) Thesis Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Thesis research for post-A exam Ph.D. students.

## LANDSCAPE ARCHITECTURE

P. J. Trowbridge, chair (446 Kennedy Hall, 255-1649); M. I. Adleman, S. Baugher, K. L. Gleason, H. W. Gottfried, A. Hammer, P. H. Horrigan, R. Jaenson, D. W. Krall, L. J. Mirin, A. Okigbo, R. T. Trancik, R. W. Venables

### **LA 140(1400) The Symbols of New York State's Cultural Landscape (CA) (LA)** Spring. 3 credits.

Lectures with slides and other media illustrate how successive waves of New Yorkers continually defined and redefined their sense of place and "the power of place" by references to natural symbols such as Niagara Falls and to human constructions such as towns of Iroquois long houses and cities of skyscrapers.

### **LA 141(1410) Grounding in Landscape Architecture**

Fall. 4 credits. Limited to 15 students. Letter grades only. Fee for required drafting equipment plus materials for projects: approx. \$250.

Introduction to the representation and design of landscapes and to working in a studio setting. Uses freehand drawing, measured drawing, and model making to understand design principles of the changing landscape.

### **LA 142(1420) Grounding in Landscape Architecture**

Spring. 4 credits. Limited to approx. 20 students. Prerequisite: freshman landscape architecture majors or permission of instructor. Required drafting equipment plus project supplies: approx. \$250.

Applies fundamentals of landscape design to small-scale site-planning projects. Work in the studio introduces students to the design process, design principles, construction materials, planting design, and graphics.

### **LA 155(1550) American Indian Cultural Landscapes: Changes in Time (D) (CA) (LA)**

Fall. 3 credits.

Lectures with slides and other media illustrate American Indian cultures and philosophies both before and after 1492. A major focus is on how all Indian societies, from hunting societies to agricultural communities, continually transformed their cultural landscapes. Lectures also include how European expansion forcefully transformed American Indian cultural landscapes.

### **LA 201(2010) Medium of the Landscape**

Fall. 5 credits. Prerequisite: landscape architecture majors. Required drafting equipment, supplies, and fees: approx. \$200; field trip: approx. \$250.

Studio course emphasizing the design process and principles involved in organizing and giving form to outdoor space through the use of structures, vehicular and pedestrian circulation systems, earthforms, water, and vegetation.

### **LA 202(2020) Medium of the Landscape** Spring. 5 credits. Prerequisite: LA 201 with grade of C or better. Supplies and fees: approx. \$250; field trip: approx. \$250.

Focuses on the role of materials in design, design theory, and design vocabulary associated with landscape architecture projects.

### **LA 215(2150) Sophomore Seminar: Engaging Places**

Fall. 4 credits. Lec. A. Hammer.

Explores how places come to be what they are, how they shape—and are shaped by—the people who live in them, how they become coordinates for plotting both a culture's biography and the meaning of a life. While the course serves as an introduction to cultural landscape studies, or the interaction of people and place, its focus is on writing: how do we represent the complexity of a place and our relation to it?

### **LA 261(2610) Fieldwork in Urban Archaeology (also CRP/ARKEO 261[2610]) (CA) (LA)**

Fall. 4 credits.

Urban archaeologists study American Indian, colonial, and 19th-century sites that now lie within the boundaries of modern cities. This course explores how urban centers evolve; what lies beneath today's cities; and how various cultures have altered the urban landscape. Students participate in a local archaeological excavation. Three 8-hour Saturday field labs are required; students choose three labs from seven that are offered.

### **LA 262(2620) Laboratory in Landscape Archaeology (also ARKEO 262[2620])**

Spring. 3 credits. Prerequisites: LA 261 or ARKEO 261 or permission of instructor.

Various American Indian civilizations and European cultures have altered the landscape to meet the needs of their cultures. Students learn how to interpret the American Indian and Euro-American landscapes of specific archaeological sites by identifying and dating artifacts, studying soil samples, and creating site maps.

### **[LA 263/547(2630/5470) American Indians, Planners, and Public Policy (also CRP 363/547[3630/5470]) (D) (CA) (LA)]**

Spring. 3 credits. Offered alternate years; not offered 2006–2007.]

### **LA 266(2660) Jerusalem through the Ages (also NES 266[2660], JWST/ARKEO/RELST 266[2660]) (CA) (LA)**

Fall. 3 credits.

Explores the history, archaeology, and natural topography of Jerusalem throughout its long life, from its earliest remains in the Chalcolithic period (ca. 4000 B.C.E.) to the 19th century, including Jebusite Jerusalem, Jerusalem as the capital of the Davidic dynasty, the Roman era city of Herod and Jesus, the Crusaders and medieval Jerusalem, and Ottoman Jerusalem as the city entered the modern era. Students examine the original historical sources (e.g., Bible, Josephus, and the Madeba map) that pertain to Jerusalem. Uses slides and videos to illustrate the natural features, human-built monuments, and artifacts that flesh out the textual material, providing a fuller image of the world's most prominent spiritual and secular capital.

### **LA 282(2820) Photography and the American Landscape Architecture (CA) (LA)**

Fall. 3 credits.

Interdisciplinary study of the relationship between photography, the American landscape, and cultural meaning. Topics include representation and perception, photography and painting in the 19c, expeditionary surveys and national identity, pictorialism, the American sublime,

photography and tourism, modernism and postmodernism, the industrial landscape and American ruins, and contemporary practice.

### **LA 301(3010) Integrating Theory and Practice I**

Fall. 5 credits. Prerequisite: LA 202 with grade of C or better. Supplies and fees: approx. \$250; field trip: approx. \$250.

Engages participants in the art and science of design. The studio focuses on site-scaled projects that consider significant cultural and natural landscapes. Explores theories of landscape restoration, sustainable design, and landscape representation through projects that derive form from a specific site and place.

### **LA 315(3150) Site Engineering I**

Spring. 3 credits. Prerequisite: permission of instructor.

Lectures and studio projects focusing on the professional skills and knowledge required to competently and creatively develop grading plans for project-scale site design.

### **LA 316(3160) Site Engineering II**

Fall. 2 credits. Prerequisite: LA 315 or permission of instructor.

Lectures and studio projects dealing with earthwork estimating; storm water management, site surveys, site layout, and horizontal and vertical road alignment.

### **LA 318(3180) Site Construction**

Spring. 5 credits. Prerequisite: permission of instructor.

Emphasizes detail design and use of landscape materials in project implementation. Explores construction materials, including specifications, cost estimates, and methods used by landscape architects in project implementation are the foci for this course. Includes lectures, studio problems, and development of drawings leading to construction documentation for a comprehensive project.

### **[LA 360(3600) Pre-Industrial Cities and Towns of North America (also ARKEO 360[3600], CRP 360/666[3600/6660], LA 666[6660]) (CA) (LA)]**

Fall. 3 credits. Not offered 2006–2007.]

### **LA 401(4010) Advanced Synthesis: Project Design**

Fall. 5 credits.

Site design and construction projects introduced as an evaluation of each student's professional competency in landscape architecture.

### **LA 402(4020) Integrating Theory and Practice II**

Spring. 5 credits. Supplies and fees: approx. \$250; field trip: approx. \$250.

Studio focusing on the expression of design solutions that grow from and affirm an explicit sense of site and place. Social, cultural, physical, and historic factors and their relationships to site design and planning are critically explored through theory and practice in this studio.

### **LA 403(4030) Directed Study: The Concentration**

Fall, spring. 1 credit. Prerequisite: landscape architecture undergraduates in final year of study.

Working with their advisor, students create a written and visual paper that documents the concentration intent.

**LA 410(4100) Computer Applications in Landscape Architecture (D)**

Fall or spring. 3 credits. Limited to 15 students. Prerequisite: landscape architecture students.

Designed to develop a working knowledge of various computer software applications with emphasis on Autocad. Explores other applications relative to land-use planning and the profession of landscape architecture.

**LA 412(4120) Professional Practice**

Spring. 1 credit.

Presents the student with an understanding of the role of the professional landscape architect. The course helps students choose a type of practice and introduces the problems and opportunities one may encounter in an office or in other professional situations. Topics include job-seeking preparation, practice diversity, marketing professional services, office and project management, construction management, computers in the profession, and ethics.

**LA 418(4180) Audio Documentary: History/Sound/Landscape (CA) (LA)**

Spring. 3 credits. Limited to 15 students. Letter grades only.

Offers hands-on experience in basic audio documentary. Students create aural portraits of New York landscapes and communities undergoing critical change. Encourages projects appropriate for podcasting, webcasting and radio. Explores relationship between sound and the still or moving image.

**LA 483(4830) Seminar in Landscape Studies (CA) (LA)**

Spring. 3 credits. Prerequisite: senior or graduate standing in any major or field.

Topical seminar with a different subject and method each time it is offered.

**LA 486(4860) Placemaking by Design**

Fall. 3 credits. Limited to 20 students. Priority given to juniors, seniors, and graduate students. S-U grades optional.

Seminar providing an understanding of contemporary planning and landscape architecture design strategies that reaffirm and reclaim a sense of place. Readings and discussions focus on the theory and practice of placemaking as represented in the literature and in built works. Addresses the following questions: What constitutes a place-based design approach and what distinguishes it from other more conventional design approaches? Who are the key players shaping the theory and practice of placemaking?

**LA 491(4910) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also HORT 491[4910])**

Fall. 4 credits. Limited to 48 students. Prerequisite: horticulture or landscape architecture majors or permission of instructors. Preregistration required. Supplies: approx. \$50; field trips: approx. \$50.

Focuses on the identification, uses, and establishment of woody plants in urban and garden settings. By understanding the environmental limitations to plant growth, students are able to critically assess potential planting sites; select appropriate trees, shrubs, vines, and ground covers for a given site; and learn about the principles and practices of site amelioration and plant establishment. Design followed by written specifications and graphic details is produced to implement these practices.

**LA 492(4920) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also HORT 492[4920])**

Spring. 4 credits. Limited to 48 students.

Prerequisite: horticulture or landscape architecture majors or permission of instructors; passing grade in HORT/LA 491. Preregistration required. Supplies: approx. \$50; field trips: approx. \$50.

Second half of course focusing on winter identification, uses, and establishment of woody plants in urban and garden settings. Issues of site assessment and soil remediation are emphasized in addition to soil volume calculations, drainage and surface detailing, and planting techniques. Students critically assess potential planting sites; and select appropriate trees, shrubs, vines and ground covers for a given site. Designs for specific sites are followed by written specifications, and graphic details are produced to implement these proposals. Students implement, in a hands-on manner, site remediation and planting techniques they have learned by creating new landscapes that serve to integrate theory, principles, and practices. Together, HORT/LA 491 and 492 constitute an integrated course.

**LA 494(4940) Special Topics in Landscape Architecture**

Fall or spring. 1-3 credits; may be repeated for credit. S-U grades optional.

Topical subjects in landscape architectural design, theory, history, or technology. Group study of topics not considered in other courses.

**LA 495(4950) Green Cities: The Future of Urban Ecology (also CRP 384/584[3840/5840])**

Fall. 4 credits.

Explores the history and future of the ecology of cities and their role in solving the present global ecological crisis. Examines the politics, design, and economics of "green cities" in terms of transportation, renewable energy, solid waste and recycling, land use, and the built environment.

**LA 497(4970) Individual Study in Landscape Architecture**

Fall or spring. 1-5 credits; may be repeated for credit.

Students must register using independent study form (available in 140 Roberts Hall). S-U grades optional. Work on special topics by individuals or small groups.

**LA 498(4980) Undergraduate Teaching**

Fall or spring. 1-2 credits. Prerequisites:

previous enrollment in course to be taught and permission of instructor. Students must register using independent study form (available in 140 Roberts Hall).

Designed to give qualified undergraduates experience through actual involvement in planning and teaching courses under the supervision of department faculty members.

**LA 499(4990) Undergraduate Research**

Fall or spring. 1-5 credits. Students must register using independent study form (available in 140 Roberts Hall).

Permits outstanding undergraduates to carry out independent research in landscape architecture under appropriate faculty supervision. Research goals should include description, prediction, and explanation, and should generate new knowledge in the field of landscape architecture.

**LA 501(5010) Composition and Theory**

Fall. 5 credits. Prerequisite: graduate standing. Drafting supplies and fees: approx. \$250; field trip: approx. \$250.

Basic principles of natural and cultural processes that form "places" in the landscape. Projects focus on design applied to the practice of landscape architecture: particularly the relationship between measurement, process, experience, and form at multiple scales of intervention.

**LA 502(5020) Composition and Theory**

Spring. 5 credits. Prerequisite: graduate standing. Drafting supplies and fees: approx. \$250; field trip: approx. \$250.

Studio focusing on the spatial design of project-scale site development. Students develop their expertise in applying the design theory, vocabulary, and graphic expression introduced in LA 501.

**LA 505(5050) Landscape Representation I**

Fall. 3 credits. Corequisite: LA 501 or permission of instructor.

Introduces students to both conventional and unconventional modes of landscape architectural design representation. Teaches drafting, orthographic drawing, axonometric project, lettering, analysis, and concept drawing alongside more expressive modes of direct site study and representation.

**LA 506(5060) Graphic Communication II**

Spring. 3 credits. Prerequisite: LA 505.

Corequisite: LA 502 or permission of instructor.

Intermediate-level course focusing on modes of landscape representation from ideation to presentation. Representation modes may include freehand, process drawing, analysis and orthographic drawing; concept modeling; composite drawings; and visual books.

**LA 524(5240) History of European Landscape Architecture\***

Fall. 3 credits.

\*Offered through College of Architecture, Art, and Planning.

**LA 525(5250) History of American Landscape Architecture\***

Spring. 3 credits.

\*Offered through College of Architecture, Art, and Planning.

**LA 545(5450) The Parks and Fora of Imperial Rome**

Spring. 3 credits. Prerequisites: advanced standing in a design field, classics, or history of art, other disciplines, or permission of instructor.

Advanced seminar seeking an interdisciplinary group of students in classics, art history, archaeology, landscape architecture, horticulture, and architecture to bring their knowledge of Latin, Greek, Italian, archaeology, drawing, design, or computer modeling to a collaborative study of the ancient forums and public parks depicted on the Severan Marble plan of Rome. Opportunity for a spring break trip to Rome.

**[LA 569(5690) Archaeology in Preservation Planning and Site Design (also CRP 569[5690])**

Spring. 3 credits. Offered alternate years; not offered 2006-2007.]

**LA 580(5800) Landscape Preservation: Theory and Practice**

Fall. 3 credits. Prerequisite: junior, senior, or graduate standing.

Examines the evolving practice of landscape preservation in the United States. Topics include the recent history of the discipline, methodology in documentation of historic landscapes, and important practitioners and notable projects. Format is assigned readings and discussion, invited speakers, lectures, and a project documenting a local site.

**LA 582(5820) Photography and the American Landscape Architecture**

Fall. 3 credits.

Interdisciplinary study of the relationship between photography, the American landscape, and cultural meaning. Topics include representation and perception, photography and painting in the 19c, expeditionary surveys and national identity, pictorialism, the American sublime, photography and tourism, modernism and postmodernism, the industrial landscape and American ruins, and contemporary practice.

**LA 590(5900) Theory Seminar**

Spring. 3 credits. Prerequisite: senior or graduate standing.  
Seminar in landscape design theory.

**LA 598(5980) Graduate Teaching**

Fall or spring. 1-3 credits. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). Staff.  
Designed to give qualified students experience through involvement in planning and teaching courses under the supervision of faculty members. The experience may include leading discussion sections, preparing, assisting in desk critiques, and presenting lectures. There are assigned readings and discussion sessions on education theory and practice throughout the semester. (Credit hours are determined by the formula: 2 hours per week = 1 credit hour).

**LA 601(6010) Integrating Theory and Practice I**

Fall. 5 credits. Prerequisite: graduate standing or permission of instructor.  
Supplies and fees: approx. \$250.  
Studio focusing on site-scaled projects that consider significant cultural and natural landscapes. Explores theories of landscape restoration, sustainable design, and landscape representation are explored through projects that derive form from specific site and place. The integration of site history, ecology, and site construction supports an understanding and relationship between design and site. This course will also engage sound and landscape, requiring students to also register for the 1-credit seminar LA 605.

**LA 602(6020) Integrating Theory and Practice II**

Spring. 5 credits. Prerequisite: graduate standing. Drafting supplies and fees: approx. \$250; field trip: approx. \$250.  
Studio building on prior course work with an expectation that participants can creatively manipulate the program and conditions of a site, with increased emphasis on contemporary construction technology. Focuses on the expression of design solutions that grow from and affirm an explicit sense of site and place. Social, cultural, physical, and historic factors and their relationship to site design and planning are critically explored through theory and practice.

**LA 603(6030) Directed Study: The Concentration**

Fall, spring. 1 credit. Prerequisite: landscape architecture graduate students in final year of study.  
Working with their advisor, students create a written and visual paper that documents the concentration intent.

**LA 605(6050) Sound + Landscape Architecture**

Fall. 1 credit. Must be taken with LA 601. Letter grades only.  
Much landscape design privileges the eye. Sound and Landscape focuses on designing for the ear as well. Explores landscapes in terms of their sonic dimensions: their keynotes, signals, and soundmarks. Offers tools for mapping and analyzing the acoustic profile of a site. Introduces basic digital recording and editing skills and considers how sound may be integrated with visual presentations.

**LA 615(6150) Site Engineering I**

Spring. 3 credits. Prerequisite: permission of instructor.  
Lectures and studio projects focusing on the professional skills and knowledge required to competently and creatively develop grading plans for project-scale site design.

**LA 616(6160) Site Engineering II**

Fall. 2 credits. Prerequisite: LA 615 or permission of instructor.  
Lectures and studio projects dealing with earthwork estimating, storm water management, site surveys, site layout, and horizontal and vertical road alignment.

**LA 618(6180) Site Construction**

Spring. 5 credits. Prerequisite: permission of instructor.  
Emphasizes detail design and use of landscape materials in project implementation. Explores materials, including specifications, cost estimates, and methods used by landscape architects in project implementation. Includes lectures, short studio problems, and the development of drawings leading to construction documentation for a comprehensive project.

**[LA 666(6660) Pre-Industrial Cities and Towns of North America (also CRP 666(6660)) (D)]**

Fall. 3 credits. Not offered 2006-2007.]

**LA 680(6800) Graduate Seminar in Landscape Architecture**

Fall or spring. 1-3 credits; may be repeated for credit. Prerequisite: graduate standing. S-U grades optional.  
Topical subjects in landscape architectural design, theory, history, or technology. Includes seminar topics and group study not considered in other courses.

**LA 694(6940) Special Topics in Landscape Architecture**

Fall or spring. 1-3 credits; may be repeated for credit. S-U grades optional.  
Topical subjects in landscape architectural design, theory, history, or technology. Includes group study of topics not considered in other courses.

**LA 701(7010) Urban Design and Planning: Designing Cities in the Electronic Age (also CRP 555(5550))**

Fall. 5 credits. Prerequisite: graduate standing. Supplies and fees: approx. \$250; required field trip: approx. \$250.

Application of urban-design and town-planning techniques to specific contemporary problems of city environments. Investigates issues of urbanism and applies them to physical design interventions and spatial typologies involving the street, square, block, garden, and park systems. Introduces three-dimensional computer modeling and digital design media as tools for urban design. This is a specially arranged collaborative studio with the Department of City and Regional Planning.

**LA 702(7020) Advanced Design Studio**

Spring. 5 credits.  
Capstone studio providing the opportunity to explore issues in contemporary landscape architecture and to integrate related fields. Topics include the influences of culture, history, and criticism, as well as reinterpretations of engineering and representation.

**LA 800(8000) Master's Thesis in Landscape Architecture**

Fall or spring. 9 credits.  
Independent research, under faculty guidance leading to the development of a comprehensive and defensible design or study related to the field of landscape architecture. Work is expected to be completed in final semester of residency.

## NATURAL RESOURCES

B. A. Knuth, chair (117 Fernow Hall, 255-2822); M. B. Bain, B. L. Bedford, B. Blosser, T. Brown, L. E. Buck, E. Cooch, P. Curtis, D. J. Decker, J. Dickinson, J. Enck, T. J. Fahey, T. A. Gavin, J. W. Gillett, G. Goff, J. R. Jackson, C. Kraft, M. E. Krasny, J. P. Lassoie, B. Lauber, R. A. Malecki, E. Mills, S. Morreale, M. Muskett, M. E. Richmond, L. Rudstam, R. Schneider, R. Sherman, P. J. Smallidge, C. R. Smith, K. Sullivan, P. Sullivan, J. Tantillo, N. Trautmann, S. Wolf, J. B. Yavitt

**NTRES 100(1001) Introduction to Environmental Studies**

Summer. 3 credits. S-U grades optional.  
R. J. McNeil.  
Discussion-centered course examining the interrelationships between the sciences, arts, and humanities as they relate to our environment. Students explore how we manage nature and negotiate with each other to meet our needs. Emphasis is on principles of ecology, economics, aesthetics, ethics, and law.

**NTRES 101(1010) Intro to the Science and Management of Environmental and Natural Resources (also SNES 101(1010))**

Fall. 3 credits. Prerequisite: first-year students in Natural Resources, Science of Natural and Environment Systems, or other "environmental cluster" areas in CALS.  
J. Lassoie and E. Madsen.  
This course provides an overview of the science and management of natural and environmental resources. Material highlights facts and principles from the physical, biological, social, and economic sciences. The focus is on identifying knowledge required to enhance intelligent and sustainable management of the Earth's ecological and environmental systems. Case studies, guided readings, multi-media presentations, discussions, and field and laboratory exercises are used to introduce students to the



interdisciplinary basis for understanding the complexities of such systems within the text of modern society. Active student participation in all phases of the course is expected.

**NTRES 102(1020) Science Fiction and Environment**

Summer. 3 credits. S-U grades optional. R. J. McNeil.

This course is intended to be primarily for Summer College students (high school rising seniors), new freshmen, Cornell staff, and other people with an interest in, but little formal background in environmental studies. Science fiction short stories and two books will be used as vehicles for illustrating environmental predicaments and to enable easy discussion of environmental principles which may be helpful to us in choosing ways to live. Some extra attention to studying and learning may be helpful to new college students.

**NTRES 201(2010) Environmental Conservation**

Spring. 3 credits. T. Fahey.

At the beginning of the 21st century, our lives increasingly are touched by questions about environmental degradation at local, regional, and global scales. Business as usual is being challenged. This course stimulates students to go beyond the often simplistic portraits of the environmental dilemma offered by the mass media to gain a firmer basis for responsible citizenship and action on environmental issues.

**NTRES 210(2100) Introductory Field Biology**

Fall. 4 credits. Limited to 60 students. Prerequisite: sophomore or junior standing with advisor in natural resources or permission of instructor; BIO G 101 and 102 or equivalent. Cost of two required overnight weekend field trips: approx. \$12. T. Gavin and C. Smith.

Introduction to methods of inventorying, identifying, and studying plants and animals. Students are required to learn taxonomy, natural history, and how to identify approximately 170 species of vertebrates and 80 species of woody plants. Stresses selected aspects of current ecological thinking. Emphasizes the interaction of students with biological events in the field and accurate recording of those events.

**NTRES 232(2320) Nature and Culture (HA) (CA)**

Spring. 3 credits. S-U grades optional. J. Tantillo.

We will examine the history of human-environment relationships, the diversity of environmental values and ethics, cultural manifestations of nature, and the role of society in forming natural resource and environmental policy. The history of natural resource conservation and management in North America, including the history and philosophy of ecology, will be introduced.

**NTRES 303(3030) Introduction to Biogeochemistry (also EAS 303(3030))**

Fall. 4 credits. Prerequisites: college-level chemistry and a biology and/or geology course. J. B. Yavitt and L. A. Derry.

For description, see EAS 303.

**NTRES 310(3100) Applied Population Ecology**

Fall. 3 credits. Prerequisite: completion of calculus (MATH 106, 111, or equivalent). Highly recommended: background in biology or ecology. Letter grades only. E. Cooch.

In-depth analysis of the ecological factors influencing the natural fluctuation and regulation of animal population numbers. Examines models of single- and multi-species population dynamics, with emphasis on understanding the relationship between ecological processes operating at the individual level and subsequent dynamics at the population level. Significant emphasis is placed on principles as applied to conservation and management. Computer and field-based exercises are used to reinforce concepts presented in lecture.

**NTRES 311(3110) Fish Ecology, Conservation, and Management**

Spring. 3 credits. Prerequisites: none. Recommended: NTRES 210, BIOEE 261, or equivalent. E. Mills, L. Rudstam, and R. Jackson.

Covers basic principles of fish ecology at the individual, population, and community level, particularly as they relate to interactions between fish and their environment and the implications of human activities to these relationships. Emphasizes the application of ecological principles to the conservation and management of fisheries resources and aquatic habitats. Extensive use of current literature and case studies will provide context for principles covered.

**NTRES 312(3111) Fish Ecology Laboratory**

Spring, four field trips TBA. 1 credit. Pre- or corequisite: NTRES 311. E. Mills, L. Rudstam, and R. Jackson.

Four field trips are planned to provide hands-on experiences in fish ecology and management. They include: a one-weekday Great Lakes experience aboard the USGS Kahoe on Lake Ontario, a one-day Oneida Lake trip to a state-of-the-art fish hatchery during the walleye run, a one-day Oneida Lake weekend trip to the Cornell Biological Field Station experiencing fish collection techniques, and a two-hour trip to Cayuga Inlet to witness the spring run of rainbow trout and possibly lamprey eels. Activities include demonstrations of various fish sampling gears and sample analysis techniques. Each student is required to maintain a written journal describing activities and concepts learned from each field trip that will be turned in at the end of the semester.

**NTRES 313(3130) Biological Statistics I (also BTRY 301(3010))**

Fall. 4 credits. Prerequisite: one semester of calculus. P. Sullivan.

Develops statistical methods and applies them to problems encountered in the biological and environmental sciences. Methods include data visualization, population parameter estimation, sampling, bootstrap resampling, hypothesis testing, the Normal and other probability distributions, and an introduction to modeling. Applied analysis is carried out in the Splu statistical computing environment.

**NTRES 314(3140) Conservation of Birds**

Spring or summer. 2 credits. Prerequisite: NTRES 210 or permission of instructor. Offered alternate odd years; next offered 2007. C. R. Smith.]

**NTRES 315(3141) Conservation of Birds Laboratory**

Spring or summer. 1 credit. Corequisite: NTRES 314. Sat. A.M., TBA. Offered alternate odd years; next offered 2007. C. R. Smith.]

**NTRES 322(3220) Global Ecology and Management**

Spring. 3 credits. Prerequisites: college-level biology and general ecology course. J. B. Yavitt.

The subjects of biogeography, ecology, and biodiversity have patterns and processes that emerge only at the global scale. Recognizing the global importance of these patterns and processes is even more imperative in light of the tremendous increase in the human population size and the effects of humans on the Earth. This course is an introduction to the field of global ecology. Topics include comparative ecology and biogeography, community ecology, island biogeography, and ramifications of global climatic change.

**NTRES 323(3230) Principles of Toxicology (also TOX 323(3230))**

Spring. 3 credits. Prerequisites: one year each of chemistry and biology with labs; one semester of organic chemistry lecture or permission of instructor. Not offered 2006-2007.]

**NTRES 324(3240) Ecological Management of Water Resources**

Spring. 3 credits. Prerequisites: introductory ecology and introductory chemistry or permission of instructor. R. Schneider.

In-depth analysis of those ecological and biological principles relevant to the management of fresh and marine water resources, with emphasis on the effects of water management on community ecology. Lectures and discussion integrate scientific literature with current management issues. Topics include linkages between hydrologic variability and communities; groundwater-surface connections, flow paths for dispersal, patchily distributed water resources, and water quality controls on organisms.

**NTRES 325(3250) Forest Management and Maple Syrup Production**

Spring. 3 credits. Letter grades only. Offered alternate even years; next offered 2007-2008. P. J. Smalldge.

Practical, field-oriented course emphasizing principles and practices of stewardship and multiple purpose management of small, nonindustrial, private forest land in the northeastern United States, including the production of maple syrup.]

**NTRES 326(3260) Applied Conservation Ecology**

Spring. 3 credits. Prerequisite: BIOEE 261 or permission of instructor. S. Morreale.

Field and lab course designed to provide direct experience with some of the most important field methods and analytical techniques used to examine ecosystem and community function, structure, and value, especially within the context of contemporary conservation ecology and evolutionary theory. Tools include field sampling techniques, resource and conservation mapping, spatial referencing, GIS, measures of biodiversity, and manual and automated techniques for studying soil, stream, and forest biota and related physical factors.

**NTRES 330(3300) Natural Resources Planning and Management**

Fall. 3 credits. Prerequisite: junior standing. T. B. Lauber.

Focuses on terrestrial and aquatic resources. Emphasizes the comprehensive planning process and human dimensions of resource management. Students integrate biological, social, and institutional dimensions of management through case studies. Grades are based on individual and group performance.

**NTRES 331(3310) Environmental Governance (also S&TS/B&SOC 331(3311)) (SBA)**

Spring. 3 credits. S. Wolf.

Considers the question of environmental governance, defined as the assemblage of social institutions that regulate natural resource use and shape environmental outcomes. Participants explore the roles of public policy, market exchange, and collective action in resource (mis)management. Introduces theoretical concepts from a variety of social science perspectives to support case studies and student-led discussions. Comparative analysis of how governance is pursued in different countries, historical periods, and ecological contexts (forestry, endangered species, water quality) highlight scope for institutional innovation. Course details at [www.dnr.cornell.edu/saw44/ntres331.html](http://www.dnr.cornell.edu/saw44/ntres331.html).

**NTRES 332(3320) Introduction to Ethics and Environment (KCM)**

Fall. 4 credits. J. Tantillo.

Introduction to ethics, aesthetics, and epistemology as related to the environment. Asks the question "How should I live?" and explores the implications of different answers to that question for our treatment of nature. Also examines the various approaches to ethics theory; the relations between art, literature, religion, and mortality; the objective nature of value judgments; and the subjective nature of nature.

**NTRES 333(3330) Environmental Issues and Indigenous People (also AIS 333(3330)) (CA) (D)**

Spring. 3 credits. M. Muskett.

Explores environmental perceptions and relationships held by indigenous people. Interpretations of the relationships between Indians and nature are examined through the concepts of connective and holistic interrelationship, community, identity, and the sacredness of nature. These concepts are illustrated with specific legal cases, stories, individual perceptions, and current environmental case studies.

**NTRES 336(3360) History of Environmental Sciences (HA)**

Fall. 3 credits. S-U grades optional. M. Muskett.

This course will review ideas about the environment in the natural sciences, from early human thoughts of nature to modern technological advancement. It will examine scientific culture, its narratives, and its relationships to aspects of nature and society. Rather than judge various approaches to environmental sciences, the course seeks to understand them by their own terms and theoretical assumptions within the historical and cultural circumstances that shaped them.

**[NTRES 406(4060) Ecology Risk Assessment (also TOX 406(4060))]**

Fall. 3 credits. Prerequisites: BIOEE 261 or equivalent; an advanced students in natural sciences or engineering or permission of instructor. Not offered 2006–2007.]

**NTRES 410(4100) Conservation Biology: Concepts and Techniques**

Fall. 4 credits. Limited to first 30 seniors, plus graduate students. Prerequisite: NTRES 210 recommended; NTRES 310 or equivalent required. E. G. Cooch and T. A. Gavin.

Thorough analysis the ecological and quantitative dimensions for decision making in modern conservation biology and management. Emphasizes analysis of variation and maintenance of biological diversity, and focuses on principles and techniques, including demographic viability analysis of populations, genetic analysis, as well as aspects of the human dimensions of conservation biology.

**[NTRES 411(4110) Quantitative Ecology and Management of Fisheries Resources]**

Spring. 4 credits. Prerequisites: NTRES 313 recommended or permission of instructor. S-U grades optional. Offered alternate years; next offered 2008–2009. P. J. Sullivan.

Examines the dynamics of marine and freshwater fisheries resources with a view toward observation, analysis, and decision making within a quantitative framework. Growing pressure on fisheries' resources, habitat modification, and increased uncertainty about the nature of biological systems are at the center of many fisheries' issues. Quantitative models are useful for integrating information needed by decision makers in addressing these issues. The course develops analytical methods to assess the dynamics and status of fisheries' resources and then demonstrates how the information may be transformed into useful information for decision makers.]

**[NTRES 412(4120) Wildlife Population Analysis: Techniques and Models]**

Spring. 3 credits. Prerequisites: NTRES 310 (or equivalent or permission of instructor), a college-level math or statistics course. Next offered 2007–2008. E. Cooch.]

**NTRES 413(4130) Biological Statistics II (also BTRY 302(3020))**

Spring. 4 credits. Prerequisite: NTRES 313 or BTRY 301. Staff.

Applies linear statistical methods to quantitative problems addressed in biological and environmental research. Methods include linear regression, inference, model assumption evaluation, the likelihood approach, matrix formulation, generalized linear models, single factor and multifactor analysis of variance (ANOVA), and a brief foray into nonlinear modeling. Applied analysis is carried out in the Splus statistical computing environment.

**[NTRES 414(4140) A Darwinian Perspective on Human Behavior and Natural Resources]**

Spring. 2 credits. Prerequisite: BIONB 212 or permission of instructor. Offered alternate even years; next offered 2007–2008. T. Gavin.

Seeks to understand why human behavior, a product of natural selection and cultural factors, seems to result in environmental

degradation. Once students understand the probable underlying basis for this human behavior, the course explores possible methods for altering this behavior.]

**NTRES 420(4200) Forest Ecology**

Fall. 3 credits. Prerequisite: introductory biology. T. J. Fahey.

Comprehensive analysis of the distribution, structure, and dynamics of forest ecosystems. Topics include paleoecology of forests; ecophysiology of forest trees; disturbance, succession and community analysis; primary productivity; and nutrient cycling.

**NTRES 421(4201) Forest Ecology Laboratory**

Fall. 1 credit. Corequisite: NTRES 420. Weekend trip: approx. \$30. T. J. Fahey. Field trips designed to familiarize students with the nature of regional forests and to provide experience with approaches to quantifying forest composition and its relation to environmental factors. Optional weekend field trips to Adirondacks and to the White Mountains, New Hampshire. Includes group research projects in local forests.

**NTRES 422(4220) Wetland Ecology and Management—Lecture**

Fall. 3 credits. Prerequisite: BIOEE 261. B. L. Bedford.

Examination of the structure, function, and dynamics of wetland ecosystems with an emphasis on ecological principles required to understand how human activities affect wetlands. Topics include geomorphology, hydrology, biogeochemistry, plant and animal adaptations to wetland environments, and vegetation dynamics of freshwater and saline wetlands. Considers current regulations, protection programs, and management strategies.

**NTRES 423(4221) Wetland Ecology and Management—Laboratory**

Fall. 1 credit. Optional. Corequisite: NTRES 422. One weekend field trip required. B. L. Bedford.

Integrated set of field and laboratory exercises designed to expose students to the diversity of wetland ecosystems; the vegetation, soils, water chemistry, and hydrology of wetlands in the region; methods of sampling wetlands vegetation, soils, and water; and methods of wetland identification and delineation.

**NTRES 424(4240) Landscape Impact Analysis**

Spring. 3 credits. Prerequisites: junior standing; one introductory and one advanced course in ecology or equivalents. B. L. Bedford.

Presents ecological concepts and analytical tools needed to evaluate environmental impacts to natural resources and ecosystems within an integrated context that incorporates the landscapes in which these resources occur. Explores diverse conceptual frameworks for landscape impact analysis and exposes students to modern tools for evaluating landscapes.

**NTRES 426(4260) Practicum in Forest Farming as an Agroforestry System (also HORT/CSS 426(4260))**

Fall. 2 credits. K. W. Mudge, L. E. Buck, and P. Hobbs.

Students actively take part in the development and management of a 70-year-old nut grove originally planted at Cornell in the 1930s. The MacDaniel's Nut Grove is being developed as a multipurpose forest-farming teaching,

research, and extension site. Hands-on activities include all or most of the following: temperate-nut harvest and variety evaluation, mushroom culture, small-fruit and fruit-tree culture, medicinal-herb culture, site evaluation and planning, and field trips to other agroforestry-related sites. Outdoor activities are integrated with selected readings via an online discussion board.

**[NTRES 427(4270) Ecoregions: Ecology and Conservation]**

Spring. 2 credits. Prerequisites: NTRES 210, 310; junior standing or above. Recommended: statistics course. Letter grades only. Lec/lab. Offered alternate even years; next offered 2007-2008. C. R. Smith.]

**[NTRES 428(4280) Principles and Practices of Applied Wildlife Science]**

Spring. 3 credits. Prerequisites: NTRES 310 or equivalent; permission of instructor. S-U grades optional. Offered alternate even years; next offered 2007-2008. M. E. Richmond, R. A. Malecki, and P. D. Curtis. The course covers the theory and practice of solving wildlife-related resource issues. Differences between basic and applied wildlife science will be discussed. The application of basic science and the scientific method will be integrated into community/agency-based problem solving. Issues and approaches to management of terrestrial and wetland wildlife will be discussed with emphasis on technical, logistical, analytical, and communication skills.]

**[NTRES 430(4300) Environmental and Natural Resources Policy Processes]**

Spring. 3 credits. Prerequisites: junior standing; special application process. Lec, Wash., D.C., during Jan. 11-day winter session; three two-hour orientation sessions in fall semester and four two-hour sessions in Feb. and March. Fee: approx. \$450. Completed applications due by October 12. Applications available by contacting map10@cornell.edu or at www.dnr.cornell.edu/teaching/ugrad/courses/. B. A. Knuth.

Intensive field-based exploration of the environmental policy process and its conceptual framework. Defining environmental problems; aggregating interests; agenda-setting; formulating and selecting alternative solutions; implementation and evaluation stages; roles of lobbyists, legislature, executive branch, and other actors. Case studies; discussion with about 20 prominent Washington policymakers who appear as guest panelists. Self-selected research topic requires conducting independent interviews with Washington experts, policy analysis paper, and oral presentation.

**[NTRES 431(4310) Environmental Strategies (SBA)]**

Spring. 3 credits. S. Wolf. Research-oriented seminar focused on conservation of natural resources in the contemporary political and institutional environment. We study opportunities to mobilize market mechanisms and competitive strategies of firms to harmonize economic and environmental demands on ecological systems. Through production of a portfolio of analyses of real-world integrated environmental management schemes, students will come to understand the mechanics of this general class of environmental policy tools and develop a critique as to why the market

does not represent a comprehensive approach to sustainability. Course details at www.dnr.cornell.edu/saw44/ntres431.html.

**[NTRES 432(4320) Human Dimensions of Natural Resource Management]**

Spring. 3 credits. Prerequisite: junior or senior standing. S-U grades optional. J. Enck.

Focuses on how a social science-based understanding of human attitudes, values, and behaviors can be incorporated in natural resource management decisions and actions. Uses examples from federal, state, and nongovernmental fish, wildlife, and forest management programs to illustrate the importance of socioeconomic considerations in problem solving and decision making.

**[NTRES 433(4330) Applied Environmental Philosophy (KCM)]**

Spring. 3 credits. Recommended: NTRES 332. J. Tantillo.

Focuses on environmental philosophy and environmental ethics considered as an academic field. Major themes include anthropocentrism versus non-anthropocentrism, intrinsic value, monism versus pluralism, animal rights versus environmental ethics, and various approaches to environmental ethics, including deep ecology, ecofeminism, and pragmatism.

**[NTRES 434(4340) International Conservation: Communities and the Management of the World's Natural Resources]**

Fall. 3 credits. Letter grades only. Next offered 2007-2008. J. Lassoie.

Lectures, readings, and multimedia information, including the Internet, build a multidisciplinary understanding of the principles underpinning conservation and natural-resource management. Specific attention is given to the role of local communities in developing sustainable land-use strategies. Case studies from Africa, Latin America, Asia, and the United States examine particular conservation and management issues from widely different geopolitical perspectives. Stakeholder analyses are used to base discussions of each case, followed by a synthesis and discussion of key contrasts and comparisons centered on common themes identified during the course.]

**[NTRES 435(4350) Tribal Governance and Environmental Policy (also AIS 435[4350]) (CA)]**

Fall. 3 credits. S-U grades optional. M. Muskett.

This course explores historical tribal relationships to the environment and current environmental policies. Tribal environmental governance has a contested history in which Western land use and environmental policies have clashed with tribal land use and environmental policies because of different understandings of land relationships. The course examines interactions between tribal nations and federal, state, and local governments, and evaluates environmental policy and management of Native American lands.

**[NTRES 444(4440) Resource Management and Environmental Law (also CRP 444[4440])]**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing. S-U grades optional. R. Booth.

For description, see CRP 444.

**[NTRES 456(4560) Stream Ecology (also BIOEE 456[4560])]**

Fall. 4 credits. Limited to 40 students. Prerequisite: BIOEE 261 or permission of instructor. S-U grades optional. One Sat field trip. Offered alternate odd years; next offered 2007-2008. C. Kraft and A. Flecker. Lecture examines patterns and processes in stream ecosystems, including geomorphology and hydrology, watershed-stream interactions, trophic dynamics, biogeochemistry, disturbance, and conservation and management. Field and laboratory exercises focus on experimental and analytical techniques used to study stream ecosystems, including techniques to measure stream discharge, physical habitat, water chemistry, and stream biota. Field project with lab papers.]

**[NTRES 480(4800) Global Seminar: Building Sustainable Environments and Secure Food Systems for a Modern World (also FD SC/IARD 480[4800])]**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing. J. Lassoie and D. Miller.

Modernization has led to development pressures that have increasingly disrupted natural systems leading to widespread concerns about the long-term viability of important environmental services, including those critical to food security worldwide. This multidisciplinary course uses case studies to explore interrelationships among social, economic, and environmental factors basic to sustainable development. Cases examine contemporary issues such as population growth, genetically modified foods, biodiversity, sustainable marine fisheries, tourism, global warming, and global responsibility. Cornell faculty members lead discussions in each of the major topic areas. In addition, students participate in discussions and debates with students from Sweden, Costa Rica, Honduras, South Africa, and Australia through live interactive videoconferences and electronic discussion boards.

**[NTRES 493(4930) Individual Study in Resource Policy, Management, and Human Dimensions]**

Fall, spring, or winter. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). R. A. Baer, T. Brown, L. E. Buck, D. J. Decker, J. Enck, J. Gillett, B. Knuth, T. B. Lauber, M. Muskett, J. Tantillo, and S. Wolf.

Topics in environmental and natural resource policy, management, and human dimensions are arranged depending on the interests of students and availability of staff.

**[NTRES 494(4940) Special Topics in Natural Resources]**

Fall or spring. 4 credits max. S-U grades optional.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**NTRES 495(4850) Individual Study in Fish and Wildlife Biology and Management**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). M. Bain, E. Cooch, P. Curtis, T. Gavin, J. R. Jackson, C. Kraft, R. Malecki, E. Mills, S. Morreale, M. Richmond, L. Rudstam, C. Smith, and P. Sullivan.

Topics in fish and wildlife biology and management are arranged depending on the interests of students and availability of staff.

**NTRES 496(4960) Individual Study in Ecology and Management of Landscapes**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). B. Bedford, B. Blosssey, T. Fahey, M. Krasny, J. Lassoie, R. Schneider, R. Sherman, P. Smallidge, and J. Yavitt.

Topics in ecology and management of landscapes are arranged depending on the interests of students and availability of staff.

**NTRES 497(4970) Honors Research in Natural Resources**

Fall or spring. 1–6 credits, variable; may be repeated for credit. Prerequisite: enrollment in NTRES honors research program; students must register using independent study form (available in 140 Roberts Hall). NTRES Staff.

Intended for students pursuing the research honors program in natural resources. Students must complete the CALS Honors program application by the third week of the fall semester of their senior year. The research supervisor should be a faculty member or senior research associate within NTRES.

**NTRES 498(4980) Teaching in Natural Resources**

Fall and spring. 1–4 credits. Prerequisite: permission of instructor. Students must register using independent study form (available in 140 Roberts Hall). S-U grades optional.

Designed to give students an opportunity to obtain teaching experience by assisting in labs, field trips for designated sections, discussions, and grading. Students gain insight into the organization, preparation, and execution of course plans through application and discussions with instructor.

**NTRES 500(5900) Professional Projects—M.P.S.**

Fall and spring. Credit TBA. Prerequisite: M.P.S. graduate students working on professional master's projects. S-U grades only.

**NTRES 600(6000) Introduction to Graduate Study in Natural Resources**

Fall. 2 credits. Prerequisite: beginning graduate students whose faculty advisors are in Natural Resources. S-U grades. Lec TBA.

Includes faculty-led discussions of key natural resource issues, student discussions of research ideas, and skill building sessions on proposal writing and giving research presentations. Students are required to complete a research proposal.

**NTRES 601(6010) Seminar on Selected Topics in Natural Resources**

Fall or spring. 1 credit. S-U grades only. Check with department for availability. Staff.

Selected readings and discussions of research and/or current problems in natural resources. Offering varies by semester and is subject to availability of staff.

**[NTRES 603(6030) Inquiry Science Outreach in Secondary Schools**

Fall or spring. 1 credit. Prerequisite: recipients of fellowships from Cornell Science Inquiry Partnerships (CSIP) program. S-U grades. Not offered 2006–2007. N. Trautmann and M. Krasny.

Prepares graduate students who receive Cornell Science Inquiry Partnerships fellowships for outreach work in high school and middle school science classes. Participants explore effective strategies for inquiry-based learning and review core educational issues such as learning standards, working with students of various ability levels, and assessing student learning.]

**NTRES 604(6040) Seminar on Selected Topics in Resource Policy and Management**

Fall. 2 credits. S-U grades only. Check with department for availability.

Special topics seminar on subjects related to resource policy and management. Offering varies by semester and is subject to availability of staff.

**[NTRES 607(6070) Ecotoxicology (also TOX 607(6070))**

Spring. 3 credits. Prerequisites: graduate or senior standing and two 300-level courses in chemistry, biological science, or toxicology. Not offered 2006–2007. Staff.

Lectures, readings, and special guests focus on the principles of effects of toxic chemicals on natural ecosystems, their components, and processes. Major topics include fate and transport of chemicals (chemodynamics), comparative biochemical toxicology, ecosystem process analysis, simulation through mathematical and physical (microcosm) models, and relationships to regulation and environmental management.]

**[NTRES 611(6110) Quantitative Ecology and Management of Fisheries Resources**

Spring. 4 credits. Prerequisite: NTRES 313 or permission of instructor. S-U grades optional. Offered alternate years; next offered 2008–2009. P. J. Sullivan.

Taught in conjunction with NTRES 411 (see description above). Students taking the course for graduate credit are asked, in addition to the 400-level projects and homework, to construct and document a model of population or community dynamics that reflects and extends the concepts covered in the course.]

**[NTRES 612(6120) Wildlife Population Analysis: Techniques and Models**

Spring. 3 credits. Prerequisites: NTRES 310 (or equivalent or permission of instructor), college-level math and statistics course. Next offered 2007–2008. E. Cooch.]

**NTRES 614(6140) Fish and Wildlife Ecology Seminar**

Fall and spring. 1 credit. Prerequisite: permission of instructor. Check with department for availability. Staff.

Discussion of individual research, current problems, and current literature in fish and wildlife ecology. Offering varies by semester and subject to availability.

**[NTRES 615(6150) Case Studies and Special Topics in Agroforestry**

Fall. 2 credits. Prerequisites: graduate standing or permission of instructor. Offered alternate odd years; next offered 2007–2008. S-U grades only. J. P. Lassoie.

Multidisciplinary examination of the principles and practices of agroforestry in developed and developing countries through discussions of specific case studies and key research and development literature. Students, working individually or in teams, prepare written reviews and analyses of original cases or contemporary topics in agroforestry for presentation to the class.]

**NTRES 616(6160) Forest Science and Management Seminar**

Fall. 1 credit. Prerequisite: upper-level undergraduate or graduate standing. J. B. Yavitt.

Reviews current literature, student research, and selected topics of interest. Topics include biogeography, ecology, and human use of forests located in boreal, temperate, and/or tropical environments.

**[NTRES 628(6280) Principles and Practices of Applied Wildlife Science**

Spring. 3 credits. Prerequisites: NTRES 310 or equivalent; permission of instructor. S-U grades optional. Offered alternate even years; next offered 2007–2008.

M. E. Richmond, R. A. Malecki, and P. D. Curtis.

For description, see NTRES 428.]

**NTRES 630(6300) Writing for the Biological Sciences**

Spring. 2 credits. Prerequisites: graduate students in writing phase of their thesis or dissertation or involved in preparation of manuscripts for submission to scientific journals. S-U grades optional. Offered alternate odd years. R. A. Malecki and M. E. Richmond.

This course is designed for graduate students interested in learning to convey scientific information in a clear and concise manner. Attention is given to format requirements for theses and manuscripts, submission and editorial policies of scientific journals, construction of sentences and paragraphs, grammar, punctuation, word usage, development of figures and tables, and use of literature. Come prepared to write, rewrite, and edit.

**NTRES 631(6310) Environmental Governance**

Spring. 4 credits. S. Wolf.

For description, see NTRES 331. Students taking the course for graduate credit are required to read supplemental materials, undertake more complex research assignments, and participate in seminar discussion section.

**[NTRES 634(6340) Seminar in International Conservation and Sustainable Development**

Fall. 3 credits, variable. Prerequisites: previous or concurrent registration in NTRES 434 or permission of instructor. S-U grades optional. Not offered 2007–2008. J. P. Lassoie.

This seminar provides a multidisciplinary examination of the conservation and



sustainable management of parks, protected areas, and fragile landscapes. Attention is given to the roles of local communities, governmental agencies, and non-governmental organizations in protecting biodiversity while providing livelihood opportunities for those most dependent on the natural resources in question. Discussions based on selected readings will examine issues from widely different geopolitical perspectives. An additional 1 credit is available for those interested in writing a term paper.]

#### **[NTRES 670(6700) Spatial Statistics**

Spring. 3 credits. Prerequisites: BTRY 601 and 602. Highly recommended: introductory GIS course. S-U grades optional. Offered alternate years; next offered 2007-2008. P. J. Sullivan.

Develops and applies spatial statistical concepts and techniques to ecological and natural resource issues. Topics include visualizing spatial data and analysis and modeling of geostatistical, lattice, and spatial point processes. Students should consider taking this course simultaneously with CSS 620.]

#### **NTRES 694(6940) Special Topics in Natural Resources**

Fall or spring. 4 credits max. S-U grades optional.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

#### **NTRES 696(6960) Agroecological Perspectives for Sustainable Development (also IARD/CSS 696(6960))**

Fall and spring. 1 credit. S-U grades only. L. Buck, L. Fisher, and S. DeGloria.

For description, see IARD 696.

#### **NTRES 699(6990) Graduate Individual Study in Natural Resources**

Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. NTRES graduate faculty.

Study of topics in natural resources more advanced than, or different from, other courses. Subject matter depends on interests of students and availability of staff.

#### **NTRES 800(8900) Master's Thesis Research**

Fall and spring. Credit TBA. Prerequisite: graduate students working on master's thesis research. S-U grades only.

#### **NTRES 900(9900) Graduate-Level Thesis Research**

Fall and spring. Credit TBA. Prerequisite: Ph.D. students before "A" exam has been passed. S-U grades only.

#### **NTRES 901(9910) Doctoral-Level Thesis Research**

Fall and spring. Credit TBA. Prerequisite: Ph.D. candidates after "A" exam has been passed. S-U grades only.

### **Related Courses in Other Departments**

Courses in many other departments are relevant to students majoring in natural resources. The following list includes some of the most closely related courses but is not exhaustive.

Environment and Society (D SOC 324, 340, 410)

Ecology and Biology (ENTOM 370, 470; BIOEE 261, 263, 274, 278, 450, 457, 459, 462, 463, 465, 466, 468, 472, 475, 476, 478; BIOMI 290-292, 397, 418)

Environmental Law, Ethics, and Philosophy (S&TS 206; CRP 380, 443, 444, 451, 453; PHIL 241, 246, 247, 381)

Human Systems and Communication (COMM 260, 285, 352, 421)

Physical Sciences (BEE 151, 371, 401, 427, 435, 471, 473, 475, 478; CSS 260, 365, 372, 397, 483; EAS 102, 104, 303; CEE 432)

Public Policy and Politics (GOVT 427, 428; B&SOC 461)

Resource Economics (AEM 250, 450, 451)

Spatial Data Interpretation (CSS 411, 420, 620, 660)

## **PLANT BREEDING AND GENETICS**

T. Brutnell, E. S. Buckler, W. R. Coffman, W. De Jong, J. J. Doyle, E. D. Earle, V. Gracen, P. Gregory, A. F. Krattiger, S. Kresovich, M. M. Jahn, L. Li, S. R. McCouch, M. A. Mutschler, R. J. Nelson, W. Pawlowski, K. V. Raman, T. L. Setter, F. Shotkoski, M. E. Smith, M. E. Sorrells, S. D. Tanksley, D. R. Viands. Emeritus: R. E. Anderson, H. M. Munger, R. P. Murphy, W. D. Pardee, R. L. Plaisted

#### **PL BR 201(2010) Plants, Genes, and Global Food Production**

Fall. 2 credits. May be used for partial fulfillment of CALS distribution requirement GROUP B—Biological Sciences.

Prerequisite: one year introductory biology or permission of instructor. V. Gracen.

Introduces plant breeding; offers a sense of the historical and social importance of the field, tracing its evolution from the pre-scientific days of crop domestication to modern applications of biotechnology. Offers specific examples of how breeding objectives are realized and raises questions about the environmental, social, and economic consequences of intensive food production systems.

#### **PL BR 225(2250) Plant Genetics**

Spring. 3 or 4 credits; 2 credits if taken after BIOGD 281. Prerequisites: one year of introductory biology or equivalent; permission of instructor for students who have taken BIOGD 281. M. Mutschler.

Surveys the fundamentals of plant genetics and shows how this information is used in plant biology and allied agricultural sciences and provides a basis for understanding the complex issues related to modern crop genetics. Topics include simple inheritance; linkage analysis; polyploidy; analysis of nuclear, chloroplast and mitochondrial genomes; pollination controls; and methods for analysis and manipulation of genes, chromosomes, and whole genomes. Examples and materials are drawn from diverse crops and plant species.

#### **PL BR 299(2990) Introduction to Research Methods in Plant Breeding and Genetics**

Fall, spring, or summer. 1-3 credits, variable. S-U grades only. Staff.

Intended for students who are new to undergraduate research. Students may be

reading scientific literature, learning research techniques, or assisting with ongoing research. Students must identify a faculty supervisor who determines the work goals and the form of the final report.

#### **PL BR 401(4010) Plant Cell and Tissue Culture**

Fall. 3 credits. Prerequisite: plant biology or genetics course or permission of instructor. E. D. Earle.

Provides broad coverage of techniques of plant tissue, cell, protoplast, embryo, and anther culture and the applications of those techniques to biological and agricultural studies. Examples include horticultural, agronomic, and endangered species. Genetic modification of plants via gene transfer and other manipulations of cultured cells is a major topic.

#### **[PL BR 402(4020) Plant Tissue Culture Laboratory**

Fall. 1 credit. Limited enrollment. Pre- or corequisite: PL BR 401 or permission of instructor. Not offered 2006-2007. E. D. Earle.

Provides hands-on experience in plant tissue culture and complements PL BR 401. Lab work includes cell, tissue and organ culture techniques related to plant propagation, germplasm storage, and genetic manipulations. Experiments use a broad range of plant materials and include protoplast culture and *Agrobacterium*-mediated gene transfer.]

#### **PL BR 403(4030) Genetic Improvement of Crop Plants**

Fall. 3 credits. Prerequisites: BIOGD 281, PL BR 225, or other standard genetics course and course in crops or horticulture. V. Gracen.

Genetic enhancement of crop value to humans began with domestication and continues with farmers' variety development and scientifically trained plant breeders' applications of Mendelian, quantitative, and molecular genetics. This course examines crop genetic improvement methods by discussing the history and current practice of plant breeding, tools available to breeders, choices and modifications of those tools to meet specific objectives, and challenges plant breeders face in developing varieties for the future.

#### **PL BR 404(4040) Crop Evolution, Domestication and Diversity (also BIOPL/IARD 404(4040))**

Fall. 2 credits. Prerequisite: BIOGD 281 or PL BR 225 or permission of instructor. S-U or letter grades. S. Kresovich.

Evolution, domestication, and breeding of crop plants have molded the current diversity we conserve and use. Based on advances in systematics and molecular genetics, this course presents an integrated approach to understanding and describing diversity of agricultural and horticultural species. Also addresses underlying ethical, legal, and social issues affecting conservation and use.

#### **PL BR 446(4460) Plant Cytogenetics Laboratory**

Spring, two-week module. 1 credit. S-U grades only. Prerequisite: genetics course or permission of instructor. Check with department for further information. K. N. Watanabe.

Aims to provide fundamental knowledge and techniques in plant cytogenetics. Emphasizes applications to research on plant genetics and



plant breeding. Plant materials involve a wide range of crop species. Covers basic techniques for examination of plant chromosomes.

**PL BR 482 Plant Biotechnology (also PL PA 462.2, BIOPL 482.6)**

Spring. 1 credit. Prerequisite: BIOPL 483.1 or permission of instructor. S-U grades optional. 12 lec. E. D. Earle and M. Zaitlin. Deals with current and proposed use of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides, or have improved nutritional or processing characteristics. Other topics are use of transgenic plants for production of valuable products and for environmental remediation. Biosafety, social, legal, and international issues relating to plant biotechnology are discussed.

**PL BR 483.1 Concepts and Techniques in Plant Molecular Biology (also BIOPL 483.1, PL PA 463.01)**

Fall, eight weeks. 2 credits. Prerequisites: see BIOPL 483. S-U grades optional. Two lec and one day of disc per week. S. McCouch, J. Giovannoni, and J. Rose. For description, see BIOPL 483.1.

**PL BR 483.3 Plant Genome Organization (also BIOPL 483.3)**

Fall. 1 credit. Prerequisite: BIOPL 483.1. S-U or letter grades. Offered alternate years. S. D. Tanksley. For description, see BIOPL 483.3.

**[PL BR 483.5 Molecular Breeding (also BIOPL 483.5)]**

Fall. 1 credit. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. S. Tanksley. For description, see BIOPL 483.5.]

**PL BR 494(4940) Special Topics in Plant Breeding**

Fall or spring. 4 credits max. S-U grades optional. The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**PL BR 496(4960) Internship in Plant Breeding**

Fall or spring. Variable credit; may be repeated to max. of 6; minimum 60 on-the-job hours per credit granted. Prerequisites: junior or senior in plant breeding; minimum GPA of 3.0 in plant breeding courses; permission of advisor and enrollment during pre-enrollment period of semester before internship. S-U grades only. Students must attach to their course enrollment materials a CALS independent study, research, teaching, or internship form signed by faculty member who will supervise study and assign credits and grade. Staff.

On-the-job learning experience under the supervision of professionals in a cooperating organization. A learning contract is written between the faculty supervisor and student, stating the conditions of the work assignment, supervision, and reporting.

**PL BR 497(4970) Individual Study in Plant Breeding**

Fall or spring. Variable credit; may be repeated to max. of 6. Prerequisite: permission of instructor. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). Staff.

**PL BR 498(4980) Undergraduate Teaching**

Fall or spring. Variable credit; may be repeated to max. of 6. S-U grades optional. Prerequisites: permission of instructor and previous enrollment in course to be taught or equivalent. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Undergraduate teaching assistance in a plant breeding course. Teaching experience may include leading a discussion section, preparing and teaching laboratories, and tutoring.

**PL BR 499(4990) Undergraduate Research**

Fall or spring. Variable credit. Prerequisite: permission of instructor. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall). Staff.

Undergraduate research projects in plant breeding.

**PL BR 504(5040) Research Experience for Teachers (also EDUC 504[5040], BIO G 504[5040])**

Spring. 3 credits. Intended for, but not restricted to, students in M.A.T. degree program, practicing teachers, and students considering becoming teachers. Prerequisites: appropriate science major, 6 credits education or educational psychology course work, and permission of instructor. S-U or letter grades. T. Fulton.

Students work in a laboratory with a research team for the semester. Research experiences are accompanied by weekly discussions and readings. Students explore how research is conducted, how formal scientific discourse and informal communication occur and differ, and how these concepts can be conveyed during classroom teaching.

**PL BR 604(6040) Methods of Plant Breeding Laboratory**

Fall. 2 credits. Pre- or corequisite: PL BR 403 or equivalent. S-U grades optional. M. E. Sorrells.

Field trips to plant breeding programs involve discussion of breeding methods used, overall goals, selection and screening techniques, and variety and germplasm release. Additional labs include selection techniques for various traits, intellectual property issues, genetically modified crops, and international agriculture. For a term project, each student designs a comprehensive breeding program on a chosen crop.

**PL BR 606(6060) Advanced Plant Genetics**

Spring. 3 credits. Prerequisites: BIOGD 281 or equivalent and permission of instructor. S-U grades optional. W. Pawlowski.

Advanced survey of genetics in higher plants including selected topics in Mendelian genetics, chromosome biology (cytogenetics), and epigenetics. The development of critical analytical skills is stressed through case studies, in-class exercises, and the course project.

**PL BR 612(6120) Patents, Plants, and Profits: Intellectual Property Management for Scientists and Entrepreneurs (also IARD 612[6120])**

Spring, weeks 1–8. 2 credits. Prerequisite: senior or graduate standing. S-U or letter grades. Lec. A. F. Krattiger and S. Kowalski.

Covers statutory protection (copyright, trademarks, patents, plant variety protection), contracts (from material transfer to licensing), management of IP (e.g., freedom-to-operate, valuation, genetic resources, trade, and marketing), and negotiation. Emphasizes technology transfer and international aspects. The course is particularly relevant to students interested in science management, technology transfer, international agriculture, and business.

**PL BR 618(6180) Breeding for Pest Resistance (also HORT 618[6180])**

Fall. 2 credits. Prerequisites: BIOGD 281 and PL BR 403 or equivalents. Highly recommended: introductory course in plant pathology and/or entomology. Offered alternate even years. P. Griffiths.

Multidisciplinary examination of the challenge of incorporating disease and insect resistance into crop plants. Topics include national and international germplasm collections, germplasm evaluation and enhancement, resistance mechanisms in plants, monogenic and polygenic control of resistance, approaches to breeding for resistance, stability of genetic resistance mechanisms, and the use of biochemical, physiological, and molecular tools in breeding for pest resistance.

**PL BR 622(6220) Seminar**

Fall or spring. 1 credit. S-U grades only. Staff, graduate students, and visitors.

**[PL BR 624(6240) Quantitative Trait Loci Analysis (also BIOGD/PL PA 624[6240])]**

Fall. 1 credit. Prerequisites: introductory statistics and BIOGD 281 or permission of instructor. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. K. Lee.

For description, see BIOGD 624.]

**PL BR 650(6500) Special Problems in Research and Teaching**

Fall or spring. 1 or more credits. Prerequisite: permission of instructor supervising research or teaching. Staff.

**PL BR 694(6940) Special Topics in Plant Breeding**

Fall or spring. 4 credits max. S-U grades optional.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**PL BR 716(7160) Perspectives in Plant Breeding Strategies**

Spring. 3 credits. Prerequisite: PL BR 403. S-U grades optional. Offered alternate odd years. M. E. Sorrells.

Emphasizes critical discussion and evaluation of selected benchmark papers and current literature. Reviews and discusses conventional and molecular selection techniques and breeding objectives, methods, and strategies for both self- and cross-pollinated crops.

Requires extensive outside reading. Grades are based on four papers demonstrating creative thinking and analysis of plant breeding concepts.

**[PL BR 717(7170) Quantitative Genetics in Plant Breeding]**

Spring. 3 credits. Prerequisites: PL BR 403 and BTRY 601 or equivalent. S-U grades optional. Offered even years; not offered 2006-2007; next offered 2007-2008. D. R. Viands.

Discussion of quantitative genetics for more effective plant breeding. Specific topics include population genetics, linkage, components of variance (estimated from various mating designs); heritability; theoretical gain from selection; and genotypic and phenotypic correlation coefficients. During one period, plants in the greenhouse are evaluated to provide data for computing quantitative genetic parameters.]

**[PL BR 800(8900) Master's-Level Thesis Research]**

Fall or spring. Variable credit. Prerequisite: Ph.D. students only before "A" exam has been passed; permission of instructor. S-U grades optional. Graduate faculty.

For students working on a master's thesis.

**[PL BR 900(9900) Graduate-Level Dissertation]**

Fall or spring. Variable credit. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.

**[PL BR 901(9910) Doctoral-Level Dissertation Research]**

Fall or spring. Variable credit. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.

For students admitted to candidacy after "A" exam has been passed.

## PLANT PATHOLOGY

G. W. Hudler, chair (331 Plant Science Bldg., 255-7848); S. V. Beer, G. C. Bergstrom, S. Cartinour, A. R. Collmer, W. E. Fry, S. M. Gray, K. T. Hodge, S. G. Lazarowitz, K. Lee, J. W. Lorbeer, R. Loria, G. B. Martin, M. T. McGrath, M. G. Milgroom, E. B. Nelson, R. J. Nelson, T. Pawlowska, K. L. Perry, B. G. Turgeon, X. Wang, M. Zaitlin, T. A. Zitter

**[PL PA 110(1100) Symbiotic Associations in Nature]**

Spring. 3 credits. E. B. Nelson.

This course is a Freshman Writing Seminar where students will explore symbiotic biology and the nature of science and written scientific communication through discussions of a broad range of symbiotic relationships. Students will be exposed to a broad range of writing styles in scientific communication. Students will gain experience writing in a number of styles common in the biological sciences. Additionally, students will learn to use evidentiary and inferential reasoning, articulate their thoughts and ideas through writing, make logical and systematic arguments, learn to revise their own writing and effectively critique others' writing content, organization, and style.

**[PL PA 201(2010) Magical Mushrooms, Mischievous Molds]**

Spring. 2 credits. S-U grades optional. G. W. Hudler.

Presentation of the fungi and their roles in nature and in shaping past and present civilizations. Emphasizes the historical and practical significance of fungi as decayers of organic matter, as pathogens of plants and animals, as food, and as sources of mind-altering chemicals.

**[PL PA 301(3010) Plant Diseases and Disease Management]**

Fall. 4 credits. Prerequisite: one year of biology. M. G. Milgroom.

Introduction to plant diseases, their diagnosis, and their management. Topics include fungi, bacteria, viruses, nematodes, and other plant pathogens; disease cycles, plant disease epidemiology, disease forecasting, and the principles and practices of plant disease management. Intended for students who want a practical knowledge of plant diseases and their control.

**[PL PA 309(3090) Fungi]**

Fall. 3 credits. Prerequisite: one year of biology. Recommended: concurrent enrollment in PL PA 319. K. T. Hodge.

A thorough introduction to the astounding kingdom of fungi, including mushrooms, molds, yeasts, athlete's foot, histoplasmosis, and the blue stuff in blue cheese. We cover fungal biodiversity, how fungi work, and their roles in the environment and in human affairs. Students work with living and preserved fungi and learn basic lab and identification skills.

**[PL PA 319(3190) Mushrooms of Field and Forest]**

Fall, weeks 1-8. 2 credits. Letter grades only. K. T. Hodge.

Students learn to identify mushrooms and other macrofungi on a series of eight field trips to local forests. Mushrooms are collected during afternoon lab field trips. During the evening labs, students use keys and microscopes to identify mushrooms they've collected, and brief lectures introduce fungal ecology and diversity. Students must attend both lab times.

**[PL PA 394(3940) Circadian Rhythms (also ENTOM 394(3940), BIOGD/BIOMB 394(3940))]**

Fall. 2 credits. Prerequisite: 200-level biology. S-U grades optional. K. Lee (even years), J. Ewer (odd years).

Explores a fundamental feature of living organisms from all kingdoms: how the cellular 24-hour biological clock operates and influences biological activities. Covers fundamental properties of biological rhythms and cellular and molecular structure of circadian oscillators in many organisms including cyanobacteria, fungi, insects, plants, reptiles, birds, and mammals (including humans).

**[PL PA 409(4090) Principles of Virology (also VETMI/BIOMI 409(4090))]**

Fall. 3 credits. Prerequisites: BIOMI 290, 291 or permission of instructor. Recommended: BIOBM 330-332, 432. Letter grades only. G. R. Whittaker and S. G. Lazarowitz.

For description, see VETMI 409.

**[PL PA 411(4110) Plant Disease Diagnosis]**

Fall. 3 credits. Limited to 18 students. Prerequisites: PL PA 301 or equivalent and permission of instructor. Next offered 2007-2008. Staff.

Teaches a method of diagnosing plant diseases caused by infectious and

noninfectious agents with emphasis on application of contemporary laboratory techniques and effective use of the literature. After seven weeks of formal lecture and laboratory sessions, students spend the rest of the semester working on their own to determine the causes of plant diseases on samples that have either been received by the Plant Disease Diagnostic Lab or that have been prepared by instructors.]

**[PL PA 419(4190) Agricultural Application of Plant Disease Concepts]**

Fall. 2 credits. Eight sessions. Prerequisite: PL PA 301 and permission of instructor. S-U or letter grades. H. S. Aldwinckle and J. P. Nyrop.

Addresses real-world problems in plant pathology and entomology through the application of research. Students tour fields of diverse fruit and vegetable field crops, a nursery, forests, and a golf course that have been impacted by diseases and arthropod pests. Strategies for managing diseases and pests based on research and the interface between Research and Extension are emphasized. This course is taught at Geneva. Free transportation available.

**[PL PA 420(4200) Grape Pest Management (also ENTOM 420(4200))]**

Fall. 3 credits. Prerequisite: PL PA 301, ENTOM 241, or permission of instructors. S-U or letter grades. W. Wilcox, G. English-Loeb, and A. Landers.

The course emphasizes general integrated pest management concepts, the biology and specific management practices pertaining to the major diseases and arthropod pests of grapes, and modern spray application technologies. Laboratories emphasize field illustrations of classroom concepts. Team taught by a plant pathologist, entomologist, and agricultural engineer.

**[PL PA 443(4430) Pathology and Entomology of Trees and Shrubs (also ENTOM 443(4430))]**

Fall. 4 credits. Limited to 30 students. Prerequisites: PL PA 301 or equivalent, ENTOM 212 or equivalent. Offered even years. G. W. Hudler and P. A. Weston.

For students preparing for careers in horticulture, urban forestry, natural resources, and pest management. Deals with identification, impact, assessment, biology, and management of insects and diseases that damage trees and shrubs. Emphasizes pests of northeastern flora but examples from other parts of the country and the world are also used. Considers forest, shade, and ornamental plants.

**[PL PA 448(4480) Evolution and Ecology of Symbiotic Associations]**

Spring. 2 credits. Prerequisites: BIO G 101-102 or equivalent. Letter grades only. T. Pawlowska.

Symbiosis, a living together of two organisms in close associations, encompasses a spectrum of interactions ranging from mutually detrimental to mutually beneficial. We are going to focus on a selection of ecologically important symbiotic interactions, consider their evolutionary origins, and explore conditions that would favor their establishment and maintenance.

**PL PA 462.1(4620.1) Molecular Plant-Pathogen Interactions I and II (also BIOPL 482.1)**

Spring. 1 credit. Jan. 22–Feb. 16 (12 lec). Prerequisites: BIOGD 281, BIOBM 330 or 331, and BIOPL 483.1. A. R. Collmer and B. G. Turgeon (odd years); S. G. Lazarowitz and G. B. Martin (even years).

Examines the molecular and cellular factors that control pathogen-plant interactions from the perspectives of pathogen biology and plant responses to pathogen infection. Beginning spring 2004, alternate years will focus on (1) plant perception of microbial pathogens and the interplay of plant defenses and pathogen counterstrategies that result in resistance or susceptibility to disease production, with topics including the genetic nature of dominant and recessive resistance, induction of pathogen defense genes, apoptotic responses that limit infection, and RNA interference; and (2) the genetic and molecular mechanisms of microbial pathogenesis, with an emphasis on fungal and bacterial virulence proteins, toxins, and their deployment systems.

**PL PA 462.2(4620.2) Plant Biotechnology (also BIOPL 482.2, PL BR 482)**

Spring. 1 credit. 12 lec Mar. 26–Apr. 20. M. Zaitlin and E. D. Earle.

Deals with production and uses of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides; produce useful products; or have improved nutritional and food processing characteristics. Discusses regulatory and social issues relating to plant biotechnology.

**PL PA 463(4630) Plant Molecular Biology 1**

Fall. 1–5 credits. Prerequisite: BIOGD 281, BIOBM 330 or 331.

**Sec 01 Concepts and Techniques in Plant Molecular Biology (also BIO PL/PL BR 483.1)**

Fall. 2 credits. Aug. 24–Oct. 20 (12 lec). J. J. Giovannoni, S. R. McCouch, and J. Rose.

Introductory module that provides a broad overview of molecular biology concepts relevant to the plant sciences, and serves as a prerequisite to other modules in the BIOPL 653 (fall) and BIOPL 652 (spring) series. The course is divided into two sections: (1) gene discovery, which covers genetic, molecular, and genomics approaches to the isolation of plant genes; and (2) gene characterization, which covers DNA sequencing, DNA and RNA blotting, use of gene databases, and various approaches to producing transgenic plants. Emphasis is on understanding the appropriate approach that is needed for different experiments.

**[PL PA 464(4640) Molecular Plant-Microbe Interactions (also BIOPL 482.2/BIOPL 482.2)]**

Spring. 1 credit. Jan. 21–Feb. 15 (12 lec). Prerequisites: BIOGD 281, BIOBM 330 or 331 or 333, and BIOPL 483.1 or equivalents. S-U grades optional. Offered even years; next offered 2007–2008. S. C. Winans.

For description, see BIOPL 482, sec 2.]

**PL PA 470(4700) Professional Skills in Plant Science**

Fall. 2 credits. S-U grades only. E. B. Nelson.

Provides students who are aspiring to careers as research plant scientists with an overview of the art and science of the profession. Topics include (1) what it means to be a scientist and plant pathologist; (2) preparation required of graduate students in plant pathology programs; (3) ethical considerations important to plant pathologists; (4) how to seek funding to support research activities; (5) managing the scientific literature; (6) funneling curiosity into scientific inquiry; and (7) how to read a scientific paper. Students in related disciplines (e.g., horticulture, plant breeding, plant biology) also benefit from concepts presented in this course.

**PL PA 494(4940) Special Topics in Plant Pathology**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**PL PA 497(4970) Independent Study**

Fall or spring. 1–5 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

An opportunity for independent study of a special topic in mycology or plant pathology under the direction of a faculty member.

**PL PA 498(4980) Teaching Experience**

Fall or spring. 1–5 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Undergraduate teaching assistance in a mycology or plant pathology course by mutual agreement with the instructor.

**PL PA 499(4990) Undergraduate Research**

Fall or spring. 3–5 credits. S-U grades optional. Students must register using independent study form (available in 140 Roberts Hall).

Opportunity for research experience under the direction of a faculty member.

**PL PA 601(6010) Concepts of Plant Pathology**

Spring. 3 credits. Prerequisites: PL PA 301 or equivalent. S-U grades optional. A. R. Collmer.

Concepts in plant-pathogen relationships uniting molecular and population biology approaches, with emphases on molecular/cellular investigations of model pathosystems and population biology studies integrating host-pathogen evolution, genetics, and ecology. The discussion section is used for examining current research literature and other exercises complementary to lecture topics; emphasis is on critical thinking in science. Students prepare and review mock grant proposals.

**PL PA 602(6020) Biology of Plant Pathogens**

Spring. 3 credits. Prerequisite: PL PA 301. Recommended: PL PA 601 as corequisite. Staff.

Biology and ecology of four major groups of plant pathogens: fungi, bacteria, viruses, and oomycetes. Model plant pathogens are used to illustrate concepts of pathogen diversity, evolution, reproduction, life cycles, movement, diagnosis, and control. Lecture and laboratory topics are coordinated with PL PA 601 to provide students with a comprehensive treatment of pathogen-host interactions at all levels from molecular to ecological. Laboratory periods are used for hands-on demonstration of pathogen diagnosis and manipulation or to discuss current literature relevant to lecture topics.

**PL PA 606(6060) Molecular Plant Virology (also BIOPL 650(6500))**

Spring. 7 weeks, first half of semester. 1 credit. Prerequisites: BIOPL 409 or equivalent or permission of instructor. S-U grades optional. Offered odd years. S. G. Lazarowitz.

Introduces students to the molecular biology of plant virus replication and interactions with the host to produce disease. Topics include virus replication strategies, cell-to-cell and systemic movement, host defense responses and virus counterstrategies, and engineered resistance.

**PL PA 608(6080) Genomics of Bacterium-Host Interactions (also BIOPL 608(6080))**

Fall, second half of semester. 1 credit. Prerequisite: BIOPL 290 or equivalent or permission of instructor. S-U grades optional. Offered even years. A. R. Collmer and S. C. Winans.

Introduction to genomic approaches, tools, and discoveries involving the study of bacterial interactions with plant and animal hosts. Topics include the TIGRE Comprehensive Microbial Resource and Artemis tools, the pathogens *Yersinia pestis*, *V. enterocolitica*, *Pseudomonas syringae*, *Ralstonia solanacearum*, and *Agrobacterium tumefaciens*, and the symbiont *Sinorhizobium meliloti*.

**PL PA 624(6240) Quantitative Trait Loci Analysis (also BIOGD/PL BR 624(6240))**

Fall. 1 credit. Limited to 20 students. Prerequisite: introductory statistics and genetics or permission of instructor. S-U grades optional. K. Lee.

The combination of genomic sequences, new molecular marker technologies and sophisticated mapping algorithms has made it possible to use natural variation in combination with quantitative genetic techniques to dissect complex traits down to single loci. In this modular QTL analysis course, students learn basic principles of statistical inference and quantitative genetics for QTL analysis. Students also learn how to use the statistical and QTL analysis programs so that they can perform QTL analysis independently.

**PL PA 625(6250) Evolution and Ecology of Mutualisms**

Fall. 1 credit. S-U grades only. T. Pawlowska.

Mutualisms are mutually beneficial interactions between species. Despite their ubiquity, the understanding of evolution and ecology of

mutualisms is surprisingly limited. We are going to explore the conceptual framework explaining the establishment and maintenance of mutualisms and examine whether the empirical findings from various interactions support the theoretical predictions.

**PL PA 638(6380) Filamentous Fungal Genomics and Development (also BIOGD 638[6380])**

Spring, last four weeks of semester. 1 credit. Prerequisite: BIOGD 281 or equivalent. S-U grades optional. Offered odd years. B. G. Turgeon.

Molecular genetic and genomic approaches to the study of fungal biology. Applications of contemporary methodology to genetic dissection of developmental processes, such as pathogenesis and reproduction, are described and experimental data are evaluated. Examples are chosen from investigations of model plant pathogenic fungi such as *Cochliobolus heterostrophus*, *Fusarium graminearum*, *Magnaporthe grisea*, and *Ustilago maydis* and from well known genetic models such as *Aspergillus nidulans* and *Neurospora crassa*.

**PL PA 642(652)(6420/6520) Special Topics Series**

Unless otherwise indicated, the following description applies to PL PA 642-652. Fall or spring. 1 credit. Prerequisite: permission of instructor. S-U grades only.

Weekly discussions of current topics in special areas of plant pathology and mycology. Students are required to do extensive reading of current literature and to present oral and written reports.

**PL PA 642(6420) Pathogen Population Biology**

Fall. M. G. Milgroom.

**PL PA 644(6440) Current Topics in Oomycete Biology**

Fall. E. B. Nelson.

**PL PA 645(6450) Plant Virology**

Fall. S. M. Gray.

**PL PA 647(6470) Phyto bacteriology Research Updates**

Fall and spring. S. V. Beer.

Emphasizes current research in phyto bacteriology undertaken in laboratories at Cornell.

**PL PA 649(6490) Fungal Biology**

Spring. 1 credit. Recommended: some background in mycology or plant pathology. K. T. Hodge and B. G. Turgeon.

Weekly meeting to discuss current scientific articles on the biology of fungi. Primarily directed at graduate students, but undergraduates, postdocs, staff, and guests who have an interest in fungi are welcome.

**PL PA 650(6500) Diseases of Vegetable Crops**

Fall. 1 credit. S-U grades only. J. W. Lorbeer and T. A. Zitter.

**PL PA 652(6520) Field Crop Pathology**

Spring. 1 credit. W. G. C. Bergstrom.

**PL PA 660(6600) Special Topics in Plant Disease Management**

Fall and spring. 1 credit. S-U grades only. C. D. Smart.

Weekly discussions of current topics in plant disease management. These include not only management practices, but also factors that

influence management strategies. Students are required to read current literature and present oral reports on a topic. Offered only at the Geneva campus. Students provide their own transportation.

**PL PA 661(6610) Diagnostic Lab Experience**

Fall and spring. 1 or 2 credits. Priority given to graduate students in plant pathology and plant protection. Recommended: course work or experience in diagnostic techniques. S-U grades only. Requires 3 hours per week per credit hour. T. A. Zitter.

For graduate students and advanced undergraduates with a special interest in diagnosing plant diseases. Students work in the Diagnostic Laboratory (plant pathology department) under supervision of the diagnostician.

**PL PA 681(6810) Plant Pathology Seminar**

Fall and spring. 1 credit. Requirement for all plant pathology majors. S-U grades only. B. G. Turgeon.

**PL PA 694(6940) Special Topics in Plant Pathology**

Fall or spring. 4 credits max. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

**PL PA 788(7880) Research in Molecular Plant Pathology**

Fall and spring. 2, 4, or 6 credits. Prerequisite: permission of instructor before beginning research. S-U grades only. S. V. Beer.

Guided research experiences in laboratories addressing questions concerning the interaction of pathogens (bacteria, fungi, viruses) and plants at the molecular level. Intended for beginning graduate students with a concentration in molecular plant pathology and sufficient theoretical background and practical laboratory experience. Students submit plans and reports on each research experience.

**PL PA 797(7970) Special Topics**

Fall or spring. 1-5 credits. S-U grades optional. Staff.

Opportunity for independent study of a special topic.

**PL PA 798(7980) Graduate Teaching Experience**

Fall or spring. 1-5 credits. S-U grades. Staff.

Graduate teaching assistance in a mycology or plant pathology course by mutual agreement with the instructor. This experience may include, but is not limited to, preparing, assisting in, and teaching laboratories, preparing and delivering lectures, leading discussion sessions, and tutoring.

**PL PA 800(8900) Master's-Level Thesis Research**

Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of advisor. Graduate faculty.

For students working on a master's degree.

**PL PA 900(9900) Graduate-Level Thesis Research**

Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of advisor. Graduate faculty.

For Ph.D. students who have not passed "A" exam.

**PL PA 901(9910) Doctoral-Level Thesis Research**

Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of advisor. Graduate faculty.

For Ph.D. candidates who have passed "A" exam.

## SCIENCE OF NATURAL AND ENVIRONMENTAL SYSTEMS

G. W. Evans, T. J. Fahey, A. S. Flecker, C. C. Geisler, P. H. Horrigan, C. J. Lehmann, E. L. Madsen, I. Merwin, M. J. Pfeffer, S. J. Riha, C. W. Scherer, W. D. Schulze, N. R. Scott, J. B. Yavitt

**SNES 101(1010) Intro to the Science and Management of Environmental and Natural Resources (also NTRES 101[1010])**

Fall. 3 credits. Prerequisite: first-year students in Natural Resources, Science of Natural and Environment Systems, or other "environmental cluster" areas in CALS.

J. Lassoie and E. Madsen.

For description, see NTRES 101.

**SNES 200(2000) Environmental Sciences Colloquium**

Fall. 1 credit. S-U grades only. S. Riha and J. Lehmann.

This colloquium consists of a series of lectures on an annually changing theme central to the Environmental Sciences, which poses biophysical, economical and political challenges to modern society. Participants will become familiar with contemporary issues of environmental degradation and opportunities for their mitigation. The colloquium is mandatory for SNES majors and is open to the public.

## FACULTY ROSTER

Abawi, George S., Ph.D., Cornell U. Prof., Plant Pathology (Geneva)  
Acree, Terry E., Ph.D., Cornell U. Prof., Food Science, and Technology (Geneva)  
Adleman, Marvin I., M. L. A., Harvard U. Prof., Landscape Architecture  
Agnello, Arthur M., Ph.D., North Carolina State U. Prof., Entomology (Geneva)  
Ahner, Beth A., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Biological and Environmental Engineering  
Albright, Louis D., Ph.D., Cornell U. Prof., Biological and Environmental Engineering  
Aldwinckle, Herbert S., Ph.D., U. of London (England). Prof., Plant Pathology (Geneva)  
Aneshansley, Daniel J., Ph.D., Cornell U. Prof., Biological and Environmental Engineering  
Austic, Richard E., Ph.D., U. of California, Davis. Prof., Animal Science  
Baeumner, Antje J., Ph.D., U. of Stuttgart (Germany). Assoc. Prof., Biological and Environmental Engineering  
Bain, Mark B., Ph.D., U. of Massachusetts. Assoc. Prof., Natural Resources

- Barbano, David M., Ph.D., Cornell U. Prof., Food Science
- Barrett, Christopher B., Ph.D., U. of Wisconsin. Prof., Applied Economics and Management
- Bartsch, James A., Ph.D., Purdue U. Assoc. Prof., Biological and Environmental Engineering
- Bassuk, Nina L. Ph.D., U. of London (England). Prof., Horticulture
- Batt, Carl A., Ph.D., Rutgers U. Prof., Food Science
- Baughner, Sherene, Ph.D., SUNY, Stonybrook. Assoc. Prof., Landscape Architecture
- Bauman, Dale E., Ph.D., U. of Illinois. Prof., Animal Science
- Baveye, Philippe C., Ph.D., U. of California, Riverside. Assoc. Prof., Crop and Soil Sciences
- Beer, Steven V., Ph.D., U. of California, Davis. Prof., Plant Pathology
- Bell, Alan W., Ph.D., U. of Glasgow (UK). Prof., Animal Science
- Bellinder, Robin R., Ph.D., Virginia Polytechnic Inst. and State U. Prof., Horticulture
- Bergstrom, Gary C., Ph.D., U. of Kentucky. Prof., Plant Pathology
- Bills, Nelson L., Ph.D., Washington State U. Prof., Applied Economics and Management
- Bjorkman, Thomas N., Ph.D., Cornell U. Assoc. Prof., Horticultural Sciences (Geneva)
- Blake, Robert W., Ph.D., North Carolina State U. Prof., Animal Science
- Blalock, Garrick, Ph.D., U. of California, Berkeley. Asst. Prof., Applied Economics and Management
- Blossey, Bernd, Ph.D., Christian-Albrechts U. (Germany). Assoc. Prof., Natural Resources
- Bogan, Vicki L., Ph.D., Brown U. Asst. Prof., Applied Economics and Management
- Boisclair, Yves R., Ph.D., Cornell U. Assoc. Prof., Animal Science
- Boisvert, Richard N., Ph.D., U. of Minnesota. Prof., Applied Economics and Management
- Boor, Kathryn J., Ph.D., U. of California, Davis. Assoc. Prof., Food Science
- Booth, James, Ph.D., U. of Kentucky. Prof., Biological Statistics and Computational Biology
- Brady, John W., Jr., Ph.D., SUNY, Stonybrook. Prof., Food Science
- Brown, Dan L., Ph.D., Cornell U. Assoc. Prof., Animal Science
- Brown, David L., Ph.D., U. of Wisconsin. Professor, Development Sociology
- Brown, Susan K., Ph.D., U. of California, Davis. Prof., Horticultural Sciences (Geneva)
- Buckley, Daniel H., Ph.D., Michigan State U. Asst. Prof., Crop and Soil Sciences
- Burr, Thomas J., Ph.D., U. of California, Berkeley. Prof., Plant Pathology (Geneva)
- Bustamante, Carlos D., Ph.D., Harvard U. Asst. Prof., Biological Statistics and Computational Biology
- Butler, Walter R., Ph.D., Purdue U. Prof., Animal Science
- Caffarella, Rosemary S., Ph.D., Michigan State U. Prof., Education
- Calderone, Nicholas W., Ph.D., Ohio State U. Assoc. Prof., Entomology
- Camp, William G., Ph.D., Georgia State U. Prof., Education
- Chapman, Lewis D., Ph.D., U. of California, Berkeley. Prof., Applied Economics and Management
- Chase, Larry E., Ph.D., Pennsylvania State U. Prof., Animal Science
- Chau, Ho Yan, Ph.D., Johns Hopkins U. Assoc. Prof., Applied Economics and Management
- Cheng, Lailiang, Ph.D., Oregon State U. Assoc. Prof., Horticulture
- Cherney, Jerome H., Ph.D., U. of Minnesota. Prof., Crop and Soil Sciences
- Christy, Ralph D., Ph.D., Michigan State U. Prof., Applied Economics and Management
- Coffman, W. Ronnie, Ph.D., Cornell U. Prof., Plant Breeding
- Collmer, Alan R., Ph.D., Cornell U. Prof., Plant Pathology
- Colucci, Stephen J., Ph.D., SUNY, Albany. Prof., Earth and Atmospheric Sciences
- Conrad, Jon M., Ph.D., U. of Wisconsin. Prof., Applied Economics and Management
- Constas, Mark A., Ph.D., Cornell U. Assoc. Prof., Education
- Cooch, Evan G., Ph.D., Queen's U. (Canada). Assoc. Prof., Natural Resources
- Cook, Kerry H., Ph.D., North Carolina State U. Prof., Earth and Atmospheric Sciences
- Cooke, J. Robert, Ph.D., North Carolina State U. Prof. Emeritus, Biological and Environmental Engineering
- Cox, William J., Ph.D., Oregon State U. Prof., Crop and Soil Sciences
- Crawford, Barbara A., Ph.D., U. of Michigan. Assoc. Prof., Education
- Currie, W. Bruce, Ph.D., Macquarie U. (Australia) Prof., Animal Science
- Curtis, Paul D., Ph.D., North Carolina State U. Assoc. Prof., Natural Resources
- Danforth, Bryan N., Ph.D., U. of Kansas. Assoc. Prof., Entomology
- Daouk, Hazem, Ph.D., Indiana U. Asst. Prof., Applied Economics and Management
- Datta, Ashim K., Ph.D., U. of Florida. Prof., Biological and Environmental Engineering
- Decker, Daniel J., Ph.D., Cornell U. Prof., Natural Resources
- Degaetano, Arthur, Ph.D., Rutgers U. Assoc. Prof., Earth and Atmospheric Sciences
- DeGloria, Stephen D., Ph.D., U. of California, Berkeley. Prof., Crop and Soil Sciences
- de Gorter, Harry, Ph.D., U. of California, Berkeley. Assoc. Prof., Applied Economics and Management
- DeJong, Walter S., Ph.D., U. of Wisconsin. Asst. Prof., Plant Pathology
- Dickinson, Janis L., Ph.D., Cornell U. Assoc. Prof., Natural Resources
- Dillard, Helene R., Ph.D., U. of California, Davis. Prof., Plant Pathology (Geneva)
- DiTommaso, Antonio, Ph.D., McGill U. (Canada). Assoc. Prof., Crop and Soil Sciences
- Drinkwater, Laurie, Ph.D., U. of California, Davis. Assoc. Prof., Horticulture
- Duxbury, John M., Ph.D., U. of Birmingham (England). Prof., Crop and Soil Sciences
- Earle, Elizabeth D., Ph.D., Harvard U. Prof., Plant Breeding
- Eberts, Paul R., Ph.D., U. of Michigan. Prof., Development Sociology
- Eloundou-Enyegue, Parfait M., Ph.D., Pennsylvania State U. Asst. Prof., Development Sociology
- English-Loeb, Gregory M., Ph.D., U. of California, Davis. Assoc. Prof., Entomology (Geneva)
- Everett, Robert W., Ph.D., Michigan State U. Prof., Animal Science
- Ewer, John, Ph.D., Brandeis U. Assoc. Prof., Entomology
- Fahey, Timothy J., Ph.D., U. of Wyoming. Prof., Natural Resources
- Feldman, Shelley, Ph.D., U. of Connecticut. Prof., Development Sociology
- Fick, Gary W., Ph.D., U. of California, Davis. Prof., Crop and Soil Sciences
- Forsline, Philip L., M.S., U. of Minnesota. Courtesy Asst. Prof., Horticultural Sciences (Geneva)
- Fox, Danny G., Ph.D., Ohio State U. Prof., Animal Science
- Francis, Joe D., Ph.D., U. of Missouri. Assoc. Prof., Development Sociology
- Fry, William E., Ph.D., Cornell U. Prof., Plant Pathology
- Fuchs, Marc, Ph.D., U. Louis Pasteur (France). Asst. Prof., Plant Pathology (Geneva)
- Galton, David M., Ph.D., Ohio State U. Prof., Animal Science
- Gan, Susheng, Ph.D., U. of Wisconsin. Asst. Prof., Horticulture
- Gavin, Thomas A., Ph.D., Oregon State U. Assoc. Prof., Natural Resources
- Gay, Geraldine K., Ph.D., Cornell U. Prof., Communication
- Gebremedhin, Kifle G., Ph.D., U. of Wisconsin. Prof., Biological and Environmental Engineering
- Geisler, Charles C., Ph.D., U. of Wisconsin. Prof., Development Sociology
- Gellert, Paul K., Ph.D., U. of Wisconsin. Asst. Prof., Development Sociology
- Gilbert, Cole, Ph.D. U. of Kansas. Assoc. Prof., Entomology
- Gillespie, Tarelton L., Ph.D., U. of California, San Diego. Asst. Prof., Communication
- Gillett, James W., Ph.D., U. of California, Berkeley. Prof., Natural Resources
- Gleason, Kathryn L., Ph.D., Oxford U. (England). Assoc. Prof., Landscape Architecture
- Gloy, Brent A., Ph.D., Purdue U. Assoc. Prof., Applied Economics and Management
- Gomes, Carla P., Ph.D., U. of Edinburgh (UK). Assoc. Prof., Applied Economics and Management
- Gonzales, Angela, M.A., Harvard U. Asst. Prof., Development Sociology
- Good, George L., Ph.D., Cornell U. Prof. Emeritus, Horticulture
- Gorewit, Ronald C., Ph.D., Michigan State U. Prof., Biological and Environmental Engineering
- Gottfried, Herbert W., Ph.D., Ohio U. Prof., Landscape Architecture
- Gravani, Robert B., Ph.D., Cornell U. Prof., Food Science
- Griffiths, Phillip D., Ph.D., U. of Florida. Assoc. Prof., Horticultural Sciences (Geneva)
- Gurak, Douglas T., Ph.D., U. of Wisconsin. Prof., Development Sociology
- Hagen, James M., Ph.D., U. of Illinois. Asst. Prof., Applied Economics and Management
- Hahn, Russell R., Ph.D., Texas A&M U. Assoc. Prof., Crop and Soil Sciences
- Haith, Douglas A., Ph.D., Cornell U. Prof., Biological and Environmental Engineering
- Hajek, Ann E., Ph.D., U. of California, Berkeley. Prof., Entomology
- Halseth, Donald E., Ph.D., Cornell U. Assoc. Prof., Horticulture
- Hancock, Jeffrey T., Ph.D., Dalhousie U. (Canada) Asst. Prof., Communication
- Hang, Yong D., Ph.D., McGill U. (Canada). Prof., Food Science and Technology (Geneva)
- Harman, Gary E., Ph.D., Oregon State U. Prof., Horticultural Sciences (Geneva)
- Harrington, Laura, Ph.D., U. of Massachusetts. Asst. Prof., Entomology
- Henick-Kling, Thomas, Ph.D., U. of Adelaide (Australia). Prof., Food Science and Technology (Geneva)



- Hintz, Harold F., Ph.D., Cornell U. Prof. Emeritus, Animal Science
- Hirschl, Thomas A., Ph.D., U. of Wisconsin. Prof., Development Sociology
- Hoch, Harvey, Ph.D., U. of Wisconsin. Prof., Plant Pathology (Geneva)
- Hodge, Kathie, Ph.D., Cornell U. Asst. Prof., Plant Pathology
- Hoffmann, Michael P., Ph.D., U. of California, Davis. Prof., Entomology
- Horrigan, Paula H., M.L.A., Cornell U. Assoc. Prof., Landscape Architecture
- Hotchkiss, Joseph H., Ph.D., Oregon State U. Prof., Food Science
- Hrazdina, Geza, Ph.D., Eidg. Technische Hochschule, Zürich (Switzerland). Prof., Food Science and Technology (Geneva)
- Hudler, George W., Ph.D., Colorado State U. Prof., Plant Pathology
- Hullar, Theodore L., Ph.D., U. of Minnesota. Prof., Natural Resources
- Hunter, Jean B., D.En.Sc., Columbia U. Assoc. Prof., Biological and Environmental Engineering
- Irwin, Lynne H., Ph.D., Texas A&M U. Assoc. Prof., Biological and Environmental Engineering
- Jahn, Margaret M., Ph.D., Cornell U. Prof., Plant Breeding
- Jewell, William J., Ph.D., Stanford U. Prof., Biological and Environmental Engineering
- Johnson, Patricia A., Ph.D., Cornell U. Prof., Animal Science
- Just, David R., Ph.D., U. of California, Berkeley. Asst. Prof., Applied Economics and Management
- Kaiser, Harry M., Ph.D., U. of Minnesota. Prof., Applied Economics and Management
- Kanbur, Sanjiv Madhwarao, Ph.D., U. of Oxford (England). Prof., Applied Economics and Management
- Ketterings, Quirine, Ph.D., Ohio State. Assoc. Prof., Crop and Soil Sciences
- Knipple, Douglas C., Ph.D., Cornell U. Assoc. Prof., Entomology (Geneva)
- Knoblauch, Wayne A., Ph.D., Michigan State U. Prof., Applied Economics and Management
- Knuth, Barbara A., Ph.D., Virginia Polytechnic Inst. and State U. Prof., Natural Resources
- Koeller, Wolfram, Ph.D., Phillips-U-Marburg (Germany). Prof., Plant Pathology (Geneva)
- Kraft, Clifford E., Ph.D., U. of Wisconsin, Madison. Assoc. Prof., Natural Resources
- Krall, Daniel W., M.L.A. Cornell U. Assoc. Prof., Landscape Architecture
- Krasny, Marianne E., Ph.D., U. of Washington. Prof., Natural Resources
- Kresovich, Stephen, Ph.D., Ohio State U. Prof., Plant Breeding
- Kroma, Margaret M., Ph.D., Iowa State U. Asst. Prof., Education
- Kyle, Steven C., Ph.D., Harvard U. Assoc. Prof., Applied Economics and Management
- Lakso, Alan N., Ph.D., U. of California, Davis. Prof., Horticultural Sciences (Geneva)
- Lassoie, James P., Ph.D., U. of Washington. Prof., Natural Resources
- Lawless, Harry T., Ph.D., Brown U. Prof., Food Science
- Lazarowitz, Sondra G., Ph.D., Rockefeller U. Prof., Plant Pathology
- Lazzaro, Brian, Ph.D., Pennsylvania State U. Asst. Prof., Entomology
- Lee, Chang Y., Ph.D., Utah State U. Prof., Food Science and Technology (Geneva)
- Lee, David R., Ph.D., U. of Wisconsin, Madison. Prof., Applied Economics and Management
- Lee, Kwangwon, Ph.D., Texas A&M U. Asst. Prof., Plant Pathology
- Lehmann, C. Johannes, Ph.D., U. of Bayreuth (Germany). Asst. Prof., Crop and Soil Sciences
- Lei, Xingen, Ph.D., Michigan State U. Assoc. Prof., Animal Science
- Leiponen, Aija, Ph.D., U. of California, Berkeley. Asst. Prof., Applied Economics and Management
- Lesser, William H., Ph.D., U. of Wisconsin, Madison. Prof., Applied Economics and Management
- Lewenstein, Bruce V., Ph.D., U. of Pennsylvania. Assoc. Prof., Communication
- Liebherr, James K., Ph.D., U. of California, Berkeley. Prof., Entomology
- Liu, Ruihai, Ph.D., Cornell U. Assoc. Prof., Food Science
- Long, Qiaoming, Ph.D., U. of Edinburgh (Scotland). Asst. Prof., Animal Science
- Lorbeer, James W., Ph.D., U. of California, Berkeley. Prof., Plant Pathology
- Loria, Rosemary, Ph.D., Michigan State U. Prof., Plant Pathology
- Losey, John E., Ph.D., U. of Maryland. Assoc. Prof., Entomology
- Lovette, J. Irby, Ph.D., U. of Pennsylvania. Asst. Prof., Ornithology
- Luo, Dan, Ph.D., Ohio State U. Asst. Prof., Biological and Environmental Engineering
- Lyson, Thomas A., Ph.D., Michigan State U. Prof., Development Sociology
- March, John C., Ph.D., U. of Maryland. Asst. Prof., Biological and Environmental Engineering
- Martin, Gregory B., Ph.D., Michigan State U. Prof., Plant Pathology
- McBride, Murray B., Ph.D., Michigan State U. Prof., Crop and Soil Sciences
- McComas, Katherine A., Ph.D., Cornell U. Asst. Prof., Communication
- McCouch, Susan, Ph.D., Cornell U. Prof., Plant Breeding
- McGrath, Margaret T., Ph.D., Pennsylvania State U. Assoc. Prof., Plant Pathology
- McLaughlin, Edward W., Ph.D., Michigan State U. Prof., Applied Economics and Management
- McLeod, Poppy L., Ph.D., Harvard U. Assoc. Prof., Communication
- McMichael, Philip D., Ph.D., SUNY, Binghamton. Prof., Development Sociology
- Meloy, Margaret G., Ph.D., Cornell U. Adj. Asst. Prof., Applied Economics and Management
- Merwin, Ian A., Ph.D., Cornell U. Prof., Horticulture
- Mezey, Jason G., Ph.D., Yale U. Asst. Prof., Biological Statistics and Computational Biology
- Milgroom, Michael G., Ph.D., Cornell U. Prof., Plant Pathology
- Miller, Dennis D., Ph.D., Cornell U. Prof., Food Science
- Miller, William B., Ph.D., Cornell U. Prof., Horticulture
- Mills, Edward L., Ph.D., Cornell U. Prof., Natural Resources
- Mize, Ronald L., Ph.D., U. of Wisconsin, Madison. Asst. Prof., Development Sociology
- Moraru, Carmen I., Ph.D., U. of Galati (Romania). Asst. Prof., Food Science
- Mount, Timothy D., Ph.D., U. of California, Berkeley. Prof., Applied Economics and Management
- Mt. Pleasant, Jane, Ph.D., North Carolina State U. Assoc. Prof., Horticulture
- Mudge, Kenneth W., Ph.D., Washington State U. Assoc. Prof., Horticulture
- Mulvaney, Steven J., Ph.D., Cornell U. Assoc. Prof., Food Science
- Mutschler, Martha A., Ph.D., U. of Wisconsin. Prof., Plant Breeding
- Nault, Brian, Ph.D., North Carolina State. Asst. Prof., Entomology, Geneva
- Nelson, Eric B., Ph.D., Ohio State U. Prof., Plant Pathology
- Nelson, Rebecca J., Ph.D., U. of Washington. Assoc. Prof., Plant Pathology
- Ng, David T., Ph.D., Columbia U. Asst. Prof., Applied Economics and Management
- Nielsen, Rasmus, Ph.D., U. of California, Berkeley. Adjunct Prof., Biological Statistics and Computational Biology
- Novakovic, Andrew M., Ph.D., Purdue U. Prof., Applied Economics and Management
- Nyrop, Jan P., Ph.D., Michigan State U. Prof., Entomology (Geneva)
- Obendorf, Ralph L., Ph.D., U. of California, Davis. Prof., Crop and Soil Sciences
- Oltenu, Pascal A., Ph.D., U. of Minnesota. Prof., Animal Science
- Ostman, Ronald E., Ph.D., U. of Minnesota. Prof., Communication
- Overton, Thomas R., Ph.D., U. of Illinois. Assoc. Prof., Animal Science
- Padilla-Zakour, Olga, Ph.D., Cornell U. Assoc. Prof., Food Science and Technology (Geneva)
- Park, Travis D., Ph.D., U. of Florida. Asst. Prof., Education
- Parks, John E., Ph.D., Virginia Polytechnic Inst. and State U. Prof., Animal Science
- Parlange, Jean-Yves, Ph.D., Brown U. Prof., Biological and Environmental Engineering
- Pawlowska, Teresa E., Ph.D., U. of Minnesota. Asst. Prof., Plant Pathology
- Pawlowski, Wojtek P., Ph.D., U. of Minnesota. Asst. Prof., Plant Breeding and Genetics
- Peck, Daniel C., Ph.D., Cornell U. Asst. Prof., Entomology (Geneva)
- Pell, Alice N., Ph.D., U. of Vermont. Prof., Animal Science
- Perez, Pedro, Ph.D., Rensselaer Polytechnic Inst. Asst. Prof., Applied Economics and Management
- Perry, Keith, Ph.D., Cornell U. Assoc. Prof., Plant Pathology
- Peters, Scott J., Ph.D., U. of Minnesota. Asst. Prof., Education
- Petrovic, A. Martin, Ph.D., Michigan State U. Prof., Horticulture
- Pfeffer, Max, Ph.D., U. of Wisconsin, Madison. Prof., Development Sociology
- Pinstrup-Andersen, Per, Ph.D., Oklahoma State U. Prof., Applied Economics and Management
- Poe, Gregory, Ph.D., U. of Wisconsin. Assoc. Prof., Applied Economics and Management
- Pollak, E. John, Ph.D., Iowa State U. Prof., Animal Science
- Prince, Jeffrey T., Ph.D., Northwestern U. Asst. Prof., Applied Economics and Management
- Pritts, Marvin P., Ph.D., Michigan State U. Prof., Horticulture
- Quaas, Richard L., Ph.D., Colorado State U. Prof., Animal Science
- Quirk, Susan M., Ph.D., Cornell U. Assoc. Prof., Animal Science
- Raj, Sevilmedu P., Ph.D., Carnegie-Mellon U. Prof., Applied Economics and Management
- Rakow, Donald A., Ph.D., Cornell U. Assoc. Prof., Horticulture
- Raman, Kandukuri, Ph.D., U. of Reading (England). Adj. Prof., Plant Breeding
- Rangarajan, Anusuya, Ph.D., Ohio State U. Assoc. Prof., Horticulture

- Ranney, Christine K., Ph.D., U. of California,  
 Davis. Assoc. Prof., Applied Economics and  
 Management  
 Rayor, Linda, Ph.D., U. of Kansas. Sr. Res.  
 Assoc., Entomology  
 Regenstein, Joe M., Ph.D., Brandeis U. Prof.,  
 Food Science  
 Reiners, Stephen, Ph.D., Ohio State U. Assoc.  
 Prof., Horticultural Sciences (Geneva)  
 Reisch, Bruce, Ph.D., U. of Wisconsin,  
 Madison. Prof., Horticultural Sciences  
 (Geneva)  
 Reissig, William H., Ph.D., Oregon State U.  
 Prof., Entomology (Geneva)  
 Richmond, Milo E., Ph.D., U. of Missouri.  
 Courtesy Assoc. Prof., Natural Resources  
 Riha, Susan, Ph.D., Washington State U. Prof.,  
 Earth and Atmospheric Sciences  
 Rizvi, Syed S., Ph.D., Ohio State U. Prof.,  
 Food Science  
 Robinson, Richard W., Ph.D., Cornell U. Prof.  
 Emeritus, Horticultural Sciences (Geneva)  
 Robinson, Terence L., Ph.D., Washington  
 State U. Assoc. Prof., Horticultural Sciences  
 (Geneva)  
 Roelofs, Wendell L., Ph.D., Indiana U. Prof.,  
 Entomology (Geneva)  
 Rose, Jocelyn, Ph.D., U. of California, Davis.  
 Asst. Prof., Plant Biology  
 Rosenberger, David A., Ph.D., Michigan State  
 U. Prof., Plant Pathology (Geneva)  
 Rossi, Frank S., Ph.D., Cornell U. Assoc. Prof.,  
 Horticulture  
 Rudstam, Lars G., Ph.D., U. of Stockholm  
 (Sweden). Assoc. Prof., Natural Resources  
 Rutz, Donald A., Ph.D., North Carolina State  
 U. Prof., Entomology  
 Sanderson, John P., Ph.D., U. of California,  
 Riverside. Assoc. Prof., Entomology  
 Sanford, John C., Ph.D., U. of Wisconsin,  
 Madison. Courtesy Assoc. Prof.,  
 Horticultural Sciences (Geneva)  
 Scanlon, Michael J., Ph.D., Iowa State U.  
 Assoc. Prof., Plant Biology  
 Scherer, Clifford W., Ph.D., U. of Wisconsin,  
 Madison. Assoc. Prof., Communication  
 Schneider, Rebecca, Ph.D., Cornell U. Assoc.  
 Prof., Natural Resources  
 Schrader, Dawn E., Ph.D., Harvard U. Assoc.  
 Prof., Education  
 Schulze, William D., Ph.D., U. of California,  
 Riverside. Prof., Applied Economics and  
 Management  
 Schwager, Steven J., Ph.D., Yale U.  
 Assoc. Prof., Biological Statistics and  
 Computational Biology  
 Scott, Jeffrey G., Ph.D., U. of California,  
 Berkeley. Prof., Entomology  
 Scott, Norman R., Ph.D., Cornell U. Prof.,  
 Biological and Environmental Engineering  
 Seem, Robert C., Ph.D., Pennsylvania State U.  
 Prof., Plant Pathology (Geneva)  
 Setter, Timothy L., Ph.D., U. of Minnesota.  
 Prof., Crop and Soil Sciences  
 Shanahan, James E., Ph.D., U. of  
 Massachusetts, Amherst. Assoc. Prof.,  
 Communication  
 Shapiro, Michael A., Ph.D., U. of Wisconsin,  
 Madison. Assoc. Prof., Communication  
 Shelton, Anthony M., Ph.D., U. of California,  
 Riverside. Prof., Entomology (Geneva)  
 Shields, Elson J., Ph.D., U. of Wisconsin. Prof.,  
 Entomology  
 Siebert, Karl J., Ph.D., Pennsylvania State  
 U. Prof., Food Science and Technology  
 (Geneva)  
 Siepel, Adam C., Ph.D., U. of California, Santa  
 Cruz. Asst. Prof., Biological Statistics and  
 Computational Biology  
 Simon, Daniel, Ph.D., U. of Maryland. Asst.  
 Prof., Applied Economics and Management  
 Sipple, John W., Ph.D., U. of Michigan. Assoc.  
 Prof., Education  
 Smart, Christine D., Ph.D., Michigan State U.  
 Asst. Prof., Plant Pathology (Geneva)  
 Smith Einarson, Margaret E., Ph.D., Cornell U.  
 Assoc. Prof., Plant Breeding  
 Smith, R. David, Ph.D., Cornell U. Assoc.  
 Prof., Animal Science  
 Soderlund, David M., Ph.D., U. of California,  
 Berkeley. Prof., Entomology (Geneva)  
 Sorrells, Mark E., Ph.D., U. of Wisconsin,  
 Madison. Prof., Plant Breeding  
 Steenhuis, Tammo S., Ph.D., U. of Wisconsin.  
 Prof., Biological and Environmental  
 Engineering  
 Straub, Richard W., Ph.D., U. of Missouri. Prof.  
 Emeritus, Entomology (Geneva)  
 Strawderman, Rob, Ph.D., Harvard U. Prof.,  
 Biological Statistics and Computational  
 Biology  
 Streeter, Deborah H., Ph.D., U. of Wisconsin,  
 Madison. Prof., Applied Economics and  
 Management  
 Sullivan, Patrick J., Ph.D., U. of Washington.  
 Assoc. Prof., Natural Resources  
 Tanksley, Steven D. Ph.D., U. of California,  
 Davis. Prof., Plant Breeding  
 Tauer, Loren W., Ph.D., Iowa State U. Prof.,  
 Applied Economics and Management  
 Taylor, Alan G., Ph.D., Oklahoma State U.  
 Prof., Horticultural Sciences (Geneva)  
 Thaler, Jennifer S., Ph.D., U. of California,  
 Davis. Asst. Prof., Entomology  
 Thies, Janice E., Ph.D., U. of Hawaii. Assoc.  
 Prof., Crop and Soil Sciences  
 Thonney, Michael L., Ph.D., U. of Minnesota.  
 Prof., Animal Science  
 Timmons, Michael B., Ph.D., Cornell U. Prof.,  
 Biological and Environmental Engineering  
 Tingey, Ward M., Ph.D., U. of Arizona. Prof.,  
 Entomology  
 Trancik, Roger T., M.L.A., Harvard U. Prof.,  
 Landscape Architecture  
 Trowbridge, Peter J., M.L.A., Harvard U. Prof.,  
 Landscape Architecture  
 Trumbull, Deborah J., Ph.D., U. of Illinois.  
 Assoc. Prof., Education  
 Turgeon, B. Gillian, Ph.D., U. of Dayton. Prof.,  
 Plant Pathology  
 Turvey, Calum G., Ph.D., Purdue U. Prof.,  
 Applied Economics and Management  
 VanAmburgh, Michael E., Ph.D., Cornell U.  
 Assoc. Prof., Animal Science  
 vanEs, Harold M., Ph.D., North Carolina State  
 U. Prof., Crop and Soil Sciences  
 Viands, Donald R., Ph.D., U. of Minnesota.  
 Prof., Plant Breeding  
 Villenas, Sofia A., Ph.D., U. of North Carolina,  
 Chapel Hill. Assoc. Prof., Education  
 Walker, Larry P., Ph.D., Michigan State  
 U. Prof., Biological and Environmental  
 Engineering  
 Walter, Michael F., Ph.D., U. of Wisconsin,  
 Madison. Prof., Biological and  
 Environmental Engineering  
 Walter, M. Todd, Ph.D., Washington State U.  
 Asst. Prof., Biological and Environmental  
 Engineering  
 Wang, Albert, Ph.D., Massachusetts Inst. of  
 Technology. Asst. Prof., Applied Economics  
 and Management  
 Wang, Ping, Ph.D., Cornell U. Asst. Prof.,  
 Entomology, Geneva  
 Wansink, Brian C., Ph.D., Stanford U. Prof.,  
 Applied Economics and Management  
 Watkins, Christopher B., Rutgers U. Prof.,  
 Horticulture  
 Weber, Courtney A., Ph.D., U. of Florida.  
 Assoc. Prof., Horticultural Sciences  
 (Geneva)  
 Welch, Ross M., Ph.D., U. of California, Davis.  
 Courtesy Prof., Crop and Soil Sciences  
 Weston, Leslie A., Ph.D., Michigan State U.  
 Assoc. Prof., Horticulture  
 White, Gerald B., Ph.D., Pennsylvania State U.  
 Prof., Applied Economics and Management  
 Whitlow, Thomas H., Ph.D., U. of California,  
 Davis. Assoc. Prof., Horticulture  
 Wiedmann, Martin, Ph.D., Cornell U. Assoc.  
 Prof., Food Science  
 Wien, Hans C., Ph.D., Cornell U. Prof.,  
 Horticulture  
 Wilcox, Wayne F., Ph.D., U. of California,  
 Davis. Prof., Plant Pathology (Geneva)  
 Wilks, Daniel S., Ph.D., Oregon State U. Prof.,  
 Earth and Atmospheric Sciences  
 Williams, Linda, Ph.D., Brown U. Assoc. Prof.,  
 Development Sociology  
 Wilson, Arthur L., Ph.D., U. of Georgia. Prof.,  
 Education  
 Wolf, Steven, Ph.D., U. of Wisconsin, Madison.  
 Asst. Prof., Natural Resources  
 Wolfe, David W., Ph.D., U. of California,  
 Davis. Prof., Horticulture  
 Worobo, Randy W., Ph.D., U. of Alberta  
 (Canada). Assoc. Prof., Food Science and  
 Technology (Geneva)  
 Yavitt, Joseph B., Ph.D., U. of Wyoming.  
 Assoc. Prof., Natural Resources  
 Yuan, Yu (Connie), Ph.D., U. of Southern  
 California, Los Angeles. Asst. Prof.,  
 Communication  
 Zitter, Thomas A., Ph.D., Michigan State U.  
 Prof., Plant Pathology

## COLLEGE OF ARCHITECTURE, ART, AND PLANNING

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Leon Lawrence, director, multicultural affairs

Margaret N. Webster, director, visual resources facility

Jayne A. LeGro, registrar

### FACULTY ADVISORS

Architecture students are assigned faculty advisors and are also invited to share concerns with and seek advice from the most appropriate faculty member or college officer, including the registrar, the department chair, and the dean.

Students in the fine arts department are assigned a faculty advisor for the first year. After the first year, students may select their advisors. Students are required to have an advisor throughout their program in their area of concentration.

Undergraduate students in the Program of Urban and Regional Studies are assigned faculty advisors.

All students in the college are invited to share concerns and seek advice from the volunteer student advisors (EARS) at any time.

### DEGREE PROGRAMS

	<i>Degree</i>
Architecture	B. Arch.
	B.F.A.
Fine Arts	B.F.A.
History of Architecture and Urbanism	B.S.
Urban and Regional Studies	B.S.

The college offers programs leading to the bachelor's degree—the five-year program in architecture leads to the bachelor of architecture; four-year programs in art and architecture lead to the bachelor of fine arts. In addition, four-year programs with a concentration in either urban and regional studies or history of architecture lead to the bachelor of science.

Graduate-level programs are offered in art, architectural design and urban design, architectural science, history of architecture and urbanism, historic preservation planning, city and regional planning, regional science, and landscape architecture.

Students in most of these programs work in physical proximity to one another and thus gain a broader understanding of their own special area of interest through contact with students and faculty from other disciplines.

Early in its development, the college set a limit on the number of students it would enroll and devised a selective method of admission. There are now more than 670 students and a full-time teaching staff of over 60, supplemented by visiting professors and critics, part-time lecturers, and assistants. Teachers and students mix freely, and much instruction and criticism is on an individual basis.

The college's courses are integral parts of the professional curricula. Fundamental subjects are taught by faculty members whose experience provides them with professional points of view. The concentration of professional courses within the college is balanced by the breadth of view gained from courses and informal learning in the rest of the university. The college believes that this breadth is an essential element of professional education. This conviction is evident in the form of the curricula, the methods of teaching, and the extracurricular life of teachers and students.

### FACILITIES

The college occupies Sibley Hall, Olive Tjaden Hall, Rand Hall, and the Foundry. Facilities for architecture and city and regional planning, as well as college administrative offices, the Visual Resources Facility, and the Fine Arts Library, are located in Sibley Hall. The Department of Art is housed in Olive Tjaden Hall. Sculpture facilities are in the Foundry and architecture design studios and shop facilities are in Rand and Sibley. The Green Dragon Café, a student eatery and lounge, is located in the lower level of Sibley Dome. Darkrooms in the Department of Art are available for general use by students in the college and are used primarily as laboratories for the photography courses. Each user must pay a darkroom fee. Information about darkroom rules and regulations, hours, and equipment is available at the darkroom circulation desk.

Through the generosity of the late Lillian P. Heller, the college also owns the Miller-Heller House, home of William H. Miller, the first student to enroll for the study of architecture at Cornell, and later a practicing architect in Ithaca. This building is used to house visiting teachers and guests of the college and for occasional receptions and social events.

### Libraries

The Fine Arts Library in Sibley Hall serves the College of Architecture, Art, and Planning through its collections on architecture, fine arts, city and regional planning, and landscape architecture. The library, with more than 177,000 books, is capable of supporting undergraduate, graduate, and research programs. Some 1,300 serials are currently received and maintained.

The Visual Resources Facility, made possible through gifts from George and Adelaide Knight, is located in Sibley Hall and contains the F. M. Wells Memorial Slide Collection, which consists of a large and growing collection of slides of architecture, architectural history, and art. The collection now includes approximately 450,000 slides.

The facilities of the libraries of other schools and departments on campus and the John M. Olin Library, designed primarily as a research library for graduate students, are also available.

### Museums and Galleries

The Herbert F. Johnson Museum of Art was formally opened in May 1973. Although many of its exhibitions and activities relate directly to academic programs of the university, the museum has no administrative affiliation with any department. In this way, its programs freely cross academic boundaries, stimulating interchange among disciplines. With a strong and varied collection and a continuous series of high-quality exhibitions, it fulfills its mission as a center for the visual arts at Cornell. Throughout the year, works of students, faculty, and staff in the College of Architecture, Art, and Planning and of guest artists may be viewed in the John Hartell Gallery in Sibley Dome and in the Olive Tjaden Gallery in Olive Tjaden Hall. Art galleries are also maintained in Willard Straight Hall, where loan exhibitions of paintings and graphic work by contemporary artists are held.

### Rome Program

The College of Architecture, Art, and Planning's Rome Program was founded in the fall of 1986 to provide instruction in Italy for students seeking excellence in art, architecture, and other disciplines. The program offers an educational experience that draws upon the rich past of Rome, its resources in museums, its art and architecture, and its wide variety of cultural offerings. The school is located in the restored 17th-century Palazzo Lazzaroni in the center of the eternal city near such well-known Roman sights as Piazza Navona, the Pantheon, and Rome's famous outdoor market at the Campo dei Fiori.

The program in Rome offers components for students majoring in architecture, fine arts, planning, and liberal arts. Full course loads are available to all students in a curriculum that stresses the convergence of artistic, cultural, and architectural ideas vital to an

understanding of the city. Students are responsible for planning course schedules that ensure their particular requirements can be met, since course offerings in Rome are limited. For additional information, see individual department listings or contact the Rome Program office, 149 East Sibley Hall.

## COLLEGE ACADEMIC POLICIES

### Ownership of Student Work

All drawings, models, paintings, graphic art, and sculpture done in the studios and drafting rooms as a part of the instructional program are the property of the college until they have been graded and released by the instructor. Certain works may be selected by the college for retention for academic purposes.

### Exhibitions of Student Work

Exhibitions of student work are held each semester as part of the yearly schedule of the Olive Tjaden Gallery and the John Hartell Gallery in Sibley Dome. These galleries display work from a specific course or exhibit examples of recent work by individual faculty members, students, and visitors.

### Scholastic Standards

Semester by semester, a candidate for an undergraduate degree in this college is required to successfully complete a minimum of 12 credit hours with a grade point average for the semester of not less than C+ (2.3). The record of each student who falls below the standard will be reviewed by the college's Academic Records Committee for appropriate action, among those described below:

1. The student is issued a **Warning**. This means the student's performance is not up to expectations. Unless improvement is shown in the subsequent semester, the student may be placed on **Final Warning** or given a **Required Leave of Absence** from the college.
2. The student is issued a **Final Warning**. This indicates the student's record is unsatisfactory. Unless considerable improvement is shown in the subsequent semester, the student may be given a **Required Leave of Absence** from the college.
3. The student is placed on a **Required Leave of Absence**. The student is dismissed from the college and may not continue studies in the college. A student who has been placed on a required leave of absence may request to resume studies after a leave of absence of at least two semesters. This request is made by letter addressed to the college dean, chair of the Academic Records Committee, 129 Sibley Hall, Ithaca, NY 14853-6702. The student must submit evidence that time has been well used, and if employed, the student must submit a letter from the employer(s). Students on required leave are not allowed to register extramurally at Cornell, as the intention of the required leave is to insist upon a break from study at Cornell. If a student chooses to enroll in courses at another institution while on a required leave, credit is not granted automatically. Upon receiving permission to return, a student must petition the

department and include an official transcript to request credit for courses taken. A return to study in the college after a required leave of absence is at the discretion of the college's Academic Records Committee. Requests for spring semester return must be made by November 15 and requests for fall semester return must be made by April 15. The second required leave of absence is a de facto dismissal and the student will be permanently withdrawn from the college.

4. The student is placed on a **Required Withdrawal**. The student may not reregister in the College of Architecture, Art, and Planning and is dismissed from the college and is permanently prohibited from continuing studies in it.

The required withdrawal action does not prevent the student from applying for admission to another division of the university.

The above actions are not necessarily sequential. A student who has received a warning may be placed on a required leave of absence at the end of the next semester if the performance during that semester is deemed to be grossly deficient.

It is necessary to have a cumulative grade point average of at least 2.0 (C) for graduation.

## ARCHITECTURE COURSES

Course offerings in the college of Architecture, Art and Planning are listed under the various departments. Courses are identified with a standard abbreviation followed by a three-digit number.

For the entering class of 2006, all new students in the college of AAP will be required to complete a 1-credit, interdisciplinary course offered in the fall semester.

### AAP 111(1101) The World We Make

Fall and spring. 1 credit. S-U grades.

R. Moudry.

This course offers AAP first-year students an introduction to the subjects, theories, and methodologies of the disciplines of art, planning, architecture, and landscape architecture. Examples drawn from a range of historical periods as well as contemporary practice highlight distinct processes of thinking and working in each discipline, as well as areas of intersection and overlap. The course is organized in three thematic segments: Public Acts, Personal Practices, and Moral Imagination. Through lectures, two short written assignments, a group project and a trip to New York City, students will acquire a working knowledge of the college's major creative and intellectual pursuits.

## ARCHITECTURE

A. Ovaska, department head and DUG (143 East Sibley Hall, 255-5236); L. Chi, DGS; M. Cruvellier, M. Curry, F. Davis, W. Goehner, D. P. Greenberg, G. Hascup, K. Hubbell, D. M. Lasansky, B. G. MacDougall, A. B. Mackenzie, L. Mirin, V. Mulcahy, J. Ochshorn, C. F. Otto, A. Ovaska, H. W. Richardson, N. Seraji, A. Simitch, V. K. Warke, J. Wells, M. Woods, J. Zissovici

### Professional Degree Programs

Cornell offers two professional degrees in architecture: the undergraduate bachelor of architecture and the graduate master of architecture. These degrees count toward the professional registration requirements established by the various states, the National Architectural Accrediting Board, and the National Council of Architectural Registration Boards.

#### B. Arch.

The undergraduate professional program is normally five years in length and is designed particularly for people who, before they apply, have established their interest and motivation to enter the field. It therefore incorporates both a general and professional educational base.

The program is oriented toward developing the student's ability to deal creatively with architectural problems on analytical, conceptual, and developmental levels. The sequence courses in design, consisting of studio work augmented by lectures and seminars, are the core of the program. Sequences of studies in the history of architecture and cities, culture and society, architectural theory, visual studies, environmental control, structures, construction, and computer applications provide a base for the work in design.

In the first three years, the student has the opportunity to establish a foundation in the humanities and sciences through electives. During the fourth and fifth years, this base may expand through further detailed studies in these areas. Within the professional program a basis for understanding architecture in its contemporary and historical cultural contexts is established.

The structure of the program incorporates considerable flexibility for the individual student to pursue his or her particular interest in the fourth and fifth years. By carefully planning options and electives in the fifth year, it is possible for a qualified student to apply the last year's work for the bachelor of architecture degree to the post-professional M. Arch. II program. Some students are then able to complete the requirements for the master's degree in one additional year.

#### M. Arch. I

Cornell's graduate professional program is normally three and one-half years long and is intended for students who already have a bachelor's degree in any subject. Information on this professional graduate program may be found on the architecture web site ([www.architecture.cornell.edu](http://www.architecture.cornell.edu)).

**Note on Professional Accreditation**

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the bachelor of architecture, the master of architecture, and the doctor of architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, constitute an accredited professional education. The preprofessional degree, however, is not, by itself, recognized as an accredited degree.

**Rome Program**

The program offers the opportunity for students from Cornell and other universities to spend one or two semesters of study in Rome. This option is open to fourth- and fifth-year Cornell architecture students; outstanding third-year students are admitted by petition and a review of their design record. Courses offered by this department include design, history, theory, architectural science, and visual studies. In addition, courses are offered by other departments in Italian language, Italian culture, art, city and regional planning and history of art. The program provides a unique urban and architectural experience drawing from the rich past of the city for sources of instruction and inspiration.

**Overlap Program**

For qualified students the department offers an option that combines the fifth year of the undergraduate program with the first year of the post-professional master of architecture program. In the fall of the fourth undergraduate year, interested students petition the department to substitute ARCH 601-602 or 603-604 for ARCH 501-502. At the same time, they complete graduate school applications and submit them with fee and portfolio to the graduate field assistant for architecture. Students accepted into the program may not normally begin until the fall of their fifth year and, once enrolled, may not transfer back into the 501-502 sequence.

Following admission into the Overlap Program, students may petition to apply toward the requirements of the master's degree a maximum of 30 credits, including ARCH 601-602 or 603-604 and other advanced courses taken in excess of distribution requirements for the bachelor of architecture degree.

**Curriculum****First Year**

<i>Fall Semester</i>	<i>Credits</i>
101 Design I	6
181 History of Architecture I	3
151 Drawing I: Freehand Drawing	2
MATH 111 Calculus or out-of-college elective	3-4
Out-of-college elective	3
	17-18

**Spring Semester**

102 Design II	6
182 History of Architecture II	3
152 Drawing II: Drawing Systems	2
MATH 106 or 111 or out-of-college elective	3-4
Out-of-college elective (first-year writing seminar suggested)	3
	17-18

**Second Year**

<i>Fall Semester</i>	<i>Credits</i>
201 Design III	6
263 Structural Concepts	4
231 Architectural Analysis I	2
262 Building Technology, Materials, and Methods	3
ARCH 253 Drawing III: Digital Media in Architecture or out-of-college elective	2-3
	17-18

**Spring Semester**

202 Design IV	6
232 Architectural Analysis II	2
261 Environmental Systems—Site Planning	3
264 Structural Elements	3
ARCH 253 Drawing III: Digital Media in Architecture or college elective	2-3
	16-17

**Third Year**

<i>Fall Semester</i>	<i>Credits</i>
301 Design V	6
361 Environmental Systems II—Thermal Environmental Systems	3
Departmental elective	3
Departmental elective	3
Out-of-college elective	3
	18

**Spring Semester**

302 Design VI	6
363 Structural Systems	3
362 Environmental Systems III—Building Systems Integration	3
342 Architecture as a Cultural System	3
College or out-of-college elective	3
	18

**Fourth Year**

<i>Fall Semester</i>	<i>Credits</i>
401 Design VII	6
Departmental elective	3
Departmental elective	3
College elective	3
Out-of-college elective	3
	18

**Spring Semester**

402 Design VIII	6
521 Professional Practice	3
Departmental elective	3
College or out-of-college elective	3
Out-of-college elective	3
	18

**Fifth Year**

<i>Fall Semester</i>	<i>Credits</i>
501 Design IX	6
[or Overlap Program 601 or 603]	9]
Departmental elective	3
ARCH 510 Thesis Proseminar	3
Out-of-college elective	3
Out-of-college elective	3
	18

**Spring Semester**

502 Design X	8
[or Overlap Program 602 or 604]	9]
Departmental elective	3
Out-of-college elective	3
College or out-of-college elective	3
	17

**Required Departmental Courses**

<i>Semesters</i>	<i>Subject</i>	<i>Course</i>	<i>Numbers</i>	<i>Credits</i>
10	design		101-502	62
1	mathematics	MATH 111, MATH 106, or approved equivalent		3-4
3	structures	263, 264, 363		10
4	technology	261, 262, 361, 362		12
2	architectural theory	231, 232		4
2	history of architecture	181, 182		6
1	architecture, culture, and society	342		3
1	professional practice	521		3
3	drawing	151, 152, 253		6
				107-108

**Electives**

<i>Departmental Semesters</i>	<i>Credits</i>
3 history of architecture: 300 level	9
1 visual representation in architecture	3
2 architectural theory or 600-level design-related course	6
1 architectural structures, construction, or environmental systems and conservation	3
	21



<i>College Semesters</i>		
2	art: any studio courses (ART 214 will fulfill)	6
<i>Out-of-College Semesters</i>		
1	first-year writing seminar	3
1	mathematics, or physical or biological sciences	3
1	humanities	3
		12
<i>Free</i>		
	Of the electives, 15 credits are to be taken outside the College of Architecture, Art, and Planning, and 15 credits may be taken either in or outside the college.	30
	Total credits	176

### Architecture Concentrations for Majors

The Department of Architecture recognizes any concentration earned within the university but outside of the department (using standards set by those departments) on the transcripts of its students.

It is often advantageous for undergraduates to concentrate in specific subdisciplines of architecture, especially if they anticipate application to specialized graduate programs; therefore, the following concentrations in architecture are offered within the department for B. Arch. and B.F.A. in architecture candidates only:

Architecture, Culture, and Society 342 (or equivalent), plus 9 credits in this area.

Architectural Science and Technology 261, 262, 263, 264, 361, 362, 363, distribution requirement (3 credits), plus 6 credits in this area.

History of Architecture 181, 182, distribution requirements (9 credits), plus 7 credits (including a 4-credit seminar course) in this area.

Theory of Architecture 231, 232, distribution requirements (6 credits), plus 6 credits in this area.

Visual Representation in Architecture 151, 152, distribution requirement (3 credits), plus 9 credits in this area.

Students wishing to receive recognition for a concentration must submit a concentration request form to the Architecture Department office. For a course to count toward a concentration, the student must receive a grade of C or better.

### Transfer Students

Although the program leading to the bachelor of architecture is directed specifically to those who are strongly motivated to begin professional study when entering college, it is sufficiently flexible to allow transfers for students who have not made this decision until after they have been in another program for one or two years. Individuals who have already completed a nonprofessional undergraduate degree may apply to the professional M. Arch. I program.

Transfer students are responsible for completing that portion of the curriculum which has not been covered by equivalent

work. Applicants who have had no previous work in architectural design must complete the 10-semester design sequence. Since this sequence may be accelerated by attending summer semesters, seven or eight regular semesters and two or three summer terms are typically required.

Admission is offered to a limited number of transfer applicants who have completed a portion of their architecture studies in other schools. Each applicant's case is considered individually. Transfer students must complete a minimum of 70 credits and four semesters in residence, taking 35 of the 70 credits (including four semesters of design) in the Department of Architecture. Placement in the design sequence is based on a review of a representative portfolio of previous work.

For those who would benefit from an opportunity to explore the field of architecture before deciding on a commitment to professional education, the department offers an introductory summer program that includes an introductory studio in architectural design, lectures, and other experiences designed to acquaint participants with opportunities, issues, and methods in the field of architecture.

### Alternative Programs

#### Bachelor of Fine Arts

After completing the first four years of requirements, the student may choose to receive the degree of bachelor of fine arts (B.F.A.) in architecture, which is not a professional degree.

#### Bachelor of Science in History of Architecture

The history of architecture major leads to a bachelor of science degree, conferred by the College of Architecture, Art, and Planning. The major is intended for transfer students from other programs at Cornell and from colleges and universities outside Cornell. Students in the Department of Architecture and the College of Arts and Sciences may take the major as part of a dual-degree program. The course of study in this major, available to students from a variety of academic backgrounds, offers the opportunity for a vigorous exploration of architecture and its history.

**Admission requirements.** Two years of undergraduate study, ARCH 181 and 182 or the equivalent. Students transferring from a B. Arch. program must be in good standing in their design sequence.

**Procedure.** Students from Cornell may transfer to the program at the beginning of the fall semester of their third or fourth year of study. They submit a short application as prospective internal transfer students. Before applying, all prospective internal transfer students meet with a history of architecture faculty member to discuss scheduling for the program.

All students who wish to enter the program, either from Cornell or other institutions, must apply by November 15 for spring admission or by March 31 for fall admission. Applications for both internal and external transfer students are available from the Admissions Office, College of Architecture, Art, and Planning, Cornell University, B-1 West Sibley Hall, Ithaca, NY 14853-6702. Completed applications must be submitted to the Admissions Office.

**Curriculum.** A student entering the program is assigned an advisor from the history of architecture faculty in the Department of Architecture. Advisor and student together prepare an appropriate two-year course of study according to the following guidelines:

1. 24 credits of 300-level courses in architectural history: ARCH 380 through 399
2. 12 credits in 600-level architectural history seminars: ARCH 681 through 699; or 8 credits in a 600-level seminar plus ARCH 499, offered for honors candidates only
3. One 300-, 400-, or 600-level course in architectural theory
4. 24 credits in electives selected in consultation with the student's advisor
5. Language requirement, to be met in the manner specified for students enrolled in the College of Arts and Sciences

**Honors program.** Students graduate with honors if, during their two years of study in the program, they have a cumulative average of B or better in all courses, have no grade lower than A- in all history of architecture courses taken at the 300 level, and have completed an honors thesis (ARCH 499) deemed to be of distinguished quality by the history of architecture faculty.

### Dual-Degree Options

Students can earn both the B.S. and B. Arch. degrees either simultaneously or sequentially. Students who have transferred into the B. Arch. program at Cornell may find this to be a special opportunity for an enlarged and enriched program of study.

Students currently enrolled in the College of Arts and Sciences at Cornell can earn a B.A. in an arts college major and a B.S. in the history of architecture in five years. In this option, students complete a minimum of 150 credits, which includes the B.S. prerequisites and curriculum requirements and 100 credits of the usual distribution and major requirements in the College of Arts and Sciences. Further information about this option is available at the Admissions Office, B-1 West Sibley Hall, and at the Academic Advising Center of the College of Arts and Sciences, 55 Goldwin Smith Hall.

Students may also elect to continue toward a master of arts degree in the history of architecture. The M.A. ordinarily requires a minimum of two years of graduate work beyond the bachelor's degree; with this special sequential degree arrangement that time is shortened to one year.

### Summer Term in Architecture

The summer term offers students the opportunity of a concentrated period of design work; the term is six to eight weeks in duration.

Undergraduate design-sequence courses, excluding 101 and 502, are offered in Ithaca. Normally there is also a design program abroad for third-, fourth-, and fifth-year students.

Students from schools of architecture other than Cornell are welcome to apply to enroll in any summer program.

Other department courses may be offered as elective courses, contingent upon student

interest, faculty availability, and departmental approval.

The department offers a Career Explorations in Architecture Program for high school students and college students considering a professional education in architecture.

### Concentration in Architecture for Nonmajors

A special concentration has been formulated specifically for those students not enrolled in the Department of Architecture but who are interested in complementing their current academic program with an introduction to various facets of architectural studies. Some students may wish to use the Concentration in Architecture for Nonmajors as a means of investigating possible graduate studies in architecture. Some may wish to develop architectural specialties within other disciplines. Students meeting the requirements for this concentration should complete a concentration form, which is available in the architecture department office. This form, when validated by the architecture department and the AAP college registrar, serves as evidence of completion of the concentration requirements. Students should consult their individual college registrars for information about whether their home college recognizes and notes such concentrations on transcripts or diplomas.

The curriculum for students in the Concentration in Architecture Program totals 14 credit hours minimum, including 8 credits of required courses and 6 credits of elective courses. Grades earned must be C or better in all courses.

**Required courses.** A minimum of 8 credits, including one design studio, one visual studies course (e.g., drawing), and one history of architecture course. For example,

ARCH 110 Introduction to Architecture Design Studio (offered summer only) 3 credits

or

ARCH 103 Elective Design Studio (offered fall only, not offered every year) 6 credits

(ARCH 103 may substitute for ARCH 110; students who complete ARCH 103 must take all other course requirements for the concentration.)

ARCH 151 Drawing I (fall only) 2 credits

ARCH 181 or 182 History of Architecture I or II (ARCH 181, fall; ARCH 182, spring) 3 credits

**Departmental elective courses:** A minimum of 6 credits, including two departmental elective courses, are required.

### Architectural Design

Courses in brackets are not offered this year.

Each student in the architecture program (undergraduates, graduates, and Rome Program participants) is charged a fee each semester to help defray the continuing costs of refurbishing and replacing equipment.

### Sequence Courses

#### ARCH 101(1101) Design I

Fall, spring, 6 credits. Prerequisite: department students. Staff.

Introduction to design as a conceptual discipline directed at the analysis, interpretation, synthesis, and transformation of the physical environment. Exercises are aimed at developing an understanding of the issues, elements, and processes of environmental design.

#### ARCH 102(1102) Design II

Spring, 6 credits. Prerequisite: department students; ARCH 101 and 151. Staff.

Continuation of ARCH 101. Covers human, social, technical, and aesthetic factors related to space and form. Design problems range from those of the immediate environment of the individual to that of small social groups.

#### ARCH 201-202(2101-2102) Design III and IV

Fall and spring, 6 credits each semester. Prerequisites: department students; ARCH 151-152; for ARCH 201, ARCH 102 and 152; for 202, ARCH 201. Corequisite: ARCH 231-232. Staff.

#### ARCH 301-302(3101-3102) Design V and VI

Fall and spring, 6 credits each semester. Prerequisites: department students; for ARCH 301, ARCH 202; for 302, ARCH 301. Staff.

#### ARCH 401-402(4101-4102) Design VII and VIII

Fall and spring, 6 credits each semester. Prerequisite: department students; for ARCH 401, ARCH 302 and 362; for 402, ARCH 401. Staff.

Programs in architectural design, urban design, or architectural technology and environmental science and topical studies.

#### ARCH 501(5101) Design IX

Fall or spring, 6 credits. Prerequisite: department students; ARCH 402. Corequisite: ARCH 510. Staff.

Programs in architectural design, building typology investigations, and research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis.

#### ARCH 502(5902) Design X—Thesis

Fall or spring, 8 credits. Requirement for B. Arch. candidates who must satisfactorily complete a thesis. Students accepted for admission to Overlap Program are exempt from thesis requirement. Prerequisite: ARCH 501 and 510. Staff.

#### ARCH 601-602(6101-6102) Special Program in Architectural Design

Fall and spring, 9 credits each semester. Prerequisite: acceptance into Overlap Program. Registration by petition only. Staff.

#### ARCH 603-604(6103-6104) Special Program in Urban Design

Fall and spring, 9 credits each semester. Prerequisite: acceptance into Overlap Program. Registration by petition only. Staff.

### Graduate Courses

#### ARCH 511-512(5111-5112) Core Design Studios

Fall and spring, 6 credits. Prerequisites: M. Arch. I students; for ARCH 512, ARCH 511 and 551. Staff.

Two-semester sequence in which fundamental design skills are taught. The

core studios integrate a broad range of architectural territories and students acquire a command of techniques of design and representation through a number of complex architectural problems.

#### ARCH 513-516(5113-5116) Vertical Design Studios

Fall and spring, 6 credits. Prerequisites: M. Arch. I students; for ARCH 513, ARCH 512 and 552; ARCH 513-516 must be taken in sequence. Staff.

Vertical studios investigate a variety of programs and project types, from individual buildings to urban districts. Students examine topics of architectural production—such as building technology, landscape, urbanism, history, and theory—and their roles in analysis and design.

#### ARCH 701-702(7101-7102) Problems in Architectural Design

Fall and spring, 9 credits each semester. Staff.

Basic first-year design course for M. Arch. II students whose major concentration is architectural design.

#### ARCH 703-704(7103-7104) Problems in Urban Design

Fall and spring, 9 credits each semester. Staff.

Basic first-year design course for M. Arch. II students whose major concentration is urban design.

#### ARCH 801(8901) Thesis or Research in Architectural Design

Fall or spring, 9 credits. Prerequisite: ARCH 701-702. Staff.

Second-year design course for M. Arch. II students whose major concentration is architectural design.

#### ARCH 802(8902) Thesis or Research in Urban Design

Fall or spring, 9 credits. Prerequisite: ARCH 703-704. Staff.

Second-year design course for M. Arch. II students whose major concentration is urban design.

#### ARCH 811(8911) Graduate Thesis Proseminar

Fall, 3 credits. Prerequisites: M. Arch. I students; ARCH 515. Staff.

First half of the yearlong thesis in architecture. Covers research methods and other subjects students employ in the development of their individual thesis topics. Emphasizes learning different types of theses and developing specific programming, design, and site definition techniques.

#### ARCH 812(8912) Independent Design Thesis

Spring, 9 credits. Prerequisites: M. Arch. I students; ARCH 516. Staff.

The master of architecture thesis is an independent design project on a topic selected by the student and researched in ARCH 811. The student develops a thesis statement outlining an area of study or a problem that has consequences for contemporary architectural production and produces a design project that examines it. Marking the transition between the academic and professional worlds, the thesis project is an opportunity for each student to define an individual position with regard to a specific aspect of architectural practice.

**Elective Design Courses****ARCH 103-104(1103-1104) Elective Design Studio**

103, fall; 104, spring. 6 credits each semester. Prerequisite: nonarchitecture students; for ARCH 103, permission of instructor; for ARCH 104, ARCH 103 and permission of instructor. Staff.

**ARCH 200, 300, 400, 500(2100, 3100, 4100, 5100) Elective Design Studio**

Fall, spring, or summer. 6 credits. For students who are not architecture majors at Cornell. Prerequisite: permission of department office. Each student is assigned to a class of appropriate level. Staff.

Nonsequence design used as temporary placement of transfer students, off-campus foreign programs for third-year students (summer and Rome) and for incompletes in design sequence. In some cases student must petition to convert elective design into sequence design.

**ARCH 503(5103) Design IXa**

Fall and spring. 6 credits. Limited to department students. Prerequisites: ARCH 402 and passing, but nonadvancing, grade in ARCH 501.

Structured studio for those needing to retake ARCH 501. The course operates within the fourth-year design studios.

**ARCH 504(5104) Design Xa**

Fall, spring, or summer. 6 credits. Limited to department students. Prerequisite: ARCH 503 and passing, but nonadvancing, grade in ARCH 502.

A structured studio for those needing to take an alternative to design thesis. This course operates within the fourth-year design studio.

**Related Courses and Seminars****ARCH 110(1110) Introduction to Architecture: Design Studio**

Summer. 3 credits. Open to non-architecture majors in college, high school students in 11th and 12th grades, and any individuals with a minimum of a high school diploma interested in exploring the field of architecture. S-U option. Not offered every year. Staff.

Designed to introduce students to ideas, principles, and methods of solving architectural problems in a studio setting. Through a graduated sequence of exercises culminating in a major semester project, students explore the architectural concepts of space, form, function, and technology. Instruction is via highly personalized critiques of individual student work by assigned department faculty members, as well as periodic reviews of the group by invited faculty and guest critics. The grade is based on the overall performance in the studio with special emphasis on the quality of a major studio project.

**ARCH 111(1111) Concentration in Architecture: Design Studio**

Summer only. 3 credits. Subject to enrollment. Prerequisite: non-architecture students. Not offered every year. Staff.

Designed to introduce students to ideas, principles, and methods of solving architectural problems in a studio setting. Through a graduated sequence of exercises culminating in a major term project, students explore the interrelationship of the architectural concepts of space, form, function, and technology. Instruction includes critiques

of individual student work by department faculty, as well as by periodic reviews by guest critics.

**ARCH 303(3103) Special Problems in Architectural Design**

Fall or spring. Variable credit; max. 3. Does not count for design sequence credit. Prerequisite: permission of instructor and approved independent study form. Staff. Independent study.

**ARCH 306(3106) Praxis: Community Design Workshop (also ARCH 606[6106])**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year. F. Davis.

Workshop-based, hands-on course directed to underserved local and global communities that seek to improve the quality of life for all citizens. It is an interdisciplinary, service-learning course that challenges the usual definition and separation of practice and theoretical research. Services are provided collaboratively to not-for-profit agencies, civic and governmental groups, as well as community-action groups to support sustainable design solutions. The course teaches professional work proficiency, and emphasizes teamwork as well as written, verbal, and graphic communication skills to negotiate the public realm.

**ARCH 313(3113) Furniture Design**

Fall or spring. 3 credits. Limited enrollment. Students who wish to earn arch visual representation credit must enroll in sec 01; arch technology credit, sec 02; and in-college elective credit, sec 03. Prerequisite: permission of instructor. Not offered every year. G. Hascup.

Explores the history, design, and materiality of furniture. Analyses of materials and joinery-connective systems are developed in parallel with ergonomic restraints. Design transformation occurs through cycles of conceptual alternatives (models and drawings), increasing in scale as the idea evolves. Full-scale prototypes and detailed tectonic drawings are required on three pieces.

**ARCH 317(3117) Contemporary Italian Culture**

Fall or spring. Variable credit; max. 3. Prerequisite: Rome Program participants. Staff.

Provides a broad view of the culture and social structure of Italy, drawing from Italian literature, history, and current events.

**ARCH 510(5110) Thesis Proseminar**

Fall and spring. 2 credits. Prerequisite: ARCH 402. Staff.

Lectures, seminars, and independent research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis.

**ARCH 521(5201) Professional Practice**

Fall or spring. 3 credits. Staff.

Examination of organizational and management theories and practices for delivering professional design services. Includes a historic overview of the profession and a review of the architect's responsibilities from the precontract phase through construction. Application of computer technology in preparing specifications.

**ARCH 522(5202) Professional Seminar**

Fall or spring. 3 credits. Prerequisite: ARCH 521. Staff.

Visits to public and private agencies and architectural firms. Discussions relative to the various aspects of each firm's practice and the identification of agency roles.

**ARCH 605(6109) Special Problems in Design**

Fall and spring. Variable credit; max. 3. Does not count toward design sequence credit. Prerequisite: permission of instructor. Staff.

Independent study.

**ARCH 606(6106) Praxis: Community Design Workshop (also ARCH 306[3106])**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year. F. Davis.

For description, see ARCH 306.

**ARCH 610(6110) Graduate Design Seminar**

Fall. 3 credits. Intended for, but not limited to, graduate students in Architectural Design and Urban Design Program. Not offered every year. Staff.

Issues in architectural and urban design.

**ARCH 611-612(6111-6112) Urban Housing Developments**

611, fall; 612, spring. 3 credits each semester. Prerequisite: fourth- and fifth-year students in architecture and graduate students; permission of instructor. Not offered every year. Staff.

**Architectural Theory****ARCH 130(1300) An Introduction to Architecture: Lectures**

Summer. 3 credits. Open to non-architecture majors in college, high school students in 11th and 12th grades, and anyone with minimum of a high school diploma interested in exploring the field of architecture. S-U grades optional. Not offered every year. Staff.

Survey course that covers the many facets of architecture: history, design principles, preservations, landscape architecture, building technology, and cultural factors. Course format comprises lectures, demonstrations, films, and field trips. Evaluation is based on quizzes and a final exam.

**ARCH 131(1301) An Introduction to Architecture**

Fall. 3 credits. Open to out-of-department students only. ARCH 131 is not a prerequisite for ARCH 132. Staff.

Intended to familiarize non-architecture students with the art and science of architecture. The fundamentals of plan, section, and elevation, the primary elements that comprise an architectural form; basic organizational principles; the ways in which we perceive architectural space; and the various concepts of function in relation to form will be included among the topics to be covered, using examples from numerous times and cultures as well as from contemporary Cornell campus.

**ARCH 231(2310) Architectural Analysis I**

Fall. 2 credits. Corequisite: for architecture students, ARCH 201. Staff.

Introduction to analysis of the object of study in the interest of broadening one's

understandings of the ways in which architecture can connote and denote meanings.

**ARCH 232(2302) Architectural Analysis II**

Spring. 2 credits. Corequisite: for architecture students, ARCH 202. Staff.  
Advanced analytical studies focusing on complex architectural spaces, objects, images, and representations.

**ARCH 334(3304) Column, Wall, Elevation, Facade: A Study of the Vertical Surface in Architecture (also ARCH 634[6304])**

Fall or spring. 3 credits. Prerequisite: third-year students and above. J. Wells.  
Field and figure relationships (interrelation of parts dominated by the general character of the whole) are the general themes for studying numerous issues relevant to the design of elevations and facades. The first part of the semester is a lecture/seminar format. Students are required to research and present a paper for discussion. In the latter part of the semester, students do exercises to demonstrate their understanding of the issues addressed.

**ARCH 337(3309) Special Investigations in the Theory of Architecture I**

Fall or spring. Variable credit, max. 3.  
Prerequisite: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 338(3308) Special Topics in the Theory of Architecture I**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year. Staff.  
Topic TBA before preregistration.

**ARCH 339(3307) Elements, Principles, and Theories in Japanese Architecture**

Spring. 3 credits. Not offered every year. L. Mirin.  
Examination of Japanese architecture (buildings and gardens) and their contexts: landscapes, settlements, and cities. The course is addressed to those interested in Japanese architecture as a manifestation of Japanese culture and as a subject for analysis. Emphasis is on underlying concepts, ordering principles, formal typologies, space and its representation, perceptual phenomena, and symbolic content. Readings focus on theoretical treatments of these aspects by Japanese and western writers.

**[ARCH 431(4301) Theory of Architecture**  
Not offered 2006-2007.]

**ARCH 432(4302) Theory of Architecture**

Spring. 3 credits. Prerequisite: third-year standing. Not offered every year. Staff.  
Development of urban form, urban intervention, contextualism, ideal cities, historic new towns, streets, piazzas, fortifications, public buildings and social housing types, site planning, and transportation.

**ARCH 435(4305) Architecture and Representation**

Fall. 3 credits. Prerequisite: degree candidates in architecture; successful completion of ARCH 231-232. Not offered every year. Staff.  
Study of architecture as it functions as a representational art, referring to its past while inferring its present.

**ARCH 531-532(5301-5302) Architectural Analysis I and II**

Fall and spring. 3 credits. Prerequisites: for ARCH 532, 531; M. Arch. I students, or permission of instructor. Staff.  
Introduction to a wide range of questions that inform the discipline of architecture. Architectural thinking is investigated through a cross-section of contemporary theoretical texts and an analysis of built projects, unbuilt proposals, drawings, and other forms of representation.

**ARCH 634(6304) Column, Wall, Elevation, Facade: A Study of the Vertical Surface in Architecture (also ARCH 334[3304])**

Fall or spring. 3 credits. Prerequisite: third-year students and above. J. Wells.  
For description, see ARCH 334.

**ARCH 635(6305) Theory and Criticism in Architecture**

Spring. 3 credits. Prerequisite: permission of instructor. Not offered every year. Staff.  
Inquiry into the fundamental principles of architectural criticism in theory and practice, with emphasis on the structures of criticism in the 20th century.

**ARCH 637(6309) Special Investigations in the Theory of Architecture II**

Fall or spring. Variable credit; max. 4.  
Prerequisite: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 638(6308) Special Topics in the Theory of Architecture II**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year. Staff.  
Topic TBA before preregistration.

**Architecture, Culture, and Society**

**ARCH 342(3402) Architecture as a Cultural System (also ARCH 542[5402])**

Spring. 3 credits. Can substitute ARCH 445, 446, 447, or 448 by permission of instructor. B. MacDougall.

What have been the major issues in the theory and practice of architectural design through time and across cultures, and how is aesthetic judgment related to more general systems of ordering within a particular society or group? This course draws on concepts, methods, and findings from the broad field of cultural anthropology to address these questions. Case studies and examples are drawn from a wide range of architectural traditions around the world for which there is significant ethnographic literature, with special emphasis on sub-Saharan Africa, India, and the United States. Topics include the ideational and formal relationships between folk and monumental traditions in complex societies; the structure of the ideal social order and its refraction in the material world; cosmological models and architectural form; geometries of non-Western traditions; and the relationship between indigenization and culture change.

**ARCH 349(3409) Undergraduate Investigations in Architecture, Culture, and Society**

Fall or spring. Variable credit; max. 3.  
Prerequisite: permission of instructor and approved independent study form.  
B. MacDougall.  
Independent study.

**ARCH 441-442(4408-4418) Special Topics in Architecture, Culture, and Society**

Fall and spring. 3 credits each semester.  
Prerequisite: permission of instructor.  
B. MacDougall.  
Topic TBA before preregistration.

**ARCH 445(4405) Architecture and the Mythic Imagination**

Fall. 3 credits. Prerequisite: ARCH 342 or permission of instructor. Not offered every year. B. MacDougall.

**ARCH 447(4407) Architectural Design and the Utopian Tradition**

Fall. 3 credits. Prerequisite: ARCH 342 or permission of instructor. Not offered every year. Staff.

**ARCH 542(5402) Architecture as a Cultural System**

Spring. 3 credits. Can substitute ARCH 445, 446, 447, or 448 by permission of instructor. B. MacDougall.  
For description, see ARCH 342.

**ARCH 647-648(6401-6402) Architecture in Its Cultural Context I and II**

647, fall; 648, spring. 4 credits each semester. Prerequisite: permission of instructor. Not offered every year.  
B. MacDougall.

**ARCH 649(6409) Graduate Investigations in Architecture, Culture, and Society**

Fall or spring. Variable credit; max. 4.  
Prerequisite: permission of instructor and approved independent study form.  
B. MacDougall.  
Independent study.

**Visual Studies**

**ARCH 151(1501) Drawing I: Freehand Drawing**

Fall. 2 credits. Staff.  
Freehand drawing with emphasis on line as a means of visualizing form and space in architecture.

**ARCH 152(1502) Drawing II: Drawing Systems**

Spring. 2 credits. Prerequisite: ARCH 151 or permission of instructor. Staff.  
Concepts and methods of visualization and representational drawing systems used in architecture. Orthogonal projection, line weight, parallel projection, shade and shadow, and perspective.

**ARCH 253(2503) Drawing III: Digital Media in Architecture**

Fall or spring. 2 credits. Prerequisite: ARCH 152 or permission of instructor. Letter grades only.  
Introduction to two- and three-dimensional digital media in architecture and its potential for visualization, representation, and analysis.

**[ARCH 450(4530) Architectural Publications**  
Not offered 2006-2007.]

**ARCH 458(4508) Special Investigations in Visual Representation**

Fall or spring. Variable credit; max. 3.  
Prerequisites: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 459(4509) Special Topics in Visual Representation I**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Staff.  
Topics TBA before preregistration.

**ARCH 551-552(5511-5512) Techniques in Visual Representation I and II**

Fall and spring. 3 credits. Prerequisite: M. Arch. I students or permission of instructor. Staff.  
These courses explore the practice of drawing through analog and digital methods. They serve as an introduction to visualization and representation skills necessary to the development of architectural thought. Students learn a broad range of techniques and tools in relation to one another.

**ARCH 658(6509) Special Investigations in Visual Representation II**

Fall or spring. Variable credit; max. 4. Prerequisites: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 659(6508) Special Topics in Visual Representation II**

Fall or spring. 3 credits. Prerequisite: permission of instructor. Staff.  
Topics TBA before preregistration.

**Architectural Science and Technology****Structures****ARCH 263(2603) Structural Concepts**

Fall. 4 credits. Prerequisite: MATH 111 or approved equivalent. M. Cruvellier.  
Fundamental concepts of structural behavior. Statics and strength of materials. Introduction to and analysis of simple structural systems.

**ARCH 264(2604) Structural Elements**

Spring. 3 credits. Prerequisite: ARCH 263. J. Ochshorn or staff.  
Concepts and procedures for the design of individual structural components (e.g., columns, beams) in steel, concrete, and timber construction.

**ARCH 363(3603) Structural Systems**

Fall or spring. 3 credits. Prerequisite: ARCH 264. M. Cruvellier.  
Concepts and procedures for the design of overall structural framing systems in steel, concrete, and timber construction.

**ARCH 364(3604) Vertigo Structures (also ARCH 664(6604))**

Fall or spring. 3 credits. Prerequisite: ARCH 363 or equivalent. Limited enrollment. Not offered every year. M. Cruvellier.

**ARCH 365(3605) Bridge Design (also ARCH 665(6605))**

Fall or spring. 3 credits. Limited enrollment. Prerequisite: ARCH 363 or equivalent. Not offered every year. M. Cruvellier.  
The major visual impact of bridges on the built environment cannot be denied. And yet, during the past century, architects have virtually abandoned their historical role in the design of these structures. Engineers, on the other hand, have claimed bridge design as their responsibility and have hailed it as evidence of structural art. Are the basic principles of bridge design such that this situation makes sense for our society? Or is a rethinking of the manner in which bridges are designed called for? Students examine and experiment with the design of bridge structural forms, not only in terms of what is

technically feasible but also, with equal emphasis, in the context of aesthetic, historical, and social considerations. Weekly meetings include lectures, discussion seminars, and studio-type design reviews.

**ARCH 366(3606) The Tectonic Articulation of Structure (also ARCH 666(6606))**

Fall or spring. 3 credits. Limited enrollment. Prerequisite: ARCH 363 or equivalent. Not offered every year. J. Ochshorn.

Through a series of readings, exercises, and case studies, students investigate ways in which structural forces can be expressed in works of architecture. Both the structural basis of form as well as the formal articulation of structure are considered. Course objectives include: gaining insight into the behavior of structure; investigating the cultural meaning of structure and technology; and exploring the interaction of structure and form.

**ARCH 463(4603) Special Topics in Structures**

Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 263, 264, and 363 or permission of instructor. Not offered every year. Staff.  
Topics TBA before preregistration.

**ARCH 473(4609) Special Investigations in Structures**

Fall or spring. Variable credit; max. 3. Prerequisite: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 563(5603) Structural Concepts**

Fall or spring. 3 credits. Prerequisite: M. Arch. I students or permission of instructor. Staff.  
For description, see ARCH 263.

**ARCH 564(5604) Structural Elements**

Fall or spring. 3 credits. Prerequisite: M. Arch. I students or permission of instructor. Staff.  
For description, see ARCH 264.

**ARCH 663(6603) Structural Systems**

Fall or spring. 3 credits. Prerequisite: M. Arch. I students or permission of instructor. Staff.  
For description, see ARCH 363.

**ARCH 664(6604) Vertigo Structures (also ARCH 364(3604))**

Fall or spring. 3 credits. Prerequisite: ARCH 563 or equivalent. Limited enrollment. Not offered every year. M. Cruvellier.  
For description, see ARCH 364.

**ARCH 665(6605) Bridge Design (also ARCH 365(3605))**

Fall or spring. 3 credits. Limited enrollment. Prerequisite: ARCH 363 or equivalent. Not offered every year. Staff.  
For description, see ARCH 365.

**ARCH 666(6606) The Tectonic Articulation of Structure (also ARCH 366(3606))**

Fall or spring. 3 credits. Limited enrollment. Prerequisite: ARCH 363 or equivalent. Not offered every year. J. Ochshorn.  
For description, see ARCH 366.

**Construction****ARCH 262(2602) Building Technology, Materials, and Methods**

Fall. 3 credits. J. Ochshorn.  
Properties of materials—their use and application to the design of buildings and building systems. Discussion of various methods of building construction and assembly.

**ARCH 367(3607) Working Drawings (also ARCH 667(6607))**

Fall or spring. 3 credits. Prerequisite: ARCH 262 or equivalent. Limited enrollment. Not offered every year. J. Ochshorn.

**ARCH 465(4605) Special Topics in Construction**

Fall or spring. 3 credits. Limited to 30 students. Prerequisite: ARCH 262 or permission of instructor. Not offered every year. Staff.  
Topics TBA before preregistration.

**ARCH 475(4604) Special Investigations in Construction**

Fall or spring. Variable credit; max. 3. Prerequisite: permission of instructor and approved independent study form. Staff.  
Independent study.

**ARCH 562(5602) Building Technology, Materials, and Methods**

Fall or spring. 3 credits. Prerequisite: M. Arch. I students or permission of instructor. Staff.  
For description, see ARCH 262.

**ARCH 667(6607) Working Drawings (also ARCH 367(3607))**

Fall or spring. 3 credits. Prerequisite: ARCH 262 or equivalent. Limited enrollment. Not offered every year. J. Ochshorn.

**Environmental Systems and Conservation****ARCH 261(2601) Environmental Systems I—Site Planning**

Spring. 3 credits. Staff.  
Basic principles involved in design in the outdoor environment. A brief historical perspective. A development of inventory including grading and drainage. Foundations, surfacing, and construction.

**ARCH 361(3601) Environmental Systems II—Thermal Environmental Systems**

Fall. 3 credits. Prerequisites: ARCH 261. Corequisite: ARCH 301. R grade only. Staff.  
The first semester of this yearlong course addresses the design of the indoor thermal environment, including the appropriate application of building envelope materials and assemblies, and an introduction to the principles of sustainability. Beginning with the basics of human thermal comfort, followed by the concept and practice of solar heating, passive cooling, indoor air quality, and human health, students will learn how to shape the form of a building to respond to climate and the needs of an occupant.

In the second half of the semester, students address the design of mechanical, electrical, and plumbing systems, including heating, ventilation and air-conditioning (HVAC) equipment, vertical transportation, communication, security, and fire protection systems.



**ARCH 362(3602) Environmental Systems III—Building Systems Integration**

Spring. 3 credits. Prerequisites: ARCH 262, 263, 301 and 361. Corequisite: ARCH 302. Letter grades only. Staff.

The second half of this yearlong course addresses the design of the visual and acoustical environments of buildings. Beginning with the basics of vision, followed by the concept and practice of daylighting, electric lighting sources, and human health, this course will provide students with a working understanding of light and sound as architectural media.

The objective of this yearlong course is to engage students to produce a comprehensive architectural project based on a building program and site. To do this, students will be required to select a design from a prior design studio project to develop in this course. In the comprehensive design project, students will be required to demonstrate an understanding of structural systems, environmental systems, building envelope systems, life-safety provisions, wall sections, building assemblies and the basic principles of sustainability.

**ARCH 461(4601) Ecological Literacy and Design (also DEA 422[4220])**

Spring. 3 credits. Letter grades only. Cost of field trips: approx. \$25. J. Elliott.

Lecture/seminar course for advanced (junior or senior) students interested in learning about the effects of designing the built environment of the biophysical world. Course objectives are to develop sensitivities to environmental issues, construct conceptual frameworks for analysis, and demonstrate how ecological knowledge can be applied to the practice of design through participatory approaches to learning. Visit <http://instruct1.cit.cornell.edu/courses/dea422/>. ARCH.

**ARCH 464(4619) Special Topics in Environmental Systems and Conservation**

Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 261, 361, and 362 or permission of instructor. Not offered every year. Staff.

Topics announced before preregistration.

**ARCH 474(4618) Special Investigations in Environmental Systems and Conservation**

Fall or spring. Variable credit; max. 3. Prerequisite: permission of instructor and approved independent study form. Staff. Independent study.

**ARCH 661(6601) Environmental Systems II—Thermal Environmental Systems**

Fall. 3 credits. Prerequisite: second-year M. Arch. I students or permission of instructor. R grade only. Staff.

For description, see ARCH 361.

**ARCH 662(6602) Environmental Systems III—Building Systems Integration**

Spring. 3 credits. Prerequisite: second-year M. Arch. I students or permission of instructor.

For description, see ARCH 362.

**Computer Applications****ARCH 374(3704) Computer Graphics I (also COM S 465)**

Fall. 4 credits. Prerequisite: COM S/ENGRD 211. Staff.

For description, see COM S 465.

**ARCH 476(4706) Special Topics in Computer Applications**

Fall or spring. 3 credits. Limited to 30 students. Prerequisite: ARCH 374 or 379 or permission of instructor. Not offered every year. Staff.

Topics TBA before preregistration.

**[ARCH 477-478(4707-4708) Special Projects in Computer Graphics**  
Not offered 2006-2007.]**ARCH 479(4709) Advanced Computer Graphics: Virtual Reality (also ARCH 679[6709])**

Fall. 3 credits. Prerequisites: introductory computer graphics or computer science course, or permission of instructor; upper-level undergraduate or graduate standing. H. Richardson.

Explores the role of synthetic imaging and computer graphics in architectural design. The first half of the course examines the new possibilities that information technologies offer for multimedia visualization of architecture, from abstract conceptual drawings, to sketching, photorealistic rendering, and multimodal representation, including motion and sound. The second half explores the uses of information technologies to model and simulate the creative design process. These explorations include developing a library of design ideas as building blocks for design; creating multimodal, multidimensional, immersive, virtual environments; interactive transformation and synthesis of design concepts; and "reverse architecturing" of canonical works. The emphasis of this course is on concepts as well as methods and techniques of computer graphics and their application to simulating the creative design process in architecture.

**Graduate Courses****ARCH 679(6709) Advanced Computer Graphics: Virtual Reality (also ARCH 479[4701])**

Fall. 3 credits. Prerequisite: introductory computer graphics or computer science course or permission of instructor; upper-level undergraduate or graduate standing. H. Richardson.

For description, see ARCH 479.

**ARCH 761-762(7701-7702) Architectural Science Laboratory**

761, fall; 762, spring. 6 credits each semester. Prerequisite: architectural science graduate students. D. Greenberg.

Projects, exercises, and research in the architectural sciences.

**ARCH 763-764(7903-7904) Thesis or Research in Architectural Science**

763, fall; 764, spring. Variable credit; max. 12. Prerequisite: architectural science graduate students. Staff.

Independent study.

**Architectural History**

The history of the built domain is an integral part of all aspects of the architecture curriculum, from design and theory to science and technology. Incoming students take ARCH 181-182 in the first year, and three additional courses from the 380-399 series, preferably in the third and fourth years. Seminars are intended for advanced undergraduate and graduate students and do not satisfy undergraduate history requirements. Courses with the same number may be taken only

once to satisfy history of architecture or in-college requirements.

**Sequence Courses****ARCH 181(1801) History of Architecture I**

Fall. 3 credits. Requirement for first-year architecture students; open to all students in other colleges interested in the history of the built domain. Staff.

The history of the built environment as social and cultural expression from the earliest to more recent times. Themes, theories, and ideas in architecture and urban design are explored, beginning with the earliest written records.

**ARCH 182(1802) History of Architecture II**

Spring. 3 credits. Requirement for first-year architecture students; open to all students in other colleges interested in the history of the built domain; may be taken independently of ARCH 181. Staff.

The history of the built environment as social and cultural expression from more recent times to the present. Architecture and urban design themes, theories, and ideas are addressed in greater detail leading to the present time.

**Directed Electives****ARCH 380(3800) History of Theory**

Not offered every year.

**ARCH 381(3801) From Utopia to the Ghetto: Renaissance Urban Form**

Fall or spring. 3 credits. Prerequisites:

ARCH 181-182 or permission of instructor.

Not offered every year. M. Lasansky.

Significant developments in European urban design from 1300 to 1600. Particular attention is given Italy and Spain. Focuses on a series of case studies: entire towns, specific urban spaces, and individual building types. Weekly discussions contextualize the city within a larger cultural framework. This course considers how civic, economic, social, political, legislative, technical, and material concerns have had a significant impact on the form, function, and patronage of these places, spaces, and structures. The relevance of Renaissance theory to contemporary practice is also emphasized through the discussion of several 20th-century urban plans and built projects.

**ARCH 382(3802) The Cinematic City**

Fall. 3 credits. Prerequisite: ARCH 181-182 or permission of instructor. Not offered every year. M. Lasansky.

Examines the relationship between cinematic forms of mass media and architecture. Explores the representation, perception, and understanding of architecture as it has been mediated by various cinematic genres including film, television, and documentaries. Considers how cinema has been deployed as a tool in architectural production, how it has influenced the experience and design of space, the extent to which it has been used as a vehicle for critical commentary on the urban condition, and the way it is imbedded in the historical development of architecture and urbanism.

**ARCH 383(3803) The Construction of Modern Life: The Politics of Memory and the Commodification of Architecture**

Fall or spring. 3 credits. Prerequisite: ARCH 181-182 or permission of instructor. Not offered every year. M. Lasansky.

Examines the complex relationship between the built environment, the construction and

definition of cultural heritage, collective memory and civic identity, and the commodification or commercial celebration of specific buildings, sites, and urban events. Focuses on late 18th-, 19th-, and 20th-century Europe. Particular attention is awarded to the discourse surrounding the restoration of buildings (and figures such as Ruskin, Viollet-le-Duc, and Giovannoni); political agendas guiding restoration and urban renewal projects; newly defined venues of modern urban spectacle (e.g., the World's Fair, department stores, morgues, and panoramas); and the role played by tourism in the commodification of local and foreign sites.

**ARCH 384(3804) The Urban Landscape of Renaissance Rome: 1450 to 1600**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. M. Lasansky. Exploration into the urban morphology, architecture, and civic life of Renaissance Rome. The city was a thriving center for architectural practice. It drew practitioners from throughout the peninsula and served as an important theoretical model for architects elsewhere. The course surveys the important issues, individuals, and building projects of the city between 1450 and 1600 with particular emphasis on the intellectual and physical rediscovery and re-appropriation of Antiquity; the role of the Vatican with its large population of pilgrims, tourists, resident church officials, foreign bankers, and dignitaries that made specific demands of the built environment; and the unique topography and natural resources of the city's location. The last portion of the course addresses the legacy of the Renaissance during the period of Italian unification and the Fascist regime.

**[ARCH 385(3805) Magnificent Utility—Architecture and the Arts of Persuasion**

Not offered 2006-2007.]

**ARCH 386(3806) The Architecture of India and Its Interpretation**

Spring. 3 credits. Not offered every year. B. MacDougall. Surveys the architectural record of ancient and medieval India with an emphasis on stupa and temple traditions. Devotes attention to European efforts to write a Western-style architectural history for India and to the British fascination with explaining Indian ethnology and history over two centuries. Attempts to evaluate the claim made by the historian James Fergusson that architecture provided the basis for reconstructing an imperfectly known Indian history. Also examines the notion that scholarly enterprises were closely entwined with strategies for domination. To this end, students read 19th-century firsthand reports on architecture in antiquarian English-language journals alongside more modern accounts. They are compared with indigenous architecture writings that were often unacknowledged by Europeans.

**ARCH 387(3807) 19th Century: Tales of the City**

Fall or spring. 3 credits. Prerequisite: ARCH 181-182 or permission of instructor. Not offered every year. M. Woods. Focuses on 19th-century cities as settings for modernisms and modernities, new visions and experiences of modern life. The relationship between urbanism and creativity that emerges during the 19th century engages students in

Berlin, Havana, Miami, London, Bombay, Paris, Harlem, and other cities. Issues of center and periphery, nation and locality, capital and colony also emerge. Urban pleasures and dangers for men, women, and the other as revealed through histories of the built environment but also through literature, painting, photography, and film are examined.

**[ARCH 388(3808) Modernism**  
Not offered 2006-2007.]

**[ARCH 389(3809) Architecture, Revolution, and Tradition**  
Not offered 2006-2007.]

**ARCH 390(3810) American Architecture and Building I (also AM ST 390(3810))**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. M. Woods. Review of architecture, building, and responses to the landscape from the prehistoric period to the Civil War. Architecture and building as social and collaborative arts are emphasized and thus the contributions of artisans, clients, and users as well as professional architects and builders are examined. The architectural expressions of Native Americans, African Americans, women, and others are treated in addition to those of European colonists and settlers.

**ARCH 391(3811) American Architecture and Building II (also AM ST 391(3811))**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. M. Woods. Continuation of ARCH 390 but may be taken independently. An account of American architecture, building, and responses to the environment from the post-Civil War period to the present day. Particular attention is paid to the processes of industrialization, professionalization, and urbanization as well as to the manifestations of gender, class, race, and ethnicity in the built and architectural environments.

**ARCH 392(3812) Modern Architecture on Film**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. M. Woods. Exploration of certain themes deemed critical to modern architecture and urbanism through their representation in both commercial and avant-garde films from the medium's birth until the present day. The focus varies each semester with particular emphases to include the modern house and housing, the modern city, technology and visions of the future, and finally the image of the architect. Representations of these themes in other forms such as painting, photography, theater, literature, and advertising also are examined. The course includes selected readings in modern architecture and film, screenings in class, class discussions, presentations, and papers.

**[ARCH 393(3813) The Cumulative City**  
Not offered 2006-2007.]

**ARCH 395(3815) History of the Present—Contemporary Architecture and Urbanism**

Fall or spring. 3 credits. Prerequisite: ARCH 181-182 or permission of instructor. C. F. Otto. Theory and practice in architecture and urbanism are investigated from later

Modernism to contemporary positions. Built work, theoretical texts and graphics, and the nature of design practice in locations worldwide (such as the United States and the Pacific Rim) raise issues of globalization and the specificity of place and cultural identity. By engaging the immediate past using methods of cultural and design history, the course problematizes the relationship (and relevance) of history to architectural practice and experience.

**ARCH 396(3816) Special Topics in the History of Architecture and Urbanism**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. Staff. Topics TBA.

**ARCH 397(3817) Special Topics in the History of Architecture and Urbanism**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. Staff. Topics TBA.

**ARCH 398(3818) Special Topics in the History of Architecture and Urbanism**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. Staff. Topics TBA.

**ARCH 399(3818) Special Topics in the History of Architecture and Urbanism**

Fall or spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Not offered every year. Staff. Topics TBA.

**Graduate Seminars in the History of Architecture and Urbanism**

All topics for ARCH 682 to 699 TBA before the start of the semester.

**ARCH 680(6800) Seminar in Historiography**

Fall. 4 credits. Requirement for first- and second-year graduate students in History of Architecture and Urbanism Program. Prerequisite: permission of instructor. Staff. Examines historiographic and methodological issues in relation to the history of architecture and urbanism. Taught by different faculty members in successive years, the seminar is required of all first- and second-year graduate students in the History of Architecture and Urbanism Program.

**[ARCH 686(6806) Seminar in 17th- and 18th-Century Architecture and Urbanism**  
Not offered 2006-2007.]

**[ARCH 688(6808) Seminar in 20th-Century Architecture and Urbanism**  
Not offered 2006-2007.]

**[ARCH 690(6810) Seminar in American Architecture, Building, and Urbanism**  
Not offered 2006-2007.]

**[ARCH 692(6812) Seminar in 19th-Century Architecture, Building, and Urbanism**  
Not offered 2006-2007.]

**ARCH 696(6816) Seminar in Special Topics in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year. Staff.

**ARCH 697(6817) Seminar in Special Topics in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year. Staff.

**ARCH 698(6818) Seminar in Special Topics in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year. Staff.

**ARCH 699(6819) Seminar in Special Topics in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year. Staff.

**Independent Study, Thesis, Dissertation****ARCH 299(2809) Undergraduate Independent Study in the History of Architecture and Urbanism**

Fall or spring. Variable credit; max. 3. May not be taken by students in design to satisfy undergraduate history requirements. Prerequisite: permission of instructor. Staff. Independent study for undergraduate students.

**ARCH 499(4901) Undergraduate Thesis in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Prerequisite: B.S. honors candidates in history. Staff.

**ARCH 799(7809) Graduate Independent Study in the History of Architecture and Urbanism**

Fall or spring. Variable credit; max. 12. Prerequisite: permission of instructor. Staff. Independent study for graduate students only.

**ARCH 899(8921) M.A. Essay in the History of Architecture and Urbanism**

Fall or spring. 4 credits. Staff. Independent preparation of the M.A. essay, often developed from topics investigated in ARCH 680.

**ARCH 999(9901) Ph.D. Dissertation in the History of Architecture and Urbanism**

Fall or spring. Variable credit; max. 12. Staff. Independent study for the doctoral degree.

**ART**

B. Spector, chair (224 Tjaden Hall, 255-3558); R. Bertoia, J. Locey, T. McGrain, E. Meyer, G. Page, director of graduate studies; B. Perlus, W. S. Taft, and visiting artists and critics.

**Undergraduate Program**

The curriculum in art is a program of study within the College of Architecture, Art, and Planning, as well as other colleges at Cornell.

The undergraduate curriculum in art is an excellent background for a career in the visual

arts. Past graduates have found it to be an excellent preparation for a career in applied art, although no specific technical courses are offered in such areas as interior design, fashion, or commercial art.

The undergraduate curriculum in art, leading to the degree of bachelor of fine arts, provides an opportunity for the student to combine a general liberal education with the studio concentration required for a professional degree. During the first four semesters, all students follow a common course of study designed to provide a broad introduction to the arts and a basis for the intensive studio experience of the last two years. Beginning with the third year, students concentrate in painting, sculpture, photography, printmaking, or combined media.

Studio courses occupy approximately one-half of the student's time during the four years at Cornell; the remaining time is devoted to a diversified program of academic subjects with a generous provision for electives.

All members of the faculty in the Department of Art are practicing, exhibiting artists, whose work represents a broad range of expression.

A candidate for the B.F.A. degree may also earn a bachelor of arts degree from the College of Arts and Sciences or the College of Human Ecology, or a bachelor of science degree from the College of Engineering, in a five-year dual degree program. This decision should be made early in the candidate's career (no later than the third semester) so that he or she can apply to be registered in both colleges simultaneously. Each student is assigned an advisor in both colleges of their dual-degree program to provide needed guidance. Candidates for two degrees must satisfy all requirements for both degrees. At least 62 of the total credits must come from courses offered in the Department of Art. In addition, all Department of Art requirements for first-year writing seminars, art history, and distribution must be met.

It is expected that a dual-degree candidate will complete the pre-thesis and thesis requirements for the B.F.A. degree during the fourth and fifth year.

**Bachelor of Fine Arts Degree Requirements****Credits and Distribution**

The B.F.A. degree requires 130 academic credits. A minimum of 58 are taken in the Department of Art.

**Curriculum**

Students are expected to take an average course load of 16 credits per semester during their four years. Students wishing to take more than three studio courses in any one semester must file a petition. All students must take at least one studio course a semester unless there are exceptional circumstances expressed in the form of a petition. Any request to deviate from the standard curriculum must be petitioned to the department before the act. No student in the first year of the B.F.A. program will be permitted to deviate from the required curriculum.

**Specific Course Requirements**

By the end of the second year, students must have completed an introductory course in each of the areas of painting, sculpture, printmaking, photography, electronic imaging, and four drawing courses. By the end of the third year, all students must have completed an additional 12 credits beyond the introductory level in three of the four areas.

**Concentration**

Students must plan their programs to complete 27 credits in one of the studio areas of painting, sculpture, photography, or electronic imaging and printmaking (26 credits each). Declaration of the area of concentration must be made by the second semester of the sophomore year. Students concentrating in combined media must also submit an approved projected course plan. B.F.A. students complete a senior thesis in one area of concentration and are required to participate in the Senior Exhibition in the semester the thesis is taken.

Concentration Requirements (27 credits total; 26 in electronic imaging and printmaking)

The required courses for each concentration are as follows:

Painting: ART 121, 221, 321, 322, 421, 422 (senior thesis)

Sculpture: ART 141, 241, 341, 342, 441, 442 (senior thesis)

Printmaking: ART 131/132/133 (2 of 3); 134, 231, 232, 233, 234 (1 of 4); 331, 431, 432 (senior thesis)

Photography: ART 161, 261, 263; 264, 265, 361 (1 of 3); 461, 462 (senior thesis)

Electronic Imaging: ART 171; 271/234 (1 of 2); 272/273 (1 of 2), 373/374 (1 of 2), 471, 472 (senior thesis)

**Dual Concentration**

Students interested in studying in more than one area may choose to do a dual concentration. The dual concentration requires a first area, in which the thesis is conducted, and a nonthesis second area. Pre-thesis and thesis must be taken in the first area of concentration. Students take 23 credits in the first area of concentration (22 for printmaking) and 15 credits in the second area of concentration (14 for printmaking). Drawing is available only as a second area of concentration.

The required courses for the dual concentration are:

<i>First Area of Concentration</i>	<i>Total Credits</i>
Painting: ART 121, 221, 321, 421, 422	23
Sculpture: ART 141, 241, 341, 441, 442	23
Printmaking: ART 131/132/133 (2 of 3) 231/232/233 (1 of 3) 431, 432	22
Photography: ART 161, 261, 263/264/265/361 (1 of 4), 461, 462	23
Electronic Imaging: ART 171; 271/234 (1 of 2); 272/273 (1 of 2) or 373/374 (1 of 2); 471/472	23
<i>Second Area of Concentration</i>	<i>Total Credits</i>
Drawing: ART 151, 152, 251, 252, independent study	15
Painting: ART 121, 221, 321, 322	15

Sculpture: ART 141, 241, 341, 342	15
Printmaking: ART 131/132/133 (2 of 3) 231/232/233 (1 of 3); 331	14
Photography: ART 161, 261, 263/264 265/361 (2 of 4)	15
Electronic Imaging: ART 171; 271/234 (1 of 2); 272/273 (1 of 2); or 373/374 (1 of 2)	15

**Note:** The total number of out-of-college elective credits required will be adjusted to allow for the additional credits required of the dual concentration.

### Combined Media Concentration

The combined media concentration enables students to fulfill concentration requirements by combining several studio disciplines, including out-of-department studio courses such as those offered in the departments of music and theatre, film, and dance.

Students must file an approved "area of concentration" form. In addition to the courses required of all B.F.A. majors during their first and second year (see B.F.A. curriculum), students must take two studios at the 200 or 300 level, a minimum of two "out of college" studio electives (OCE studio) of 3–4 credits each, ART 481 Pre-Thesis in Combined Media and ART 482 Thesis in Combined Media.

**Note:** The total number of in- and out-of-college elective credits required will be adjusted to allow for additional credits required of the combined media concentration.

### Rome Program

Students in good standing who have completed the requirements of the first two years of the curriculum are eligible for participation in the Rome Program. Students are admitted to the program by application and review of their academic record. Applications are submitted to the Rome Program coordinator. Students applying to the Rome Program must meet with their faculty advisor and the department chair to obtain signatures of approval for admission to the program. Students in the department wishing to attend the Rome Program must register for a full semester of credits. The department recommends that students attend the program during the first or second semester of their junior year. (Under special circumstances, seniors may petition to attend the Rome Program.) **Only under special circumstances, and with prior petition and approval, are seniors allowed to attend the Rome program.** Students wishing to spend two consecutive semesters in Rome must submit a petition, which should include the proposed course schedule for both semesters and must have appropriate faculty approval.

### Sample Rome Curriculum

ART 400	Rome Studio Requirement for Rome B.F.A. students, fulfills 4 credits in a studio concentration	4
ART 209	Site-Specific Processes	3
ART 312*	Modern Art in Italy	3
ART 317	History of Art in Rome: Early Christian to the Baroque Age [not offered 2006–2007]	4

ART 318	History of Art in Rome: Renaissance in Rome and Florence	4
or		
ART 372.20	Special Topics in Art History (spring only)	4
ITALA 111/112	Italian Language	4
[ARCH 317	Contemporary Italian Film 1**]	

\*\*Students may add by approved petition to take 19 credits in Rome.

### 18 Total

Other electives available to B.F.A. students include courses in architectural history, visual studies, city and regional planning, and the Independent Studio in Art.

Students may petition to take more than 16 credits per semester in the Rome Program. Students may study in Rome for one or two academic semesters.

\*Fulfills 300-level theory and criticism requirement.

### Out-of-College Requirements

A minimum of 57 elective credits must be taken outside of the college. In the first year, students must take two first-year writing seminars. Students are required to take courses from among three groups, which include: physical and biological sciences (minimum of two courses, of at least 3 credits each); social sciences (minimum of three courses, of at least 3 credits each); and humanities and expressive arts (minimum of three courses, of at least 3 credits each). All B.F.A. students are required to take 20 credits in the history of art. One course must be taken in each of the following areas:

Modern: for example, 260, 265, 270, 360, 362, 365, 366, 367, 370, 376, 447, 464.

Non-Western: for example, 215, 280, 339, 378, 380, 383, 384, 385, 386, 395, 396, 470, 478, 490, 571.

Three electives: any art history elective at the 300 level or above or any architectural history elective. (Note: Offerings may vary each semester. Students are encouraged to consult with their advisor. Students may petition to substitute courses of similar content.)

The university requirement of two semesters in physical education must be met.

A candidate for the B.F.A. degree at Cornell is required to spend the last two semesters of candidacy in residence at the university, subject to the conditions of the Cornell faculty legislation of November 14, 1962. No student may study in absentia for more than two semesters.

Students who transfer into the undergraduate degree program in art must complete a minimum of four semesters in residence at Cornell and a minimum of 60 credits at the university, of which 30 credits must be taken in the Department of Art, including four semesters of studio work.

### For those students matriculating in fall of 2006:

Students are required to take ART 111 Introductory Art Seminar; ART 121 Introductory Painting; or ART 141 Introductory Sculpture; Art History elective; and a first-year writing seminar during the fall semester of the freshman year. ART 131/132/133 Introductory Printmaking; Art History elective; and an additional first-year writing seminar must be taken during the spring semester of the freshman year. Two 300-level courses in theory and criticism must be taken sometime between the sophomore and senior years.

Courses that will fulfill the theory and criticism requirement (Note: Offerings may vary from year to year. Check the current course catalog):

ARCH 447

ART 170

ART 312 (Rome students only)

ART H 367, 370, 377, 422, 463, 464, 466, 494, 571, 594

ENGL 395

GERST 660

GOVT 375

AS&RC 304, 503

ANTHR 320, 322, 453

THETR 376

### First Year

<i>Fall Semester (Required Curriculum)</i>	<i>Credits</i>
111 Introductory Art Seminar	1
Art History Elective	4
121 Introductory Painting	3
or	
141 Introductory Sculpture	3
151 Drawing I	3
First-year writing seminar	3
In-/Out-of-College Electives	3
	17

### Spring Semester (Required Curriculum)

Art History Elective	4
121 Introductory Painting	3
or	
141 Introductory Sculpture	3
152 Drawing II	3
One of the following:	3
131 Introductory Etching	
132 Introductory Graphics	
133 Introductory Lithography	
First-year writing seminar	3
	16

### Second Year

<i>Fall Semester (Required Curriculum)</i>	<i>Credits</i>
161 Introductory Photography	3
171 Electronic Imaging in Art	3
251 Drawing III	3
Out-of-college elective (OCE)/Art History	3–4
OCE	3
	15–16

**Spring Semester**

200-level studio	4
200-level studio	4
In/OCE	3
300-level course in theory and criticism	3
OCE	3
	<hr/> 17

**Third Year****Fall Semester**

200-level studio	4
Art studio concentration	4
Art history elective or 300-level course in theory and criticism	3-4
OCE	3
In/OCE	3
	<hr/> 17-18

**Spring Semester**

Art studio concentration	4
Art history elective or 300-level course in theory and criticism	3-4
In/OCE (two courses)	7
	<hr/> 14-15

**Fourth Year****Fall Semester**

Pre-Thesis	6
252 Advanced Drawing Workshop	3
In/OCE (two to three courses)	7
	<hr/> 16

**Spring Semester**

Thesis	6
In/OCE (three courses)	9
	<hr/> 15

**The M.F.A. Program**

The master of fine arts program requires four semesters of full-time study, equal to a minimum of 60 credits. Graduate work done elsewhere or in the summer session is not applicable to the M.F.A. degree. The curriculum leading to the master's degree is flexible to accommodate the needs of the individual student and to enable the student to partake of the greater Cornell community. The ratio of graduate faculty to students allows an exceptional opportunity for individual mentoring. Graduate students are provided individual studios and have 24-hour access to studios and labs.

Graduate students in art may enroll in introductory or advanced courses in any field of study offered at the university. Fifteen credits are required in each semester; of these, 9 credits are in studio work, and 3 credits are in graduate seminar (ART 611, 612, 623, 624). Students are required to take at least 12 credits of academic work outside the Department of Art during their four semesters in residence. Candidates for the master of fine arts degree must have completed 18 credits in the history of art in the course of their graduate and/or undergraduate study. Every M.F.A. candidate must prepare a written statement, offer a thesis exhibition of studio work completed during residency, and give an oral defense of the written statement and

visual thesis. Gallery space is provided for a one-week solo thesis exhibition during the final spring semester.

**Course Information**

Most courses in the Department of Art are open to students in any college of the university who have fulfilled the prerequisites or have permission of the instructor.

Fees are charged for all studio courses. See the specific course description for course fees.

To take advantage of the special opportunities afforded by summer study, several courses are offered during summer session.

**Guidelines for Independent Study**

A student who wishes to undertake an independent study must be a junior and in good academic standing. Fine arts students must have completed two years of the curriculum, including all first- and second-year studios and four semesters of drawing. Students must have prior approval to have an independent study count as a drawing requirement. All students must have taken a minimum of one Cornell art department course in the area of the proposed independent study. It is recommended that the student take the independent study with a professor with whom they have previously studied. Out-of-department students may be exempt from the studio sequence requirement at the discretion of the supervising professor. Independent studies must be petitioned to count toward required studio courses. Credit hours are variable up to a maximum of 4.

**Courses in Theory and Criticism****ART 111(1101) Introductory Art Seminar**

Fall. 1 credit. Prerequisite: B.F.A. students. S-U grades only. Staff.

Students meet each week with a different member of the faculty. The varying artistic interests of the faculty are presented and discussed. A maximum of two absences are allowed except by permission of chairman.

**ART 170(1700) Visual Imaging in the Electronic Age**

Fall or spring. 3 credits. D. Greenberg. Interdisciplinary survey course designed to introduce students in the creative arts, science, and engineering to the concepts of digital pictorial representation and display. It is a concept and theory course that concentrates on "why" rather than "how." Topics include perspective representations, display technology, how television works, bandwidth concepts, digital photography, computer graphics modeling and rendering, matting and compositing, color perception, data acquisition, volumetric imaging, and historical precedents, primarily from the art world. Also included are other modes of imaging.

**Related Courses****ART 209(2009) Site-Specific Processes**

Fall or spring. 3 credits. Prerequisite: ART 251 or permission of instructor. Staff.

This studio course investigates materials, methods, and processes specific to Rome. The Italian experience and specifically the city of Rome is used to engage in artistic practices not readily available on the Ithaca campus. The methods to be studied in workshop settings could include: fresco painting, egg tempera, watercolor, paper making, wood carving, stone

carving, mosaics, and ceramics. The final project involves the use of one or more processes presented in a site-specific installation.

**ART 214(2104) Art and the Multicultural Experience**

Fall. 3 credits. R. Dalton.

Investigates selected topics related to art and the multicultural experience. Students study the basic vocabulary and tools used in the expression of art. Students question the nature of the visual arts as a discipline and survey art created by underrepresented American minority cultural groups.

**ART 311(3101) Issues in Contemporary Art**

Fall or spring. Lab fee: \$25. Staff.

Students will be exposed to the ideas, issues, and methods of contemporary visual art by combining studio practice with discussions of critical and theoretical concerns in visual culture. The course combines lectures, readings, discussions, project work, and critiques. Students will make art by using a variety of mediums, with projects structured in relation to issues and artists covered in the lecture component. Discussions of historical movements and artists since the 1980s will be stressed. Studio assignments are designed to familiarize students with a number of ways of making art and in encouraging the understanding of the connections between the conceptual and the technical in art making.

**ART 312(3102) Modern Art in Italy**

Fall or spring. 3 credits. Fulfills 300-level theory and criticism requirement for fine arts majors. Prerequisite: Rome Program participants. Staff.

Introduces students to contemporary art in Rome through studio visits, gallery exhibitions, and museum collections. Lectures by artists, critics, and others. Traces art from idea to realization and explores the gallery and its relationship to artists and to promotion of art, the role of the art critic and museum, and art collecting.

**[ART 317(3107) History of Art in Rome: Early Christian to the Baroque Age**  
Not offered 2006-2007.]**ART 318(3108) History of Art in Rome: Renaissance in Rome and Florence**

Not offered every year. Staff.

Surveys art from the beginning of the 15th century to Michelangelo's death (1564) with field trips to important churches, collections, and villas. Emphasis is given to sculpture and painting, and in the case of fresco, mosaics, and stucco decoration, the relationship with architecture and environment is a key element.

**ART 419(4109) Independent Study/Supervised Readings in Art**

Fall, spring, or summer. 4 credits, variable.

Prerequisite: juniors in good academic standing and written permission of instructor. Staff.

Independent reading and research allows a student the opportunity to investigate special interests that are not treated in regularly scheduled courses. The student develops a plan of study to pursue under the supervision of a faculty member.

**ART 570(5700) Theory Seminar**

Fall and spring. 4 credits. Priority given to AAP and Art History graduate students.

B. Spector and M. Fernandez.

Introduces students in art, art history, and architecture to diverse theoretical texts of



relevance to the three fields. Readings include classic texts in post-structural theory and more recent writings in new areas of theory and artistic practice, including digital art, cyber-feminism, globalization, museums and museology, architecture in/as visual space, biotechnology and artificial life, as well as issues in cognitive science and human-computer interaction centering on space and embodiment. Occasionally this seminar focuses on a single topic of convergence for these diverse areas.

**ART 611(6101) Professional Skills for the Visual Artist**

Spring. 3 credits. Prerequisite: M.F.A. students. Staff.

This seminar helps fine arts graduate students build professional skills that will assist them in their careers as practicing artists and in their work at art-related employment. Students complete a resource notebook that will be useful to them in the years after they graduate. Topics include: funding resources, exhibition opportunities, employment options, documentation of work, health, safety, and legal issues.

**ART 612(6102) Recent Practice in the Visual Arts**

Fall. 3 credits. Prerequisite: M.F.A. students. Staff.

This seminar is designed to provide graduate students with an overview of recent visual artwork. Students study work from a wide range of artists who have received significant recognition within the visual arts community. Reviews of major exhibitions such as "Documenta," "La Biennale di Venezia," and the "Whitney Biennial" are discussed. Students are encouraged to travel to nearby cities to look at contemporary work.

**ART 613(6103) Online Publication for the Visual Artist**

Fall. 3 credits. Prerequisite: M.F.A. students. Staff.

Seminar designed to introduce graduate students to the basic principles of electronic imaging. As a major project, each student interviews a contemporary visual artist. These interviews are illustrated with digital images of each artist's work and combined in an online magazine. Additionally each student learns to create a home page on the web.

**ART 614(6104) Contemporary Theory in the Visual Arts**

Spring. 3 credits. Prerequisite: M.F.A. students. Staff.

Seminar exploring selected writings on the current issues represented within the visual arts. Designed to introduce graduate students to several approaches to critical inquiry and analysis of contemporary visual practice. Topics vary but may include related criticism in areas such as visual culture, semiotics, identity politics, and institutional frames.

**ART 623(6203) Contemporary Theory and Visual Culture**

Fall. 3 credits. Prerequisite: M.F.A. students. Staff.

Seminar exploring selected writings on current issues in the visual arts. Designed to introduce graduate students to several approaches to critical inquiry and analysis of contemporary practice in the visual arts. Topics vary but may include related criticism in areas such as visual culture, semiotics, identity politics, and institutional frames.

**ART 624(6204) Current Criticism in the Visual Arts**

Spring. 3 credits. Prerequisite: M.F.A. students. Staff.

Seminar designed to introduce graduate students to critical writing in the visual arts, both in print and in digital format. As a major project, each student interviews a contemporary visual artist. These interviews are illustrated with digital images of each artist's work and combined in an online magazine. Additionally, each student learns to create a home page on the web.

**Studio Courses in Painting**

Fees for painting courses (121, 221, 321, 322, 421, 422, 429): \$40

**ART 121(1201) Introductory Painting**

Fall, spring, or summer. 3 credits. Staff. Studies the language of painting through color, form, materials, and techniques. Aspects of traditional and modern pictorial composition are studied including proportion, space, and color theory through the representation of a variety of subjects.

**ART 221(2201) Painting II**

Fall or spring. 4 credits. Prerequisite: ART 121 or permission of instructor. Staff. Continuation of the study of aspects of pictorial composition initiated in ART 121, focusing on problems relating to the depiction of the figure, space, and light. Topics are explored within the context of historical and contemporary artistic expression.

**ART 321(3201) Painting III**

Fall or spring. 4 credits. Prerequisite: ART 221 or permission of instructor. Staff. Intensive study of painting materials and techniques to express pictorial ideas. A variety of traditional painting techniques are explored including egg tempera, fresco, gouache, encaustic, and oil. In addition, paints and associated techniques developed in the 20th century are used as well as developing technologies applicable to the painting process.

**ART 322(3202) Painting IV**

Fall or spring. 4 credits. Prerequisite: ART 321 or permission of instructor. Staff. Advanced course centered on issues of artistic expression. A variety of painting media are used to address conceptual issues through representation as well as abstraction.

**ART 421(4201) Pre-Thesis in Painting**

Fall or spring. 6 credits. Prerequisite: ART 322. Staff.

Advanced study of painting through assigned and independent projects using a variety of materials leading to the formulation of a thesis project.

**ART 422(4202) Thesis in Painting**

Fall or spring. 6 credits. Prerequisite: ART 421. Staff.

Focused independent project demonstrating creative ability and technical proficiency. Projects are exhibited in an appropriate space at the end of the semester.

**ART 429(4209) Independent Studio in Painting**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and permission of instructor. Staff. Independent studio in painting that allows students the opportunity to pursue special interests not treated in regularly scheduled

courses. The student plans study and projects under the supervision of a faculty member selected to guide his or her progress and evaluate results.

**ART 721-722(7201-7202), 821-822(8201-8202) Graduate Painting**

721, fall; 722, spring; first-year M.F.A. students. 9 credits. 821, fall; 822, spring; second-year M.F.A. students. 9 credits. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they are to work. All members of the faculty are available for individual consultation.

**Studio Courses in Printmaking**

Fees for printmaking courses:

Intaglio (131, 231, 431, 432, 439): \$95

Screenprinting (132, 232, 431, 432, 439): \$45

Lithography (133, 233, 431, 432, 439): \$95

Expanded Print Forms (134, 234): \$95

**ART 131(1301) Introductory Intaglio**

Fall and spring. 3 credits. Staff. Basic introduction to etching techniques, with emphasis on engraving, lift ground, relief printing, monotypes, and experimental techniques.

**ART 132(1302) Introductory Graphics**

Fall and spring. 3 credits. Staff. Introduces the two-dimensional thought process and the language of vision. Students explore design projects and the use of graphic materials, including collage, pochoir, and screen printing.

**ART 133(1303) Introductory Lithography**

Fall and spring. 3 credits. Staff. Study of the theory and practice of lithographic printing, using limestone block and aluminum plate. Basic lithographic techniques of crayon, wash, and transfer drawing are studied.

**ART 134(1304) Expanded Print Forms**

Spring. 3 credits. Prerequisite: one of the following: ART 131, 132, 133, 161, 171, 251, or permission of instructor. Staff. Intensive experimental studio designed to introduce students to various ideas and processes of making artists' books. Encourages the integration of studio practice (photography, printmaking, drawing, and painting) with new digital strategies (digital photography/ink jet print, video/sound, CD-ROM/digital book making). Presents both concept and process as related to the visual book form. An introduction to digital publication as an expanded print form helps students investigate how the book is reinvented or reshaped within an electronic context.

**ART 231(2301) Intaglio II**

Spring. 4 credits. Prerequisite: ART 131. Staff.

Studio course in advanced etching techniques. Refinement of processes and ideas through the uses of aquatint, spit bite, lift ground, soft ground, and dry point in black and white with an introduction to multiple-plate color printmaking.

**[ART 232(2302) Advanced Screen Printing**

Not offered 2006-2007.]

**ART 233(2303) Lithography II**

Spring. 4 credits. Prerequisite: ART 133. Staff.

Theory and practice of lithographic printing using lithographic stones and aluminum plates. Traditional techniques in crayon, tusche wash, and color printing as well as photolithography using kodolith and computer-generated transparencies.

**ART 234(2304) Large-Format Digital Printing**

Fall and spring. 4 credits. Prerequisites: ART 161, 171, and one of the following: ART 131, 132, 133, 134 or permission of instructor. Staff.

Focuses on the use of digital printing and its use in combination with traditional forms of printmaking. Students explore various approaches to image making while also using traditional materials and media, including relief, monotype, lithography, screen printing, intaglio, transfers, collage, and photo-mechanical processes. Students use appropriate software, including Adobe Photoshop, QuarkXpress, Final Cut Pro, and Adobe Illustrator to draw from both still and video base sources. Students work with large-format inkjet printers.

**ART 331(3301) Printmaking III**

Fall or spring. 4 credits. Prerequisite: ART 231, 232, or 233 or permission of instructor. Staff.

Study of the art of graphics through both assigned and independent projects. Work may concentrate in any one of the graphic media or in a combination of media.

**ART 332(3302) Printmaking IV**

Fall. 4 credits. Prerequisite: ART 331 or permission of instructor. Staff. Continuation and expansion of ART 331.

**ART 431(4301) Pre-Thesis in Printmaking**

Fall or spring. 6 credits. Prerequisite: ART 332. Staff.

Further study of the art of graphics through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

**ART 432(4302) Thesis in Printmaking**

Fall or spring. 6 credits. Prerequisite: ART 431. Staff.

Advanced printmaking project to demonstrate creative ability and technical proficiency.

**ART 439(4309) Independent Studio in Printmaking**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and written permission of instructor. Staff.

Independent studio in printmaking that allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide his or her progress and evaluate the results.

**ART 731-732(7301-7302), 831-832(8301-8302) Graduate Printmaking**

731, fall; 732, spring; first-year M.F.A. students. 9 credits. 831, fall; 832, spring; second-year M.F.A. students. 9 credits. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they work. Members of the faculty are available for consultation; discussion sessions of work in progress are held.

**Studio Courses in Sculpture**

Fees for sculpture courses:

141: \$50

241, 341, 342, 343, 441, 442: \$75

**ART 141(1401) Introductory Sculpture**

Fall, spring, or summer. 3 credits. Staff. Series of studio problems introducing the student to the basic principles of artistic expression in three-dimensions, i.e., clay modeling, direct plaster, plaster casting, and construction in wood, metal, and other materials.

**ART 241(2401) Sculpture II**

Fall or spring. 4 credits. Prerequisite: ART 141, or architecture design studio, or permission of instructor. Staff.

Various materials, including clay, plaster, wood, stone, and metal, are used for exercises involving figurative modeling, abstract carving, and other aspects of three-dimensional form and design. Beginning in the second year, students are encouraged to explore bronze/metal casting processes. The sculpture program, which is housed in its own building, contains a fully equipped bronze-casting foundry.

**ART 341(3401) Sculpture III**

Fall or spring. 4 credits. Prerequisite: ART 241 or permission of instructor. Staff.

Continued study of the principles of sculpture and conceptual development. Each student explores the selection and expressive use of materials, media, scale, and content. Group discussions and individual criticism. Experimentation is encouraged.

**ART 342(3402) Sculpture IV**

Fall or spring. 4 credits. Prerequisite: ART 341 or permission of instructor. Staff.

Continuation and expansion of ART 341. Special projects may include site-specific and/or large-scale installations.

**ART 343(3403) Sculpture V**

Fall or spring. 4 credits. Prerequisite: ART 342 or permission of instructor. Staff.

Continued study of the principles of sculpture and the selection and expressive use of materials and media. Group discussions and individual criticism.

**ART 441(4401) Pre-Thesis in Sculpture**

Fall or spring. 6 credits. Prerequisite: ART 342. Staff.

Further study of the art of sculpture through both assigned and independent projects executed in various media. Instruction through bimonthly group discussions and individual criticism. Students complete a body of work through an approved statement of purpose and proposed schedule.

**ART 442(4402) Thesis in Sculpture**

Fall or spring. 6 credits. Prerequisite: ART 441. Staff.

Advanced sculpture project to demonstrate creative ability and technical proficiency culminating in a cohesive B.F.A. thesis exhibition.

**ART 449(4409) Independent Studio in Sculpture**

Fall, spring, or summer. 4 credits variable. Prerequisites: juniors in good academic standing and written permission of instructor. Staff.

Independent studio in sculpture that allows the student the opportunity to pursue special interests not treated in regularly scheduled

courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

**ART 741-742(7401-7402), 841-842(8401-8402) Graduate Sculpture**

741, fall; 742, spring; first-year M.F.A. students. 9 credits. 841, fall; 842, spring; second-year M.F.A. students. 9 credits. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they are to work. All members of the faculty are available for individual consultation. Weekly discussion sessions of works in progress are held.

**Studio Courses in Photography**

Darkroom fees for photography courses:

Black-and-white courses: \$135

Color courses: \$215

Additional black-and-white course taken the same semester: \$55

Additional color course taken the same semester: \$135

**ART 161(1601) Photography I**

Fall, spring, or summer. 3 credits. Staff. Basic lecture-studio course in black-and-white photography for beginners. Emphasis is on basic camera skills, darkroom techniques, and understanding of photographic imagery.

**ART 168(1608) Black-and-White Photography**

Summer, three-week session only. 3 credits. Staff.

Intended for students at all levels, from introductory to advanced. Emphasis is on camera skills, darkroom techniques, and the content of black-and-white photographic imagery.

**ART 169(1609) Color Photography**

Summer, three-week session only. 3 credits. Staff.

Intended for students at all levels, from introductory to advanced. Emphasis is on camera skills, darkroom techniques, and the content of color photographic imagery.

**ART 261(2601) Photography II**

Fall, spring, or summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor. Staff.

Continuation of Photography I, concentrating on black-and-white photographic processes, history and theory of creative practice, and individual projects.

**ART 263(2603) Color Photography**

Fall and summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor. Staff.

Studio course in color photography with emphasis on camera skills, darkroom techniques, and the content of color photography.

**ART 264(2604) Photo Processes**

Fall, spring, or summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor. Staff.

Studio course in alternative and nonsilver photographic processes. Emphasis is on camera skills, basic techniques and processes, image content, and creative use of photo processes.

**ART 265(2605) Studio Photography**

Fall or spring. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor. Staff.

Course in the use of medium- and large-format cameras that explores technique, lighting, and the use of larger-format cameras for personal expression both in the studio and outdoors.

**ART 361(3601) Photography III**

Fall, spring, or summer. 4 credits.

Prerequisite: ART 161, 261, or permission of instructor. Staff.

Continued study of creative use of photography, with emphasis on specialized individual projects.

**ART 461(4601) Pre-Thesis in Photography**

Fall or spring. 6 credits. Prerequisite: ART 261, 263. Staff.

Studio course intended for photography majors and other qualified students.

**ART 462(4602) Thesis in Photography**

Fall or spring. 6 credits. Prerequisite: ART 461. Staff.

Studio course intended for photography majors and other qualified students. Advanced photography project to demonstrate creative ability and technical proficiency.

**ART 469(4609) Independent Studio in Photography**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and written permission of instructor. Staff.

Independent studio in photography that allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

**ART 761-762(7601-7602), 861-862(8601-8602) Graduate Photography**

761, fall; 762, spring; first-year M.F.A. students. 9 credits. 861, fall; 862, spring; second-year M.F.A. students. 9 credits. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they work. Members of the faculty are available for consultation. Discussion sessions of work in progress are held.

**Studio Courses in Drawing**

Fees for all drawing courses: \$25

**ART 151(1501) Drawing I**

Fall, spring. 3 credits. Staff.

General course introducing students to principles and techniques of representation. Emphasis is on creating the illusion of space and form through line, the rendering of light and shade, and studies in perspective. Students have the opportunity to explore various media such as charcoal, chalk, pencil, pen, ink, and wash.

**ART 152(1502) Drawing II**

Spring. 3 credits. Prerequisite: ART 151. Staff.

General course in drawing that emphasizes figure study and life drawing. Builds on the foundation of ART 151 and concentrates on the analytical study of the figure. Students explore a variety of materials, traditional and contemporary.

**ART 158(1508) Conceptual Drawing**

Summer, six-week session. 3 credits. Staff. Emphasizes drawing from the imagination. Stresses the generation of ideas and their development in sketches. The intent is not to produce finished art but rather to experience a series of problems that require image and design concepts different from those of the artist working directly from nature.

**ART 159(1509) Life and Still-Life Drawing**

Summer, six-week session. 3 credits. Staff. Studies the human figure and still life both as isolated phenomena and in relation to their environment. Focuses are on helping the student observe and discover.

**ART 251(2501) Drawing III**

Fall. 3 credits. Prerequisite: ART 152. Staff. Intermediate drawing course in which students study composition, the articulation of form, and the illusion of space in a variety of materials. Expressive content, conceptualization, and the exploration of materials are stressed.

**ART 252(2502) Advanced Drawing Workshop**

Fall or spring. 3 credits. Prerequisite: ART 251. Corequisite: BFA pre-thesis studio. Staff.

This advanced studio workshop focuses on the use of drawing for the development and refinement of complex visual expression. Using both traditional and nontraditional drawing approaches, students work to clarify their conceptual concerns and develop a pertinent visual vocabulary. This course begins with assignments structured to identify the conceptual and formal considerations central to each student's individual artistic intentions. Once identified, these artistic intentions become the basis for a rigorous investigation. The resulting body of work informs and supports advanced thesis work across the visual art and design disciplines. This course includes faculty and student presentations on historical and contemporary art, as well as regular critiques focusing on peer evaluation.

**ART 459(4509) Independent Studio in Drawing**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and written permission of instructor. Staff.

Independent studio in drawing that allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide his or her progress and evaluate the results.

**Studio Courses in Electronic Imaging**

Course fees:

171, 372, 479	\$250
234, 271, 272	\$105
373/374	\$250
471, 472	\$ 70

**ART 171(1701) Electronic Imaging in Art**

Fall or spring. 3 credits. Staff.

Introductory studio course using the computer as a tool for making art. Students explore various approaches to 2- and 3-D web art using software programs and various functions. This course is an introduction to the web.

**ART 234(2304) Large-Format Digital Printing**

Fall and spring. 4 credits. Prerequisite: ART 171. Staff.

Focuses on the use of digital printing and its use in combination with traditional forms of printmaking. Students explore various approaches to image making while also using traditional materials and media, including relief, monotype, lithography, screen printing, intaglio, transfers, collage, and photomechanical processes. Students use appropriate software, including Adobe PhotoShop, QuarkXpress, Final Cut Pro, and Adobe Illustrator to draw from both still and video-based sources. Students work with large-format inkjet printers.

**ART 271(2701) Electronic 3-D Modeling and Animation**

Fall or spring. 4 credits. Prerequisite: ART 171. Not offered every year. Staff.

Studio course in creating 2- and 3-D still and animated visualizations using computers and 3-D software for object modeling, animation, and rendering. This course concentrates on the web.

**ART 272(2702) Digital Video and Sound**

Fall or spring. 4 credits. Prerequisite: ART 171. Not offered every year. Staff.

Studio course that introduces students to digital video including capture stills, animation, video, and sound with an introduction to interactive presentation and CD-ROM production. This course concentrates on the web.

**ART 273(2703) Computer Animation (also CIS 565[5640])**

Fall. 4 credits. D. Greenberg.

Focuses on techniques of computer animations. Combines critical readings with studio projects that employ a variety of animation software. Topics include modeling, storyboarding, 2-D and 3-D key frame animation, motion and kinematics, lighting effect and shading, texturing and material properties, physical simulation, and cinematography.

**ART 373(3703) Advanced Projects in Time-Based Art**

Fall. 4 credits. Prerequisites: ART 170 and one of the following: ART 272, 273, 234 or permission of instructor. Letter grades only. Staff.

This course teaches advanced techniques for creating nonlinear moving images with digital sound. Projects include integrating key frame-based animation, layering animated text, still, and video images made with 3D software applications, field recording, and sound mixing. Emphasis will be placed on ways of integrating and manipulating time-based images and sound to make multimedia art projects and installations for public spaces.

**ART 374(3704) Interactive Digital Media**

Spring. 4 credits. Prerequisites: ART 171 and one of the following: ART 272, 273, 234 or permission of instructor. Letter grades only. Staff.

This is a project-centered studio course designed to encourage students to integrate computer-aided and time-based media (video, sound, motion graphics, and text) using physical materials and space. The course will challenge students to develop a theoretical understanding of the relationship between body and technology in a social and cultural context. Students will use digital technologies to create projects using interactive CD-ROM/

web art, sensor and micro-controller aided interactive video and sound installations, real-time performance, and public space. The course encourages integrative approaches to studio production.

**ART 471(4701) Pre-Thesis in Electronic Imaging**

Fall and spring. 6 credits. Prerequisites: ART 171, 234 or 271, 272 or 273, 373 or 374. Staff.

For information, please call department.

**ART 472(4702) Thesis in Electronic Imaging**

Fall and spring. 6 credits. Prerequisite: ART 471. Staff.

For information, please call department.

**Special Studio Courses**

**ART 109(1109) Internship Practicum**

Fall, spring, and summer. Variable credit. S-U grades only.

Students serving as interns with art-related businesses or institutions may receive 1 academic credit upon receipt of a letter from the internship sponsor confirming successful performance of internship responsibilities. Students may earn up to 3 hours of nongraded credit for internships and these credits may not be used to fulfill or waive department of art academic and studio requirements.

**ART 155(1550) Drawing Rome**

Summer. 3 credits. Letter grades only. Staff. The course introduces students to methods of representing space and form through a study and application of perspective and the effects of light and shade. Uses of line, tone, and color will be investigated. The subject is the city of Rome: its public spaces, churches, museums, archaeological zones, and the residents and visitors who occupy it. A variety of materials are used including pencil, ink, charcoal, pastel and collage. With the exception of one or two in-studio sessions, all work will be done on site. This course is scheduled to be taught initially during the Summer 2006 Art Studio and Creative Writing Workshop in Rome. Course meets four weeks, 5X per week.

**ART 372(3702) Special Topics In Art Studio**

Fall, spring, or summer. 4 credits, variable. Staff.

Exploration of a particular theme or project.

**ART 372.20(3702.20) Special Topics in Art History**

Spring. 4 credits, variable. Prerequisite: Rome Program participants. Staff.

Topic TBA.

**ART 379(3709) Independent Studio in Rome**

Fall and spring. 4 credits, variable. Prerequisites: Rome Program participants; juniors in good academic standing and written permission of instructor. Staff.

Independent studio in Rome that allows non-art majors the opportunity to pursue special interests in fine arts not treated in regularly scheduled courses. The student plans a course of study or projects that meet the approval of the faculty member selected to guide his or her progress and evaluate the results.

**ART 391(3901) Media Arts Studio I (also ARCH 459/659[4509/6509], FILM/DANCE 391[3910])**

Fall. 3 credits. Prerequisites: FILM 277 or 377; junior standing and permission of instructor. Lab fee: \$50. Staff.

For description, see FILM 391.

**[ART 392(3902) Media Arts Studio II**  
Not offered 2006-2007.]

**ART 400(4000) Rome Studio**

Fall or spring. 4 credits. Fulfills 4 credits of concentration requirement. Prerequisites: Rome Program participants; permission of instructor. Content for Rome studio determined by instructor. Lab fee: \$60; additional fees for photography and printmaking. Staff.

Emphasis is divided between work accomplished in the studio and work executed outdoors in the environs of Rome. Media consist primarily of painting, drawing, sculpture, and photography, or those assigned by the instructor.

**ART 479(4709) Independent Studio in Electronic Imaging**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and written permission of instructor. Staff.

Independent studio in electronic imaging that allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide his or her progress and evaluate the results.

**ART 481(4801) Pre-Thesis in Combined Media**

Fall or spring. 6 credits. Prerequisite: written permission of instructor on combined media thesis form (must be received in art department before enrollment in course). Students must enroll in pre-thesis course in their primary area of concentration. Lab fee: \$70. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they work. Projects should reflect experiences gained by exploring and combining various media including those taken in studio courses outside the department. Students select a faculty member from the area of concentration most appropriate to their area of combined media.

**ART 482(4802) Thesis in Combined Media**

Fall or spring. 6 credits. Prerequisites: ART 481 and written permission of instructor on combined media thesis form (must be received in art department before enrollment in course). Students must enroll in thesis course in their primary area of concentration. Lab fee: \$70. Staff.

Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they work. The projects should reflect experiences gained by exploring and combining various media including those taken in studio courses outside the department. Students select a faculty member from the area of concentration most appropriate to their area of combined media.

**ART 489(4809) Independent Studio in Combined Media**

Fall, spring, or summer. 4 credits, variable. Prerequisites: juniors in good academic standing and written permission of instructor. Lab fee: \$70. Staff.

An independent studio in combined media that allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

**CITY AND REGIONAL PLANNING**

K. Reardon, chair (106 W. Sibley Hall, 254-5378); S. Baugher, L. Benería, R. S. Booth, director, URS; S. Christopherson, J. Chusid, P. Clavel, M. Drennan, J. F. Forester, W. W. Goldsmith, N. Kudva, Y. Levitte, D. Lewis, B. Lynch, P. Olpadwala, R. Pendall, S. Saltzman, R. Sinton, director, Urban Scholars Program, M. A. Tomlan, R. T. Trancik, M. Warner. Emeriti: S. Czamanski, W. Isard, J. W. Reys, S. W. Stein. Visiting: I. Azis, T. Vietorisz

The department offers several programs of study at both the undergraduate and graduate levels.

**The Undergraduate Program in Urban and Regional Studies**

The Program in Urban and Regional Studies (URS) is a four-year academic program aimed at assessing the problems of human communities and regions. Students who graduate from the program receive a bachelor of science degree. The program provides both an excellent liberal arts education and a strong concentration of studies respecting urban and regional issues. The urban and regional studies courses in the program provide students with a broad understanding of relevant issues, the ability to assess those issues, and technical analysis skills. The URS Program is truly interdisciplinary. Students learn to evaluate urban and regional problems by using a wide range of analytic tools and disciplinary perspectives.

**Basic Degree Requirements** (for students in the graduating class of 2006 and earlier)

Requirements for graduation: URS requirements include (1) eight semesters of residence; (2) 120 credits; (3) two first-year seminars; (4) qualification in one foreign language; (5) four groups of distribution requirements; (6) required courses for major; (7) area requirements for major; (8) free electives; (9) a minimum of 34 courses; and (10) completion of the university requirement of two 1-credit nonacademic courses in physical education. Note: Physical education credit does not count toward graduation or toward the 12-credit minimum required for good academic standing each semester. No course may satisfy more than one requirement.

**1. General education**

- First-year writing seminars: two courses
- Foreign language: three courses or qualification in one foreign language
- Distribution requirement: nine courses

Students must take a total of nine courses for the distribution requirement: four courses (of three or more credits each) from Groups 1 and 2, at least two of which are from Group 1, and at least one of which is from Group 2; five courses from Groups 3 and 4, with at least two in each group and two in the same department. No single course may satisfy more than one distribution requirement. URS students must follow the College of Arts and Sciences guidelines specifying courses that meet the requirements for groups 1-4.

Group 1: Physical and biological sciences (two to three courses required)

Group 2: Quantitative and formal reasoning (one to two courses required)

Group 3: Social sciences and history (two to three courses required)

Group 4: Humanities and the arts (two to three courses required)

### Advanced Placement Credit

Students may apply up to two courses of approved advanced placement credit in calculus, computer science, and science toward satisfaction of the distribution requirement in Groups 1 and 2 above, if they complete at least one science course during their undergraduate career. They may apply no advanced placement credit toward the distribution requirement in Groups 3 and 4. Grades of S-U courses cannot be applied to the distribution requirements.

### Requirements for students in the graduating class of 2007 and after

#### General Education:

1. First-year writing seminars: two courses

Students earning a score of 5 on both English literature and English language exams will receive 3 credits (in out-of-college electives) and place out of one first-year writing seminar.

#### Distribution Requirements:

(For a complete listing of courses in Groups 1 through 4, see "Distribution Requirements" under "College of Arts and Sciences." Note: The Arts and Science distribution requirement has been changed for entering freshmen in that college (class of 2007). Rather than selecting courses from Groups 3 (social sciences and history) and 4 (humanities and the arts), as of fall semester 2004, Arts and Sciences students are required to complete five courses in at least four of the following five categories: Cultural Analysis (CA); Historical Analysis (HA); Knowledge, Cognition, and Moral Reasoning (KCM); Literature and the Arts (LA); and Social and Behavioral Analysis (SBA). Social science and humanities courses are marked individually by category, and any given department may offer courses that fall into distinct categories. URS students are also encouraged to select their Group 3 and Group 4 courses from four of these five categories.

2. Required Courses for the Major in Urban and Regional Studies: seven courses

CRP 100 The American City (fall, 3 credits)

CRP 101 The Global City: People, Production, and Planning in the Third World (spring, 3 credits)

CRP 106 URS First-Year Seminar (fall, 1 credit)

CRP 200 The Promise and Pitfalls of Contemporary Planning (fall, 3 credits)

CRP 201 People, Planning and Politics in the City (spring, 3 credits)

ECON 101 Microeconomics (both semesters, 3 credits)

Statistics Various courses (both semesters, 3 credits)

#### Area Requirement: six CRP courses

A. Design and Land Use (one course)

B. Urban History, Society, and Politics (one course)

C. Environment (one course)

D. Regional Development and Globalization (one course)

E. Methods for Planning and Urban Studies (two courses)

#### Qualitative/Field Methods (one course)

and

#### Quantitative Methods (one course)

### Honors Program

Each year a few well-qualified juniors may join the honors program. Each honors student develops and writes an honors thesis under the guidance of his or her faculty advisor.

### Concentrations

#### Urban Studies Concentration (non-URS majors)

The Urban and Regional Studies Concentration has been formulated specifically for those students not enrolled in the Program of Urban and Regional Studies and who are interested in complementing their current academic program with an introduction to various facets of urban studies (domestic, environmental, international, professional, urban affairs).

To complete the Urban and Regional Studies (URS) concentration, students must take at least six courses (minimum total of 18 credits) in the Department of City and Regional Planning (CRP). Courses must be completed with letter grade of C or above.

Nine (9) credits of required core courses:

CRP 100 American Cities (3 credits)

CRP 101 The Global City: People, Production in the Third World (3 credits)

CRP 200 The Promise and Pitfalls of Contemporary Planning (3 credits)

And 9 credits of elective department courses at the 300 level or higher.

(Please consult department course listings.)

Students meet with their home college faculty advisor. Upon completion of course requirements, students complete a URS concentration application form, available in 106 W. Sibley Hall. The AAP registrar verifies course completion and grades for concentration requirements and signs the application form. The URS program director (URS concentration advisor) also verifies completion of the concentration, signs the form, and sends a letter (on department letterhead) to the student's home college. The home college will record completion of the URS concentration on the student's transcript.

The department recognizes concentrations earned within the university (accepting standards set by various colleges). Students may apply for concentrations in any college (e.g. Africana Studies, Architecture, Latino Studies, Southeast Asian Studies, and Feminist, Gender, and Sexuality Studies). When a student satisfies the requirements for a concentration, and formal notification is received by the AAP registrar, the concentration will be recorded on the student's official transcript.

### Off-Campus Opportunities

**Cornell in Washington Program.** Students in good standing may earn degree credits in the Cornell in Washington program through course work and an urban-oriented externship in Washington, D.C. Students may work as externs with congressional offices, executive-branch agencies, interest groups, research institutions, and other organizations involved in the political process and public policy. Students also select one or two other seminars from such fields as government, history, economics, human development, architectural history, natural resources, and social policy. Cornell faculty members teach these seminars, which provide credit toward fulfillment of major, distribution, and other academic requirements.

**Cornell Abroad.** Qualified undergraduates are encouraged to study abroad because exposure to foreign cultures can be an eye-opening aspect of a university education. In an increasingly interdependent world, the experience of living and learning in a foreign country is invaluable. Study-abroad opportunities are continually being developed. Current programs are available in Great Britain, Spain, and Germany. Opportunities in Asia, the Mideast, and France should be forthcoming. The department encourages URS students to explore these opportunities.

**Cornell-in-Rome Program.** The College of Architecture, Art, and Planning has a teaching facility in Rome located in the 17th-century Palazzo Lazzaroni. Students in good standing can earn degree credits through courses taken with Cornell faculty members assigned to Rome and with accredited instructors. Courses are available in areas of urban development, regional development, and architecture and art.

**Research and fieldwork.** Students are welcome to work with department faculty members on research or other opportunities that are appropriate to their particular interests. Fieldwork and community-service options also exist for students in the Urban and Regional Studies Program.

### Additional Degree Options

**Linked degree options.** Urban and regional studies students may earn both a bachelor of science degree and a master of regional planning (M.R.P.) degree in a fifth year of study. Ordinarily the professional M.R.P. degree requires two years of work beyond that for the bachelor's degree. Under this option, a minimum of 30 credits and a master's thesis or thesis project are required for the M.R.P. degree. Interested students apply to the Graduate School, usually in the senior year.

**Dual-degree option.** A student accepted in Cornell's College of Arts and Sciences may



earn both a B.A. in a College of Arts and Sciences major and a B.S. in urban and regional studies in a total of five years. Special requirements have been established for this dual-degree program. Cornell students interested in pursuing the dual degree program should contact either the director of the Urban and Regional Studies Program or the appropriate dean of the College of Arts and Sciences for further information.

#### Admissions Requirements and Procedures

Among the most important criteria for admission to the Urban and Regional Studies Program are intellectual potential and commitment—a combination of ability, achievement, motivation, diligence, and use of educational and social opportunities. Nonacademic qualifications are important as well. The department encourages students with outstanding personal qualities, initiative, and leadership ability. Above all, the department seeks students with a high level of enthusiasm and depth of interest in the study of urban and regional issues. Applicants must complete a university admission application.

#### Transfer Students

In most cases, transfer applicants should no longer be affiliated with a high school and should have completed no fewer than 12 credits of college or university work at the time of application. High school students who have completed graduation requirements at midyear and are taking college courses for the rest of the academic year should apply as freshmen. Prospective candidates who believe that their circumstances are exceptional should consult with the director of admissions in the Cornell division of interest to them before filing an application.

Forms for transfer application and financial aid are available from the Cornell University Office of Admissions, 410 Thurston Avenue, Ithaca, NY 14850-2488. Official transcripts of all high school and college work must be submitted along with SAT or ACT scores and letters of recommendation.

Prospective transfers should have taken at least 6 credits in English. In addition, students should have taken basic college-level courses distributed across the natural and social sciences, humanities, and mathematics. Applicants whose previous course work closely parallels the "General Education" requirements of the Urban and Regional Studies curriculum will have relative ease in transferring. Nevertheless, students with other academic backgrounds, such as engineering, architecture, fine arts, management, and agriculture, are eligible to apply.

Although an interview is not required, applicants are urged to visit the campus. Applicants who want further information regarding the Urban and Regional Studies Program may contact Professor Richard Booth, program director, Urban and Regional Studies, Cornell University, 106 West Sibley Hall, Ithaca, NY 14853-6701, 255-4025).

#### The Graduate Program in City and Regional Planning

There are five graduate degree programs in the city and regional planning department. The master of regional planning program stresses skills basic to professional planning practice and responds to individual needs and

interests. The faculty strongly recommends that students concentrate in one of three areas of planning. The Land Use and Environmental Planning concentration focuses on the forces and actions that directly affect the physical character, transformation, rehabilitation, and preservation of cities and regions. Economic Development Planning: Communities and Regions focuses on the economies of neighborhoods, cities, and regions with the intent of producing more informed and effective economic development policy. International Studies in Planning (ISP) focuses on urban, regional, and international development processes and their implications for people's lives and livelihoods in diverse international contexts.

The master of professional studies in international development (M.P.S./I.D.) degree is administered jointly with the Cornell International Institute for Food, Agriculture, and Development (CIIFAD). It is intended to meet the specific training needs of experienced planners or midcareer professionals in related fields.

The 60-credit master of arts (M.A.) in historic preservation planning prepares students for professional work in the creative preservation and use of our physical heritage.

The master of science (M.S.) or master of arts (M.A.) degrees in regional science is the study of regional economies and their interactions with each other. Central issues include capital flows, trade, location of economic activity, growth, and regional conflicts. Graduates are positioned for careers as researchers and policy analysts at the highest levels in national governments, corporations, and international organizations.

The doctor of philosophy (Ph.D.) program is for those who seek advanced, specialized education for a career in teaching, research, or policy making.

#### Off-Campus Opportunities

**Rome Program.** Graduate students have the opportunity to spend one or two semesters in Rome, studying at Cornell's center at the Palazzo Lazzaroni. Instruction is given by Cornell professors-in-residence and by other faculty. The program is structured to include work assignments in one of the international development organizations headquartered in Rome.

#### Course Information

Most courses in the Department of City and Regional Planning are open to students in any college of the university who have fulfilled the prerequisites and have the permission of the instructor.

The department attempts to offer courses according to the information that follows. However, students should check with the department at the beginning of each semester for late changes.

#### Undergraduate Program in Urban and Regional Studies

##### CRP 100(1100) The American City

Fall. 3 credits. S-U grades optional for out-of-department students only.  
W. W. Goldsmith.

Introductory course on the evolution of urban problems and opportunities facing the majority of this country's population as we enter the

first decade of the 21st century. Readings, discussions, and brief papers explore topics ranging from suburban development to central city poverty, from environmental threats to downtown revitalization, and from municipal finance to the new position of women in the urban economy.

##### CRP 101(1101) The Global City: People, Production, and Planning in the Third World

Spring. 3 credits. S-U grades optional for out-of-department students only. N. Kudva. Critical look at the physical and social development of giant cities in the Third World. Their origins, roles, contributions, and shortcomings are examined. Their place in world political economy is evaluated. Policy prescriptions for their principal problems are discussed.

##### CRP 106(1106) URS First-Year Seminar

Fall. 1 credit. S-U grades only. N. Kudva. Introduces students to substantive issues of the diverse disciplines that make up the planning profession through weekly interaction with CRP and other faculty members in the department. Students have the opportunity to engage in open discussions.

##### CRP 200(2000) The Promise and Pitfalls of Contemporary Planning

Fall. 3 credits. Prerequisite: CRP 100.  
K. Reardon.

Introduction to the historical origins and evolution of the city planning profession in the United States. The theoretical foundation, core values, primary methods, and key challenges facing contemporary planners are examined through a combination of readings, lectures, films, guest speakers, and field trips. Students acquire a deeper understanding of professional practice by working with local officials to develop community development profiles for several Ithaca neighborhoods.

##### CRP 201(2010) People, Planning, and Politics in the City

Spring. 3 credits. Prerequisites: CRP 100 and 101. P. Olpadwala.

Seminar examining various bases of political and professional power. What do professionals who want to serve the public need to know about power and decision-making processes in the institutional settings in which they operate? How and why can professionals make a difference when facing problems characterized by great complexity and severe inequalities among affected groups? The course addresses these and others questions.

##### CRP 261(2610) Fieldwork in Urban Archaeology (also LA 261[2610])

Fall. 4 credits. S. Baugher.  
For description, see LA 261.

##### CRP 293(2930) Inequality, Diversity, and Justice (also GOVT 293[2935], SOC 293[2930], PHIL 193[1930])

Fall. 4 credits. R. Miller.  
For description, see PHIL 193.

##### CRP 309(3090) Community Development Seminar (also CRP 509[5090])

Spring. 3 credits. Letter grades. K. Reardon. Introduction to the theory, method, and practice of contemporary community development. Topics include: the role community-based organizations are playing in promoting sustainable development in distressed communities; the contribution planners are making to enhancing the

organizational capacity of community-based organizations; and the interplay between neighborhood-based community development activities and regional economic development policy-making.

**CRP 318(3810) Politics of Community Development (also CRP 518[5180])**

Spring. 3 credits. Letter grades. Staff.  
Seminar on city economic development and community institutions. Attention to issues of local politics, planning, housing, and economics. Term papers on field investigations are encouraged. Topics vary from year to year.

**CRP 321(3210) Introduction to Quantitative Methods for the Analysis of Public Policy**

Fall. 3 credits. Not offered every year.  
Y. Mansury.  
Introduction to the role and use of quantitative methods in the study of urban and regional issues. Focuses on various types of models commonly used to analyze urban and regional policy, including regression models, cost-benefit analysis, simulation, and others. Strengths and weaknesses of those methods are also considered.

**CRP 327(3270) Regional Economical Impact Analysis (also CRP 627[6270])**

Fall. 3 credits. Letter grades. Y. Mansury.  
A central concern of practicing planners and economic development professionals is how different events affect the regional economy of concern. Some events are the result of policy choices, such as the closing of a military base or an increase in the local sales tax. Some are the result of exogenous economic forces such as out-migration of population, disasters, natural-floods and hurricanes. This course defines the context, a regional economy, for such analysis, and then presents analytical tools for estimating economic impacts. The major tool covered in depth is regional input-output. Most of the course is devoted to understanding and applying IMPLAN, a software and data system for performing regional input-output analysis at the county level.

**CRP 328(3280) Overview: Quantitative Methods in Policy Planning (also CRP 528[5280])**

Fall or spring. 3 credits. S-U grades optional. Staff.  
Introduces students to the basic tools that are used in policy analysis. The goal is to set the context for the techniques presented, to understand the questions that each addresses, to be aware of their potential and limitations, their range of applicability, and the pitfalls to be avoided.

**CRP 330(3300) Neighborhood Planning Workshop (also CRP 530[5300])**

Spring. 4 credits. Letter grades. K. Reardon.  
Offers students the opportunity to collaborate with local residents, leaders, and officials in the development of revitalization plans that address the critical environmental, economic, and social challenges confronting their neighborhoods. A participatory action research approach is used to co-produce professional-quality development plans with local stakeholder groups. Significant fieldwork required.

**CRP 331(3310) Social Justice and the City: Preparation for Urban Fieldwork**

Spring. 3 credits. Prerequisite: Urban Scholar status or permission of instructor.  
Letter grades only. R. Sinton.  
Students are introduced to key sociological, economic, historical, and cultural issues embedded in planning for social justice in urban America. Topics include: local realities and micro and macro policies affecting housing, education, immigration, health, legislation, legal affairs, community development, and organizing in a large urban setting. In preparation for field-based learning and research experiences, the challenges of experiential education, public scholarship, and reflective practice will also be addressed both from the perspective of non-profit organizations and local government agencies serving under-resourced urban communities, and the undergraduate student as learner and worker. Students will be exposed to the principles of participant observation, informal/formal interviewing skills, managing field relations, professional ethics, and ethnographic report-writing.

**CRP 332(3320) Urban Policy Research Seminar on New York City**

Fall. 3 credits. Prerequisite: successful completion of Cornell Urban Scholars, Adult Literacy, or Urban Semester Programs or permission of instructor(s).  
S-U grades optional. R. Sinton.  
Designed to enhance students' organizational, analytical, research, and communication skills in producing scholarly articles of publishable quality that critically examine important urban policy issues affecting the lives of New York City's poorest children, families, and neighborhoods. Students produce policy-oriented journal articles that address vital issues confronting the city's most vulnerable residents, whom they've identified while working in Cornell-sponsored summer internships with nonprofit organizations and public agencies that provide direct services to the poor.

**CRP 343(3430) Affordable Housing Policy and Programs (also CRP 643[6430])**

Fall. 3 credits. S-U grades optional.  
R. Pendall.  
Overview of federal, state, and local policies and programs to deliver affordable housing to low-income people; public housing, vouchers, inclusionary zoning, rent control, and much more. Lectures, debates, short papers, and term paper.

**CRP 354(3540) Introduction to Environmental Planning (also CRP 554[5540])**

Spring. 3 credits. Staff.  
Introduction to problems facing planners and decision makers as they attempt to manage and preserve environmental quality in urban and rural settings. Case studies are used to discuss issues related to sustainability, quality of life, environmental hazards, and environmental justice. Students are also introduced to the basic regulatory and institutional aspects of environmental planning and tools and techniques for environmental impact assessment, inventorying, and risk analysis.

**[CRP 360(3600) Pre-Industrial Cities and Towns of North America (also LA 260/666[2600/6660], CRP 666[6660])**

Not offered 2006–2007.]

**CRP 361(3610) Seminar in American Urban History (also CRP 661[6610])**

Fall or spring. 3 credits. Prerequisite: permission of instructor. M. Tomlan.  
Seminar in the historical evolution of the American city. Emphasizes factors in urban growth, the process of urbanization, the urban reform movement, and intellectual and social responses to the city.

**[CRP 363(3630) American Indians, Planners, and Public Policy (also CRP 547[5470], LA 263/547[2630/5470])**

Not offered 2006–2007.]

**CRP 365(3650) Gender and Globalization (also FGSS 360[3600])**

Fall. 3 credits. L. Beneria.  
For description, see FGSS 360.

**CRP 368(3860) The History of Urban Form in America (also CRP 668[6680])**

Fall or spring. 3 credits. Letter grades.  
M. Tomlan.  
Covers the history of city planning in America from colonial times to the early 20th century, including brief reviews of European influences on urban form. Lectures, discussions, and short papers.

**CRP 370(3700) The Regional Question: The Case of Italy**

Spring. 4 credits, variable. Prerequisite: Rome Program participants; majors in urban and regional studies. Staff.  
The "regional problem" in Italy has long interested regional planners, economists, sociologists, and political scientists. This course makes use of field trips to the Italian Mezzogiorno and the North to explore theoretical and practical aspects of regional inequality. The question of how Italy's integration into the European Union affects and is affected by its regional issues will be considered.

**CRP 372(3720) 20th-Century Italy: Politics and Society**

Spring. 3 credits. S-U grades optional for out-of-department students only. Staff.  
Comprehensive survey of Italian society today, starting with Italy's geography and the historical forces that shaped the nation. Discussion includes north-south tensions and such broad features of Italian social life as community structure, urban development, and family forms. The course also reviews selected institutional issues, such as gender, the system of education, problems of criminality and justice, economic reform, social class, religion, and politics.

**CRP 376(3760) Latin American Cities (also CRP 676[6760])**

Fall. 3 credits. B. Lynch.  
This course offers students an opportunity to understand urban dynamics in a rapidly changing region of the world. We ask how colonial powers, the nation-state, and global economic forces have shaped Latin American urban landscapes and the patterns of daily life in the city. The first part of this course explores the social, political, and spatial rural-urban flows, socio-spatial segregation, housing environment and employment. The second half of the course focuses on responses to these social and economic transformations; violence and repression, coping strategies, social movement, and transmigration.

**CRP 377(3770) The City in Brazil (also CRP 687[6870])**

Summer. 3 credits. S-U grades optional. W. Goldsmith.

Students are taught in Brazil by professors from Cornell and the Instituto de Pesquisa e Planejamento Urbano e Regional (IPPUR), at the Federal University of Rio de Janeiro. Students will live in three Brazilian cities, on site with local scholars, top city officials, and activists. In Belem de Para, at the mouth of the Amazon River, the focus is on the environment and development. In Brasilia, the focus is on modernist planning of the new national capital with its signature Plano Piloto, the separated satellites cities, and migration from the Brazilian Northeast. In Rio de Janeiro, the focus is on housing, transportation, and the informal economy in the context of metropolitan growth and decline.

**CRP 378(3780) Recycling and Resource Management (also CRP 578[5780])**

Spring. 3 credits. S-U grades optional. Not offered every year. R. Young.

Advanced resource-recycling and management systems are critical to the development of a sustainable society. This course reviews the political, technological, and economic strategies necessary for cities and communities to achieve a closed-loop resource-management system. Drawing from readings, speakers, and field trips that examine the cutting edge of recycling-program development, the course provides students with comprehensive exposure to leading practitioners and best practices in the recycling field. Open to undergraduate and graduate students. Graduate students have additional research requirements.

**[CRP 380(3800) Environmental Politics]**

Fall. 4 credits. Letter grades. Not offered 2006-2007. R. Booth.]

**CRP 381(3810) Principles of Spatial Design and Aesthetics (also CRP 581[5810])**

Fall. 3 credits. Limited to 15 students. R. Trancik.

A lecture projects course that introduces the spatial and visual design vocabularies of cities. Aesthetic principles and theories of design are investigated for different types of urban spaces drawn from a variety of international examples, historic and modern. Included in the course are design methods and applications in the contemporary urban context of Europe and North America.

**CRP 384(3840) Green Cities (also CRP 584[5840], LA 495[4950])**

Fall. 4 credits. S-U grades optional. Not offered every year. R. Young.

For the first time in history, a majority of human beings live in cities. As a result, any realistic solution to the global ecological crisis will need to include strategies for urban life that are ecologically sound. This course examines the history and future of urban ecology and the technology and politics that shape it. Alternative transportation, renewable energy, urban design, recycling and resource management, and sustainable economics are explored as means toward transforming cities to become the basis of a new, ecological society. Open to both graduate and undergraduate students. Graduate students have additional research requirements.

**CRP 386(3860) Planning for Sustainable Transportation (also CRP 686[6860])**

Spring. 3 credits. S-U or letter grades. Y. Levitte.

Explores issues related to sustainable transportation policy and practice. The course (1) provides an overview of current transportation trends and their impacts; (2) reviews themes such as planning history and politics, the problems with auto-dominated systems, and key challenges to development sustainable transport systems; and (3) looks at regulatory, design, and market-based approaches to reducing automobile-dependency, introducing creative sustainable solutions from around the world.

**CRP 390(3900) Professional Planning Colloquium I (also CRP 790[7850])**

Fall. 1 credit. Staff.

Visiting lecturers address problems and opportunities in the practice of planning. Topical focus to be announced. The only formal requirements for the course are attendance and a three- to five-page paper about the lecture series.

**CRP 395(3850) Special Topics (also CRP 585[5850])**

Fall, spring, summer. 4 credits, variable. Times TBA. Staff.

For description, see department coordinator, 106 West Sibley Hall.

**CRP 395.03(3850) Wilderness and Wildlands: Issues in Policy and Planning (also CRP 679.03[5850])**

Fall. 2-3 credits, variable. Graduate seminar open to juniors and seniors. Not offered every year. L. Thorndike.

Wilderness and wildland resources have been under assault by the Congress, the "Wise Use" movement, property-rights activists, pollutants, and the actual users. This seminar considers historical and philosophical foundations and political factors that affect decisions about wilderness policies, planning, acquisition, protection, and management. The roles of government, professional planners and managers, organized special interests, the legal system, citizens, and user groups are examined. Practical exposure to planning and policy development through readings, discussions, guest practitioners, and a field trip to the Finger Lakes National Forest. Optional weekend trip to Adirondack Park Wilderness area.

**CRP 404(4040) Urban Economics (also CRP 504[5040])**

Spring. 4 credits. Not offered every year.

Prerequisite: microeconomics course. Staff. Analyzes urban phenomena from an economic point of view. Areas examined include economic aspects of urbanization processes and policies, determinants of urban growth and decline, urban land and housing markets, urban transportation, and urban public services. Some time is spent in discussing problems of cities in developing countries.

**CRP 408(4080) Introduction to Geographic Information Systems (GIS) (also CRP 508[5080])**

Spring. 4 credits. Staff.

Geographic Information Systems (GIS) have revolutionized the way we manage, analyze, and present spatial information. This course focuses on GIS in the social sciences. Many of the exercises and examples are based on planning issues, but the concepts can be applied to many other disciplines such as

government, economics, natural resources, and sociology. Some of the issues covered include: fundamentals of spatial analysis; overview of GIS technology and applications; designing a GIS project; gathering and analyzing data; and creating thematic maps.

**CRP 412(4120) Devolution, Privatization, and the New Public Management (also CRP 612[6120], AEM 433/633[4330/6330], FGSS 411/611[4110/6110])**

Fall. 4 credits. Prerequisite: ECON 101 or equivalent. S-U grades optional. M. Warner. Addresses devolution and decentralization of government services in a national and international context and then focuses on the local public-sector response in the United States. Privatization, intermunicipal cooperation, and internal restructuring are reviewed, including changing roles for the private sector, nonprofit sector, and unions. Implications for policy, program design, public advocacy, and citizen involvement are addressed. A special topic may include welfare reform. Graduate students are expected to write a major research paper in addition to short papers throughout the semester.

**CRP 416(4160) European City: The Public Sphere and Public Space**

Spring. 4 credits, variable. Enrollment may be limited by instructor. Prerequisite: junior or senior standing; Rome Program participants. S-U grades optional for nonmajors. Staff.

Examination of the social, economic, and political life of the European city, particularly Italian cities, especially Rome. Study of the socioeconomic underpinnings of the city. How are cities organized, and how do citizens relate to the state; the city to the nation; the nation to the global market? How and where do different groups of people live? How do they travel, inside the city and from city to city? How are new parts of the city developed and old ones preserved, transformed, or destroyed? What public services do people expect, and how are they delivered? What is the role of private business? How do Italians/Europeans confront problems of the urban environment, poor neighborhood services, and impoverished immigrants? In all these cases, how do Italian (or European) conditions and policies differ from those in the United States (or elsewhere)?

**CRP 417(4170) Economic Development: Firms, Industries, and Regions (also CRP 517[5170])**

Fall. 4 credits. S. Christopherson.

Economic development policy in the United States has focused historically on the provision of subsidies to individual firms. As the limitations of this strategy have become more apparent, alternative approaches including multifirm and workforce development are being implemented. This comparative course draws on cases from a variety of industries and national contexts. Particular attention is paid to economic development issues and policies in New York State.

**CRP 418(4180) Government Policy Workshop (also CRP 618[6180], AEM 434/634[4340/6340], FGSS 420/620[4200/6200])**

Spring. 4 credits. S-U grades optional. M. Warner.

Students undertake research requested by clients (associations of local government,

unions, nonprofits, and state, federal, and international agencies) to analyze and identify alternative approaches to restructuring government-service delivery. The course requires teamwork and includes qualitative and quantitative methods of analysis in collaboration with clients.

**CRP 444(4440) Resource Management and Environmental Law (also CRP 544[5440], NTRES 444[4440])**

Spring. 4 credits. Prerequisite: junior, senior, or graduate standing and permission of instructor. R. Booth.

Introduces the application of legal concepts and processes to the management of natural resources and natural-resource areas. Explores the role of the common law, statutory law, administrative regulations, and judicial decisions in managing these resources. Particular focus is given to the management of wildlife, wetlands, and critical resources on public lands, and to the conflicts inherent in government attempts to regulate important natural resources on private lands.

**CRP 448(4480) Social Policy and Social Welfare (also CRP 548[5480])**

Spring. 4 credits. Not offered every year. S. Christopherson.

Addresses conceptual issues underlying social policy and the provision of social welfare and analyzes how different positions are reflected in a set of current social-welfare controversies. The first part of the course introduces principles that guide the development of social policy, including fairness and justice. Various conceptions of society are examined with reference to their influence on the nature and extent of social-welfare provision, comparing the United States with other industrialized countries. The second part examines how economic change and government policy affect social provision in the United States.

**[CRP 451(4510) Environmental Law (also CRP 551[5510])**

Fall. 4 credits. Not offered 2006–2007. R. Booth.]

**CRP 453(4530) Environmental Aspects of International Urban Planning (also CRP 683[6830])**

Fall. 4 credits. Open to advanced undergraduate and graduate students in planning, environmental studies, and related social and natural sciences. Staff.

This seminar examines the ways in which roles of diverse environmental actors—international organizations, national bureaucracies, scientific communities, NGOs, and social movement organizations—formulate environmental debates and design conservation and remediation programs and policies in the Third World.

**CRP 457(4570) Community Service Fieldwork**

Fall or spring. 4 credits, variable.

Prerequisite: permission of instructor. Staff. Undergraduate students work under the direction of a faculty member in the CRP department on a project that assists a public or nonprofit organization. Projects involve urban and regional issues as defined by a client and agreed upon by the faculty member.

**CRP 474(4740) Urban Transformations in the Global South (also CRP 674[6740])**

Fall or spring. 4 credits. S-U grades optional. W. Goldsmith.

Economic globalization and the post-colonial political order are continually reshaping urban societies and landscapes in the global South, often by relegating everyday life to the margins and shrouding it in illegality. This course focuses on the spatial, social, and political dimensions of urban transformations, paying particular attention to such topics as competition among cities for international capital and its implications for sociospatial organization; dynamic interrelations between informality in labor markets and in housing; urban environmental challenges and municipal efforts to address them; and issues related to governance, social movements, and new formulation of citizenship.

**CRP 477(4770) Issues in African Development (also CRP 677[6770])**

Fall and spring. 1 credit. S-U grades only. M. Ndulo.

Examines a broad range of critical concerns in contemporary Africa including food production, human resource development, migration, urbanization, environmental resource management, economic growth, and policy guidance. The weekly presentations are made by invited specialists. Students are required to write a term paper.

**CRP 490(4900) Student-Faculty Research**

Fall or spring. 4 credits, variable.

Prerequisite: undergraduates in Urban and Regional Studies Program. S-U grades only. Staff.

Research, reading, and/or writing project in which a student and faculty member choose a topic related to urban and regional studies.

**CRP 492(4920) Honors Thesis Research**

Fall or spring. 4 credits. Prerequisite:

Urban and Regional Studies Program majors who have been selected as honor students by department faculty. Staff.

Each selected student works with his or her thesis advisor.

**CRP 493(4930) Honors Thesis Writing**

Fall or spring. 4 credits. Prerequisite: CRP 492. Staff.

Each selected student works with his or her thesis advisor.

**CRP 497(4970) Independent Study**

Fall or spring. 4 credits, variable.

Prerequisite: junior or senior standing; permission of instructor. Staff.

**Graduate Courses and Seminars**

Courses numbered from 500 to 599 and 600 to 699 are generally considered introductory or first-year courses; those numbered from 700 to 799 and 800 to 899 are generally considered more advanced. Upper-level undergraduate courses are numbered from 300 to 499. (Undergraduate students with the necessary prerequisites and permission of the instructor may enroll in courses numbered 500 and above.)

**CRP 504(5040) Urban Economics (also CRP 404[4040])**

Spring. 4 credits. Not offered every year.

Prerequisite: microeconomics course. Staff. For description, see CRP 404.

**CRP 508(5080) Introduction to Geographic Information Systems (GIS) (also CRP 408[4080])**

Spring. 4 credits. Staff.

For description, see CRP 408.

**CRP 509(5090) Community Development Seminar (also CRP 309[3090])**

Spring. 3 credits. K. Reardon.

For description, see CRP 309.

**CRP 512(5120) Public and Spatial Economics for Planners**

Fall. 3 credits. No prior knowledge of economics necessary. Staff.

Covers basic microeconomic theory and some topics in macroeconomics. What distinguishes it from foundation courses in economics is that the context of every topic is both spatial and public. The concept of space is central to city and regional planning. The perspective of the public and nonprofit sectors is the same as that of city and regional planning. Both space and the public-nonprofit sectors are peripheral to (or absent from) the usual graduate foundations courses in economics. The course also covers the economic theory necessary to understand the many applications of economics presented in subsequent courses in city and regional planning.

**CRP 513(5130) Introduction to Planning Practice and History**

Fall. 4 credits. Staff.

Introductory graduate seminar on the theory and history of planning, administration, and related public intervention in urban affairs. Topics are analyzed from the perspective of the political economy of the growth and development of cities. Students improve their understanding of the planning process and of the urban application of the social sciences, get practice in writing, and explore one research topic in depth.

**CRP 517(5170) Economic Development: Firms, Industries, and Regions (also CRP 417[4170])**

Fall. 4 credits. S. Christopherson.

For description, see CRP 417.

**CRP 518(5180) Politics of Community Development (also CRP 318[3180])**

Spring. 3 credits. P. Clavel.

For description, see CRP 318.

**CRP 519(5190) Urban Theory and Spatial Development**

Spring. 3 credits. W. Goldsmith.

Surveys theories on the existence, size, location, and functioning of cities and their metropolitan areas in rich and poor regions of the world. Considers orthodox/conservative treatments as well as critical/left-wing perspectives of planners, geographers, economists, sociologists, and political economists. These theories are indispensable for understanding the origins of cities, the persistence of urban and regional spatial patterns, and the distinctive nature of urban problems.

**CRP 520(5200) Statistical and Mathematical Concepts for Planning**

Fall. 3 or 4 credits. Not offered every year. Staff.

Introduction to statistical and mathematical concepts and methods of importance in planning and policy analysis. Topics include matrix algebra, probability, sampling, estimation, and regression, and the use of a microcomputer statistical package.



**CRP 521(5210) Mathematical Foundation for Planning Analysis**

Fall. 1 credit. Meets for two hours, once each week, for approximately half the semester. Prerequisite: permission of department. S-U grades only. Not offered every year. Staff.

Review of mathematical foundations for planning analysis. Topics include probability statistics, mathematical functions, and matrix algebra. Intended for students with prior course work as a refresher course in preparation for higher-level courses in planning analysis.

**CRP 525(5250) Introductory Methods of Planning Analysis**

Fall. 4 credits. R. Pendall.

Quantitative and qualitative analysis of neighborhoods, cities, and regions. Focus is on data from various regions of the United States, but tools are applicable throughout the world. They include: descriptive and inferential statistics, mapping, and observation. Required lab exposes students to essential microcomputer applications and builds skills in writing and analysis.

**CRP 528(5280) Overview: Quantitative Methods in Policy Planning (also CRP 328[3280])**

Fall and spring. 3 credits. S-U grades optional. Staff.

For description, see CRP 328.

**CRP 529(5290) Mathematics for Planners**

Fall. 4 credits, variable. S-U grades optional. Not offered every year. Staff.

Covers basic mathematical concepts and techniques—with an emphasis on calculus—needed by the student who wishes to take intermediate-level courses in economics, urban and regional analysis, quantitative methods for the social sciences, and policy analysis. Topics include: matrix algebra, set theory, functions, differentiation, and integration.

**CRP 530(5300) Neighborhood Planning Workshop (also CRP 330[3300])**

Spring. 4 credits. K. Reardon.

For description, see CRP 330.

**CRP 532(5320) Real Estate Development Process**

Fall. 3 credits. Letter grades. Fee for case studies packet. B. Olson.

Examination of various forms of development as well as the role of major participants in the processes. Reviews issues in residential, retail, industrial, office, and low-income housing projects. Guest speakers and case studies included.

**CRP 533(5330) Real Estate Marketing and Management**

Fall. 3 credits. R. Abrams.

Focuses on the tenant or user as the basic source of the value of real estate. Students explore the characteristics and needs of tenants, and how the ownership and management of buildings respond to these needs. Office buildings are considered in detail while key elements common to the operation and marketing of all types of property are reviewed. Topics include examination of tenant types, factors creating preferred locations, building services and operations, negotiation of lease agreements, marketing campaigns, and governmental regulations. Guest speakers and case studies included.

**CRP 537(5370) Real Estate Seminar Series**

Fall and spring. 0.5 credit each semester. Prerequisite: M.P.S./R.E. students. S-U grades only. B. Olson.

Designed to bring students weekly into direct contact with real-estate professionals mainly through the use of videoconferences originating from locations around the world.

**CRP 544(5440) Resource Management and Environmental Law (also CRP 444[4440]/NTRES 444[4440])**

Spring. 4 credits. R. Booth.

For description, see CRP 444.

**CRP 546(5460) Introduction to Community and Environmental Dispute Resolution**

Fall. 3 credits. J. Forester.

Explores the theories and techniques of dispute resolution as they apply to community, environmental, and related public-policy disputes. Analysis complements skill-building. Issues of power, participation, and strategy are central to our examinations of negotiation and mediation practice.

**[CRP 547(5470) American Indians, Planners, and Public Policy (also CRP 363[3630], LA 263/547[2630/5470])**

Not offered 2006-2007.]

**CRP 548(5480) Social Policy and Social Welfare (also CRP 448[4480])**

Spring. 4 credits. Not offered every year. S. Christopherson.

For description, see CRP 448.

**[CRP 551(5510) Environmental Law (also CRP 451[4510])**

Fall. 4 credits. Not offered 2006-2007.]

**CRP 552(5520) Land-Use Planning**

Fall. 3 credits. Staff.

Covers surveys, analyses, and plan-making techniques for guiding physical development of urban areas, location requirements, space needs, and interrelations of land uses. Emphasizes residential, commercial, and industrial activities and community facilities, and housing and neighborhood conditions. Lectures, seminars, and field exercises.

**CRP 553(5530) Land-Use Regulations**

Spring. 3 credits. R. Pendall.

This seminar covers the essentials of "smart growth," zoning, and subdivision, and the main tools for implementing a land-use plan. Also covers agriculture and open-space preservation, infrastructure-timing controls, redevelopment, and planned-unit development.

**CRP 554(5540) Introduction to Environmental Planning (also CRP 354[3540])**

Spring. 3 credits. Staff.

For description, see CRP 354.

**CRP 555(5550) Urban Systems Studio (also LA 701[7010])**

Fall. 5 credits. Prerequisite: permission of instructor. R. Trancik.

Application of urban-design and town-planning techniques to specific contemporary problems of city environments. Issues of urbanism are investigated and applied to physical-design interventions involving the street, square, block, garden, and park systems. Topics include urban land-use development, spatial systems and aesthetics, and public and private implementation of

urban-design plans. Computer modeling and digital-design media are introduced as tools for urban design. This is a specially arranged collaborative studio with the Landscape Architecture Program.

**CRP 556(5560) Design in Real Estate Development**

Spring. 3 credits. S-U grades optional. H. Richardson.

Provides a basic understanding of the importance of design in real estate development. The role of the architect and other design professionals is considered from the initial needs assessment through project implementation. Fundamentals involved in defining, stimulating, and recognizing quality in design are addressed. The analysis of case-study presentations by guest speakers examine the methods and procedures employed to achieve quality design and how this can create added value to development.

**CRP 557(5570) City Planning Design Studio**

Spring. 4 credits. Prerequisite: design courses or permission of instructor. Staff.

Series of individual and team small-area design projects at district, neighborhood, and project scale. The course objective is to develop an understanding of the spatial issues, knowledge, and skills needed to design for the functional, aesthetic, social, and cost needs of urban communities. Studio projects, field trips, and reading.

**CRP 558(5580) City and Regional Planning Workshop**

Fall or spring. 4 credits, variable. S-U grades optional. R. Pendall.

Students work on urban issues, such as housing, traffic and parking, economic development, zoning, and related planning issues with public or nonprofit organizations in New York State. Projects are undertaken on a community-service basis for "clients" who specifically request planning assistance. Students work individually or in teams.

**CRP 560(5600) Documentation for Preservation**

Fall or spring. 3 credits. M. Tomlan.

Methods of identifying, recording, collecting, processing, and analyzing information dealing with historic and architecturally significant structures, sites, and objects.

**CRP 561(5610) Historic Preservation Planning Workshop: Surveys and Analyses**

Fall or spring. 4 credits. J. Chusid.

Covers techniques for the preparation of surveys of historic structures and districts; identification of American architectural styles, focusing on upstate New York; and explorations of local historical resources, funding sources, and organizational structures. Lectures and training sessions. Emphasizes fieldwork with individuals and community organizations.

**CRP 562(5620) Perspectives on Preservation**

Fall. 3 credits. J. Chusid.

Introductory course for preservationists. A survey of the historical development of preservation activity in Europe and America leading to a contemporary comparative overview. Field trips to notable sites and districts.



**CRP 563(5630) Problems in Contemporary Preservation Practice**

Spring. Variable credit. J. Chusid.  
Review and critique of ongoing preservation projects and an investigation of areas of expertise currently being developed. Presented by staff and guest lecturers.

**CRP 564(5640) Building Materials Conservation**

Spring. 3 credits. Prerequisite: junior, senior, or graduate standing. M. Tomlan.  
Survey of the development of building materials in the United States, chiefly during the 19th and early 20th centuries, and a review of the measures that might be taken to conserve them.

**CRP 565(5650) Fieldwork or Workshop in History and Preservation**

Fall or spring. Variable credit. M. Tomlan.  
Work on applied problems in history and preservation planning in a field or laboratory setting or both.

**CRP 566(5660) Planning and Preservation Practice**

Fall. 1 credit. Prerequisite: graduate standing in CRP programs or M.P.S./R.E. or permission of instructors. S-U grades only. R. Pendall and M. Tomlan.  
Students participate in field study of city planning, historic preservation, economic and community development, and real estate issues in large Eastern U.S. cities.

**CRP 567(5670) Measured Drawing**

Fall. 3 credits. Prerequisite: undergraduate architecture students and graduate students in history and preservation; permission of instructor. J. Chusid.  
Combines study of architectural drawing as historical documents with exercises in preparing measured drawings of small buildings. Presents the basic techniques of studying, sketching, and measuring a building and the preparation of a finished drawing for publication.

**[CRP 569(5690) Archaeology in Preservation Planning and Site Design (also LA 569[5690])]**

Not offered 2006–2007.]

**CRP 578(5780) Recycling and Resource Management (also CRP 378[3780])**

Spring. 3 credits. S-U grades optional. R. Young.  
For description, see CRP 378.

**CRP 581(5810) Principles of Spatial Design and Aesthetics (also CRP 381[3810])**

Fall. 3 credits. Limited to 15 students. R. Trancik.  
For description, see CRP 381.

**CRP 584(5840) Green Cities (also CRP 384[3840], LA 495[4950])**

Fall. 4 credits. S-U grades optional. Not offered every year. R. Young.  
For description, see CRP 384.

**CRP 585(5850) Special Topics (also CRP 385[3850])**

Fall, spring, or summer. 4 credits, variable. Times TBA. Staff.  
For description, see department coordinator, 106 West Sibley Hall.

**CRP 605(6050) Urban Public Finance**

Fall. 4 credits. Prerequisite: exposure to microeconomics. Not offered every year. Staff.

Overview of neoclassical public-economics theory, particularly those aspects of the theory that are central to urban public finance. The unusual three-tiered fiscal system of the United States is described along with the evolving fiscal and economic role of large municipal governments. Also presented is the public-finance theory of taxation. Major taxes and other revenue sources used by large municipalities are described and analyzed. The heart of the matter is the measurement and analysis of the fiscal condition of cities.

**CRP 607(6070) GIS Applications Workshop**

Fall. 4 credits. Prerequisites: introductory GIS course or permission of instructor. A.-M. Esnard.

Advanced GIS course that focuses on GIS applications and projects for one or more clients. During some semesters students work on their own projects. Contact the instructor directly to learn about project options for the current semester.

**CRP 612(6120) Devolution, Privatization, and the New Public Management (also CRP 412[4120], AEM 433/633[4330/6330], FGSS 411/611[4110/6110])**

Fall. 4 credits. Prerequisite: ECON 101 or equivalent. S-U grades optional. M. Warner.  
For description, see CRP 412.

**CRP 614(6140) Gender and International Development (also FGSS 614[6140])**

Spring. 3 credits. L. Beneria.  
The four main objectives are to (1) analyze the location of women in development processes and to understand the centrality of gender in each case; (2) examine theoretical and conceptual frameworks for the analysis, including an understanding of gender divisions and their interaction with other forms of inequality such as class, race, and ethnicity; (3) reflect upon the linkages between the global economy and the macro and micro processes of development from a gender perspective; and (4) provide a basis for research, practical action, and policy formulation and for evaluating directions and strategies for social change.

**CRP 615(6150) Current Issues and Debates on NGOs**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor. S-U or letter grades. N. Kudva.

This seminar examines a range of topics that are key to understanding NGO actions: their effectiveness at service provision and advocacy; their political role in constructing social capital and strengthening civil society; their relationship with the state and with donor agencies; and issues related to organizational design for success. The intention is to gain a broad-based understanding of the role and development of NGOs. The emphasis throughout will be to critically evaluate the literature, research, and accounts on NGOs as both institutional actors in the development arena and as bounded organizations at the local level: a task that is complicated by the heterogeneity of contexts and organizational types.

**CRP 618(6180) Government Policy Workshop (also CRP 418[4180], AEM 434/634[4340/6340], FGSS 420/620[4200/6200])**

Spring. 4 credits. S-U grades optional. M. Warner.  
For description, see CRP 418.

**CRP 621(6210) Quantitative Techniques for Policy Analysis and Program Management**

Spring. 4 credits. D. Lewis.  
Examines selected analytical techniques used in the planning and evaluation of public policy and public investments. Topics include simulation modeling, benefit-cost and cost-effectiveness analysis (including capital budgeting), and optimization strategies.

**CRP 627(6270) Regional Economical Impact Analysis (also CRP 327[3270])**

Fall. 3 credits. Letter grades. Staff.  
For description, see CRP 327.

**CRP 632(6320) Methods of Regional Science and Planning I**

Spring. 4 credits, variable. Staff.  
Introduction to some of the major methods and models used in regional science and planning. Topics related to the structure and assumptions of the models, model development, and their applications in regional science and planning are discussed. Where appropriate, computer implementation emphasizing statistical, econometric models is considered.

**CRP 635(6350) Workshop: State Economic Development Strategies**

Fall or spring. 4 credits. S-U grades optional. S. Christopherson.  
The purpose of this workshop is twofold: (1) to provide students with research tools useful in developing state-level economic-development strategies; and (2) to provide a critical understanding of the primary economic-development strategy used by U.S. state policymakers: firm-specific subsidies. The course consists of lecture and discussion meetings. The workshop sessions include exercises in qualitative information gathering on economic-development topics; use of the census in combination with geographic information systems for analysis and presentation; and shift-share analysis.

**CRP 637(6370) Regional Development Planning: An International Perspective**

Fall. 4 credits, variable. S-U grades optional. T. Vietorisz.  
Develops a broad historical and theoretical context within which urban and regional planning problems across the world are embedded; addresses aspects of the global information economy affecting economic development and cultural identity; and demonstrates how such a broad perspective can make for more viable local plans. From the perspective of commitment to an open society, the course also examines the tension between planning oriented to social equity and the polarizing forces of market fundamentalism.

**CRP 638(6380) Planning and the Global Knowledge Economy: Sustainability Issues**

Spring. 4 credits, variable. S-U grades optional. T. Vietorisz.  
Analyzes the current sustainability crisis in terms of major changes in the social

organization of production, emphasizing the worldwide economic and cultural shocks created by the emerging knowledge economy. Insight into the dynamics of this transition, in the light of similarly dramatic transitions in the past, can guide attempts to move toward sustainability and high-quality urban and regional living environments.

**CRP 642(6420) The Micro-Politics of Participatory Planning Practices**

Spring. 4 credits, variable. J. Forester.  
This seminar explores issues of "practice" (rhetoric and negotiation, interpretation and judgment, narrative and recognition) as they influence democratic deliberations involving questions of ethics and argument, participation and identity, historical trauma and working-through, and more. The approach taken can be called a "critical pragmatism." Practitioners' oral histories are used to investigate the challenges of participatory planning practices.

**CRP 643(6430) Affordable Housing Policy and Programs (also CRP 343[3430])**

Fall. 3 credits. S-U grades optional.  
R. Pendall.  
For description, see CRP 343.

**CRP 653(6530) Legal Aspects of Land-Use Planning**

Spring. 3 credits. R. Booth.  
Survey of leading cases and legal concepts in land-use planning, with particular attention to zoning, subdivision control, condemnation, and growth-control issues.

**CRP 655(6550) Real Estate Project Workshop**

Spring. 4 credits. Prerequisite: permission of instructor. Fee for mandatory field trip.  
R. Abrams and M. Schack.

Students are asked to undertake the preparation of reports analyzing various aspects of real estate activity. Individual and team working relationships are required. A range of types of problems that may be encountered in the real estate field is addressed, including project feasibility, marketing, planning and design, and legal constraints and concerns. Projects focus on real-world case studies and require professional-level reports suitable for oral and written presentations.

**CRP 657(6570) Real Estate Law**

Spring. 3 credits. Letter grades.  
A. Klausner.  
Examination of major legal concepts pertaining to acquisition, use, management, and transfer of real estate. Particular focus is on important legal considerations pertaining to property rights, contracts, and public controls on the use of land. Consideration of important case law, statutory law, and rules and regulations. Current legal issues affecting the real estate industry are discussed.

**CRP 658(6580) Residential Development**

Spring. 4 credits. Letter grades. Fee for mandatory field trip. B. Olson.  
Explores the residential-development process from site acquisition through delivery of the finished product. Topics include market feasibility, land planning and acquisition, product selection and design considerations, project financing and feasibility, schedule and budgetary controls, contracting and construction issues, marketing, and sales activities. Current issues in providing competitive housing products in today's markets are also explored. Composition of the

residential-development project team is discussed. Classes are supplemented by presentations from visiting professionals. The course includes a semester-long project based on an actual property and market opportunity.

**CRP 661(6610) Seminar in American Urban History (also CRP 361[3610])**

Fall or spring. 3 credits. Prerequisite: permission of instructor. M. Tomlan.  
For description, see CRP 361.

**CRP 662(6620) Historic Preservation Planning Workshop: Plans and Programs**

Fall or spring. 1-4 credits. Prerequisite: CRP 561. M. Tomlan.

Preparation of elements of historic preservation plans, designs, legislation, and special studies. Individual or group projects are selected by students. Fieldwork is emphasized.

**CRP 663(6630) Historic Preservation Law**

Spring. 3 credits. Offered alternate years.  
R. Booth.  
Covers law of historic district and landmark designation; tools for preservation (e.g., police power, taxation, eminent domain); and recent developments in state and federal historic preservation.

**CRP 664(6640) Economics and Financing of Neighborhood Conservation and Preservation**

Spring. 3 credits. M. Tomlan.  
The economic and financial aspects of historic preservation and neighborhood conservation. Topics include public finance, selected issues in urban economics, real estate economics, and private financing of real estate projects.

**CRP 665(6650) Preservation Planning and Urban Change**

Fall. 3 credits. M. Tomlan.  
Examination of fundamental planning concepts and issues as they relate to historic preservation. Neighborhood revitalization, federal housing programs, the role of public and private institutions, displacement, and other social issues are among the primary topics.

**[CRP 666(6660) Pre-Industrial Cities and Towns of North America (also CRP 360[3600], LA 260/666[2600/6600])**

Not offered 2005-2006.]

**CRP 668(6680) The History of Urban Form in America (also CRP 368[3680])**

Fall or spring. 3 credits. M. Tomlan.  
For description, see CRP 368.

**CRP 670(6700) Regional Planning and Development in Developing Nations**

Fall or spring. 4 credits. Prerequisite: second-year graduate standing. Staff.  
Extensive case studies of development planning are analyzed. Focus is on the political economy of the process of regional development through urbanization and in particular on the concepts of equity and efficiency, external economies, export linkages, and internal self-sufficiency and integration. Resource development, national integration, human development, and migration problems are discussed.

**CRP 671(6710) Seminar in International Planning**

Spring. 1 credit. S-U grades only.  
W. Goldsmith.

The international planning lecture series sponsors lectures by visiting scholars or professionals in the field of international development and planning. The only formal requirement for the course is a brief evaluation of the series at the end of the semester.

**CRP 672(6720) International Institutions**

Spring. 3 credits. L. Beneria.  
Focuses on the growth and transformation of international institutions since World War II. The first part includes a discussion of the Bretton Woods institutions and of the U.N. system up to the early 1970s, and how these function and have evolved over time. The second part examines some of the crises and tensions within the international system since the 1980s and how these have affected institutional change and current debates on reform and global governance.

**CRP 674(6740) Urban Transformations in the Global South (also CRP 474[4740])**

Fall or spring. 4 credits. S-U grades optional. W. Goldsmith.  
For description, see CRP 474.

**CRP 675(6750) Workshop on Project Planning in Developing Countries**

Fall. 4 credits. D. Lewis.  
Examines the problems and issues involved in preparing project proposals for presentation to funding agencies. Topics include technical design, financial feasibility, social-impact analysis, and policy relevance, as well as techniques for effective presentation of proposals. The course is organized as a seminar-workshop providing both an analysis of the critical elements of effective proposals and an opportunity to use those elements in the preparation of proposals. A multidisciplinary perspective is emphasized.

**CRP 676(6760) Latin American Cities (also CRP 376[3760])**

Fall. 3 credits. B. Lynch.  
For description, see CRP 376.

**CRP 677(6770) Issues in African Development (also CRP 477[4770])**

Fall or spring. 1 credit. S-U grades only.  
M. Ndulo.  
For description, see CRP 477.

**[CRP 678(6780) Concrete Manifestations—Infrastructure in the New World Order**

Fall or spring. 4 credits. S-U grades optional. Not offered 2006-2007.]

**CRP 679.03(5850) Wilderness and Wildlands: Issues in Policy and Planning (also CRP 395.03[3850])**

Fall. 2-3 credits, variable. Graduate seminar open to juniors and seniors. Not offered every year. L. Thorndike.  
For description, see CRP 395.03.

**CRP 683(6830) Environmental Aspects of International Urban Planning (also CRP 453[4530])**

Fall. 4 credits. Staff.  
For description, see CRP 453.

**CRP 686(6860) Planning for Sustainable Transportation (also CRP 386[3860])**

Spring. 3 credits. S-U or letter grades.  
Y. Levitte.  
For description, see CRP 386.

**CRP 687(6870) The City in Brazil (also CRP 377[3770])**

Summer. 3 credits. Letter grades optional. Staff.

For description, see CRP 377.

**CRP 689(5850) Sustainable Panama: An Interdisciplinary Workshop Course on the Future of the Panama Canal Metropolitan Landscape (also CRP 395[3850])**

Winter. 4 credits. R. Trancik.

For description, see CRP 395 (section 1).

**CRP 790(7850) Professional Planning Colloquium I (also CRP 390[3900])**

Fall. 1 credit. Staff.

For description, see CRP 390.

**CRP 791(8910) Master's Thesis in Regional Science**

Fall or spring. 12 credits, variable. S-U grades optional. Hours TBA. Regional Science faculty. Staff.

**CRP 792(8920) Master's Thesis, Project, or Research Paper**

Fall or spring. 10 credits, variable. S-U grades optional. Staff.

**CRP 794(7940) Planning Internships**

Fall, spring, or summer. 12 credits, variable. Staff.

Combines a professional planning internship in a metropolitan area with academic study to provide experience and understanding of the planner's role in formulating and implementing plans and policies. Salaried internships in federal or state agencies, legislative offices, and comparable settings include development of research, analysis, and other technical skills. Weekly seminars draw on student field experiences, assigned readings, and guest speakers to examine current issues of federal, urban, and regional policy from the perspective of planning practice.

**CRP 795(8950) Master's Thesis in Preservation Planning**

Fall or spring. 6 credits, variable. Staff.

**CRP 796(7960) Professional Writing and Publishing (Colloquium)**

Fall or spring. 2 credits. S-U grades only. Not offered every year. Staff.

Individual and group projects culminating in the production of a professional journal.

**CRP 797(7970) Graduate Independent Study**

Fall or spring. 4 credits, variable.

Prerequisites: graduate student standing, permission of instructor. Staff.

For description, see department coordinator, 106 West Sibley Hall.

**CRP 800(8000) Advanced Seminar in Urban and Regional Theory I**

Fall. 3 credits. S. Christopherson.

Introduction to key conceptual and empirical literature in urban theory. Focuses on the relationship between political and economic processes and their joint influence on urban spatial form.

**[CRP 801(8010) Advanced Seminar in Urban and Regional Theory II**

Not offered 2006–2007.]

**[CRP 810(8100) Advanced Planning Theory**

Not offered 2006–2007.]

**CRP 830(8300) Seminar in Regional Science, Planning, and Policy Analysis**

Fall or spring. 4 credits, variable. S-U grades only. Staff.

Provides an opportunity to review some of the literature and current research in regional science, planning, and policy analysis. Specific topics covered vary each year. Empirical and analytical research are emphasized. Students are expected to prepare and present a research paper during the semester on some aspect of the topics under review.

**CRP 890(8900) Planning Research Seminar I**

Fall or spring. 2 credits. Staff.

Intended for doctoral candidates in city and regional planning; other students welcome. Presentation and discussion of current problem areas and research by advanced doctoral students, faculty members, and visitors.

**CRP 892(9920) Doctoral Dissertation**

Fall or spring. 2 credits, variable. Staff.

**Special Topic Courses**

Fall or spring. Variable credit. Staff.

Typical topics are:

**CRP 609(6090) Urban and Regional Theory****CRP 619(6190) Planning Theory and Politics****CRP 629(6290) Quantitative Methods and Analysis****CRP 639(6390) Regional Development Planning****CRP 649(6490) Social-Policy Planning****CRP 659(6590) Urban Development Planning****CRP 669(6690) History and Preservation****CRP 679(6790) Planning and Developing Regions****CRP 689(6890) Environmental Planning****CRP 699(6990) Regional Science****CRP 719(7190) Planning Theory and Politics****LANDSCAPE ARCHITECTURE**

Landscape Architecture at Cornell is jointly sponsored by the College of Agriculture and Life Sciences and the College of Architecture, Art, and Planning.

**The Program**

Program faculty: P. J. Trowbridge, chair (446 Kennedy Hall, 255-1649, -7924); M. I. Adleman, S. Baugher, K. L. Gleason, H. Gottfried, A. Hammer, P. Horrigan, R. Jaenson, D. W. Krall, L. J. Mirin, A. Okigbo, R. T. Trancik, P. J. Trowbridge, R. Venables.

Landscape Architecture offers a three-year master of landscape architecture license qualifying degree, administered through the Graduate School, for those who have a four-year undergraduate degree in another field. The major is composed of several parts: core courses related to professional education in landscape architecture; a concentration in a subject related to the core courses; and free electives.

Requirements of the three-year M.L.A. curriculum include 90 credits, six resident units, satisfactory completion of the core curriculum courses, and a thesis or a capstone studio.

The department also offers a two-year master of landscape architecture advanced degree program, administered through the Graduate School, for those with accredited degrees in landscape architecture or architecture. The two-year program entails core courses in the discipline and the development of concentrations in subject-matter areas such as landscape history and theory, landscape ecology and urban horticulture, the cultural landscape, site/landscape and art, or urban design.

Both of these degrees are accredited by the Landscape Architecture Accreditation Board (LAAB) of the American Society of Landscape Architects.

**Dual-Degree Options**

Graduate students can earn a master of landscape architecture and a master of science (horticulture) or a master of city and regional planning simultaneously. Students need to be accepted into both fields of study to engage in a dual-degree program and must fulfill requirements of both fields of study. Thesis requirements are generally integrated for dual degrees.

**Course Information**

Note: All of the following courses are offered through the College of Agriculture and Life Sciences except LANAR 497, 524, and 525.

**LA 140(1400) The Symbols of New York State's Cultural Landscape**

Spring. 3 credits.

**LA 141(1410) Grounding in Landscape Architecture**

Fall. 4 credits.

**LA 142(1420) Grounding in Landscape Architecture**

Spring. 4 credits.

**LA 155(1550) American Indian Cultural Landscapes: Changes in Time**

Fall. 3 credits.

**LA 201(2010) Medium of the Landscape**

Fall. 5 credits.

**LA 202(2020) Medium of the Landscape**

Spring. 5 credits.

**LA 215(2150) Sophomore Seminar: Engaging Places**

Fall. 4 credits.

**LA 252(2520) Daily Life in Ancient Israel**

Spring. 3 credits.

**LA 261(2610) Fieldwork in Urban Archaeology (also CRP 261[2610])**

Fall. 4 credits.

**LA 262(2620) Laboratory in Landscape Archaeology (also ARKEO 262[2620])**

Spring. 3 credits.

**[LA 263(2630) American Indians, Planners, and Public Policy (also CRP 363/547[3630/5470], LA 547[5470])**

Not offered 2006–2007.]

**LA 266(2660) Jerusalem through the Ages**

Fall. 3 credits.

**LA 282(2820) Photography and the American Landscape Architecture**  
Fall. 3 credits.

**LA 301(3010) Integrating Theory and Practice I**  
Fall. 5 credits.

**LA 315(3150) Site Engineering I**  
Spring. 3 credits.

**LA 316(3160) Site Engineering II**  
Fall. 2 credits.

**LA 318(3180) Site Construction**  
Spring. 5 credits.

**[LA 360(3600) Pre-Industrial Cities and Towns of North America (also CRP 360/666[3600/6660], LA 666[6660])**  
Not offered 2006-2007.]

**LA 401(4010) Advanced Synthesis: Project Design**  
Fall. 5 credits.

**LA 402(4020) Integrating Theory and Practice II**  
Spring. 5 credits.

**LA 403(4030) Directed Study: The Concentration (also LA 603[6030])**  
Fall or spring. 1 credit.

**LA 410(4100) Computer Applications in Landscape Architecture**  
Fall or spring. 3 credits.

**LA 412(4120) Professional Practice**  
Spring. 1 credit.

**LA 418(4180) Audio Documentary: History/Sound/Landscape**  
Spring. 3 credits.

**[LA 483(4830) Seminar in Landscape Studies**  
Not offered 2006-2007.]

**LA 486(4860) Placemaking by Design: Theory Seminar**  
Fall. 3 credits.

**LA 491(4910) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also HORT 491[4910])**  
Fall. 4 credits.

**LA 492(4920) Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment**  
Spring. 4 credits.

**LA 494(4940) Special Topics in Landscape Architecture**  
Fall or spring. 1-3 credits.

**LA 495(4950) Green Cities (also CRP 384/584[3840/5840])**  
Fall. 4 credits.

**LANAR 497(4970) Individual Study in Landscape Architecture**  
Spring. 1-5 credits; may be repeated for credit. S-U grades optional. L. J. Mirin.  
Work on special topics by individuals or small groups.

**LA 498(4980) Undergraduate Teaching**  
Fall or spring. 1-2 credits.

**LA 499(4990) Undergraduate Research**  
Fall or spring. 1-5 credits.

**LA 501(5010) Composition and Theory**  
Fall. 5 credits.

**LA 502(5020) Composition and Theory**  
Spring. 5 credits.

**LA 505(5050) Graphic Communication I**  
Fall. 3 credits.

**LA 506(5060) Graphic Communication II**  
Spring. 3 credits.

**LANAR 524(5240) History of European Landscape Architecture**  
Fall. 3 credits. L. Mirin.  
Survey from classical times to the present, emphasizing design principles and techniques that have established the landscape architecture tradition in Europe. Particular reference is made to the manner in which gardens, streets, plazas, parks, and new towns reflect in their built form, a range of responses to demands of culture, economics, technology, security, the law, and ecology.

**LANAR 525(5250) History of American Landscape Architecture**  
Spring. 3 credits. L. Mirin.  
Landscape architecture in the United States from Jefferson to the present is examined as a unique expression of the American experience. Influences exerted by the physical landscape, the frontier and utopian spirit, and the cultural assumptions of democracy and capitalism are traced as they affect the forms of urban parks, private and corporate estates, public housing, transportation planning, national parks, and other open-space designs.

**LA 545(5450) The Parks and Fora of Imperial Rome**  
Spring. 3 credits.

**[LA 547(5470) Americans, Indians, Planners, and Public Policy (also CRP 363/547[3630/5470], LA 263[2630])**  
Not offered 2006-2007.]

**[LA 569(5690) Archaeology in Preservation Planning and Site Design (also CRP 569[5690])**  
Spring. 3 credits. Not offered 2006-2007.]

**LA 580(5800) Landscape Preservation: Theory and Practice**  
Fall. 3 credits.

**LA 582(5820) Photography and the American Landscape Architecture**  
Fall. 3 credits.

**LA 590(5900) Theory Seminar**  
Spring. 3 credits.

**LA 598(5980) Graduate Teaching**  
Fall or spring. 1-2 credits.

**LA 601(6010) Integrating Theory and Practice I**  
Fall. 5 credits. Prerequisite: graduate standing.

**LA 602(6020) Integrating Theory and Practice II**  
Spring. 5 credits. Prerequisite: graduate standing.

**LA 603(6030) Directed Study: The Concentration (also LA 403[4030])**  
Fall or spring. 1 credit.

**LA 605(6050) Sound and Landscape Architecture**  
Fall. 1 credit.

**LA 615(6150) Site Engineering I**  
Spring. 3 credits.

**LA 616(6160) Site Engineering II**  
Fall. 2 credits.

**LA 618(6180) Site Construction**  
Spring, weeks 8-15. 5 credits.

**[LA 666(6660) Pre-Industrial Cities and Towns of North America (also CRP 360/666[3600/6660], LA 260[2600])**  
Not offered 2006-2007.]

**LA 680(6800) Graduate Seminar in Landscape Architecture**  
Fall or spring. 1-3 credits.

**LA 694(6940) Special Topics in Landscape Architecture**  
Fall or spring. 1-3 credits.

**LA 701(7010) Urban Design and Planning: Designing Cities in the Electronic Age (also CRP 555[5550])**  
Fall. 5 credits.

**LA 702(7020) Advanced Design Studio**  
Spring. 5 credits.

**LA 800(8000) Master's Thesis in Landscape Architecture**  
Fall or spring. 9 credits.

## FACULTY ROSTER

Azis, Iwan, Ph.D., Cornell U. Visiting Prof., City and Regional Planning.  
Baugher, Sherene, Ph.D., SUNY, Stony Brook. Visiting Prof., City and Regional Planning.  
Beneria, Lourdes, Ph.D., Columbia U. Prof., City and Regional Planning.  
Bertoia, Roberto, M.F.A., Southern Illinois U. Assoc. Prof., Art.  
Blum, Zevi, B. Arch., Cornell U. Prof. Emeritus, Art.  
Booth, Richard S., J.D., George Washington U. Prof., City and Regional Planning.  
Bowman, Stanley J., M.F.A., U. of New Mexico. Prof. Emeritus, Art.  
Chi, Lily H., Ph.D., McGill U. (Canada). Assoc. Prof., Architecture.  
Christopherson, Susan M., Ph.D., U. of California, Berkeley. Prof., City and Regional Planning.  
Chusid, Jeffrey, M.Arch., U. of California, Berkeley. Assoc. Prof., City and Regional Planning.  
Clavel, Pierre, Ph.D., Cornell U. Prof., City and Regional Planning.  
Colby, Victor E., M.F.A., Cornell U. Prof. Emeritus, Art.  
Crump, Ralph W., B. Arch., Cornell U. Prof. Emeritus, Architecture.  
Cruvellier, Mark R., M.Eng., Ph.D., McGill U. (Canada). Assoc. Prof., Architecture.  
Curry, Milton S. F., M. Arch., Harvard U. Assoc. Prof., Architecture.  
Czamanski, Stan, Ph.D., U. of Pennsylvania. Prof. Emeritus, City and Regional Planning.  
Daly, Norman, M.A., Ohio State U. Prof. Emeritus, Art.  
Davis, Felecia, M. Arch., Princeton U. Asst. Prof., Architecture.  
Drennan, Matthew P., Ph.D., New York U. Prof., City and Regional Planning.  
Evelt, Kenneth W., M.A., Colorado Coll. Prof. Emeritus, Art.  
Forester, John, Ph.D., U. of California, Berkeley. Prof., City and Regional Planning.  
Goehner, Werner H., M. Arch., Cornell U. Prof., Architecture.  
Goldsmith, William W., Ph.D., Cornell U. Prof., City and Regional Planning.

- Greenberg, Donald P., Ph.D., Cornell U. Prof., Architecture
- Hascup, George E., B. Arch., U. of California, Berkeley. Prof., Architecture
- Hubbell, Kent L., M.F.A.S., Yale U. Prof., Architecture
- Isard, Walter, Ph.D., Harvard U. Prof. Emeritus, City and Regional Planning
- Kira, Alexander, M.R.P., Cornell U. Prof. Emeritus, Architecture
- Kord, Victor, M.F.A., Yale U. Prof. Emeritus, Art
- Kudva, Neema, Ph.D., U. of California, Berkeley. Asst. Prof., City and Regional Planning
- Lasansky, D. Medina, Ph.D., Brown U. Asst. Prof., Architecture
- Levitte, Yael, Ph.D., U. of Toronto (Canada). Visiting Lec., City and Regional Planning
- Lewis, David B., Ph.D., Cornell U. Prof., City and Regional Planning
- Locey, Jean N., M.F.A., Ohio U. Prof., Art
- Lynch, Barbara, Ph.D., Cornell U. Visiting Assoc. Prof., City and Regional Planning
- MacDougall, Bonnie G., Ph.D., Cornell U. Assoc. Prof., Architecture
- Mackenzie, Archie B., M. Arch., U. of California, Berkeley. Assoc. Prof., Architecture
- McGrain, Todd V., M.F.A., U. of Wisconsin. Asst. Prof., Art
- Meyer, Elisabeth H., M.F.A., U. of Texas. Assoc. Prof., Art
- Mikus, Eleanore, M.A., U. of Denver. Prof. Emeritus, Art
- Miller, John C., M. Arch., Cornell U. Prof. Emeritus, Architecture
- Mirin, Leonard J., M.L.A., U. of Michigan. Assoc. Prof., Landscape Architecture
- Mostafavi, Mohsen, AADipl, Architectural Assoc., School of Arch., London (England)
- Mulcahy, Vincent J., M. Arch., Harvard U. Assoc. Prof., Architecture
- Ochshorn, Jonathan, M.Urb.Des., City Coll. of New York. Assoc. Prof., Architecture
- Olpadwala, Porus, Ph.D., Cornell U. Prof., City and Regional Planning
- Otto, Christian F., Ph.D., Columbia U. Prof., Architecture
- Ovaska, Arthur, M. Arch., Cornell U. Assoc. Prof., Architecture
- Page, Gregory, M.F.A., U. of Wisconsin. Assoc. Prof., Art
- Pearman, Charles W., B. Arch., U. of Michigan. Prof. Emeritus, Architecture
- Pendall, Rolf, Ph.D., U. of California, Berkeley. Prof., City and Regional Planning
- Perlus, Barry A., M.F.A., Ohio U. Assoc. Prof., Art
- Poleskie, Stephen F., B.S., Wilkes Coll. Prof. Emeritus, Art
- Reardon, Kenneth, Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
- Reps, John W., M.R.P., Cornell U. Prof. Emeritus, City and Regional Planning
- Richardson, Henry W., M.R.P., Cornell U. Prof., Architecture
- Saltzman, Sid, Ph.D., Cornell U. Prof. Emeritus, City and Regional Planning
- Schack, Mario L., M. Arch., Harvard U. Arthur L. and Isabel B. Wiesenberger Prof. Emeritus, Architecture
- Seraji, Nasrine, Dipl. Arch., Architectural Assoc. School of Arch. London (England). Prof., Architecture
- Shaw, John P., M. Arch., Massachusetts Inst. of Technology. Prof. Emeritus, Architecture
- Simitch, Andrea, B. Arch., Cornell U. Assoc. Prof., Architecture
- Singer, Arnold, Prof. Emeritus, Art
- Sinton, Ruth, D.Ed., Pennsylvania State U. Lec., City and Regional Planning
- Spector, Buzz, M.F.A., U. of Chicago. Prof., Art
- Squier, Jack L., M.F.A., Cornell U. Prof. Emeritus, Art
- Stein, Stuart W., M.C.P., Massachusetts Inst. of Technology. Prof. Emeritus, City and Regional Planning
- Taft, W. Stanley, M.F.A., California Coll. of Arts and Crafts. Assoc. Prof., Art
- Tomlan, Michael A., Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
- Trancik, Roger T., M.L.A.-U.D., Harvard U. Prof., Landscape Architecture/City and Regional Planning
- Ungers, O. Mathias, Diploma, Technical U. Karlsruhe (Germany). Prof. Emeritus, Architecture
- Vietorisz, Thomas, Ph.D., Massachusetts Inst. of Technology. Adjunct Prof., City and Regional Planning
- WalkingStick, Kay, M.F.A., Pratt Inst. Emeritus Prof., Art
- Warke, Val K., M. Arch., Harvard U. Assoc. Prof., Architecture
- Warner, Mildred, Ph.D., Cornell U. Asst. Prof., City and Regional Planning
- Wells, Jerry A., B. Arch., U. of Texas. Prof., Architecture
- Woods, Mary N., Ph.D., Columbia U. Assoc. Prof., Architecture
- Zissovici, John, M. Arch., Cornell U. Assoc. Prof., Architecture



## BIOLOGICAL SCIENCES

The biology major provides a unified curriculum for undergraduates enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. Courses in biological sciences are integral to many disciplines and are basic requirements in many schools and colleges at Cornell.

Graduate study in the biological sciences is administered by more than 15 specialized fields within the Graduate School, as described in the Fields of Study catalog at [www.gradschool.cornell.edu/?p=38](http://www.gradschool.cornell.edu/?p=38).

### ORGANIZATION

Many different departments participate in the biology major.

Student services are provided by the Office of Undergraduate Biology (OUB), [www.biology.cornell.edu](http://www.biology.cornell.edu). Located in Stimson Hall, the professional and student advisors provide academic and career advising, as well as help undergraduates find research opportunities on campus. Advisors in the OUB also follow the progress of biology majors and work closely with faculty advisors. Additional services and resources of the Biology Center include tutoring, lecture tapes, examination files, and extensive information on summer research opportunities and graduate programs. The center has comfortable areas for studying and relaxing.

The Shoals Marine Laboratory, a cooperative venture with the University of New Hampshire, is located on Appledore Island in the Gulf of Maine. Its base office in Stimson Hall provides academic advising for students interested in the marine sciences and administers the SEA Semester program for Cornell students pursuing studies at Woods Hole, Mass., or aboard the schooner *Robert C. Seamans* or brigantine *Corwith Cramer*.

### DISTRIBUTION REQUIREMENT

In the College of Agriculture and Life Sciences, the Physical and Life Sciences distribution requirement is a minimum of 18 credits, including at least 6 credits of introductory biology satisfied by BIO G 109–110, 105–106, or 101 and 103 plus 102 and 104, or 107–108.

For students in the College of Arts and Sciences, all biology ("BIO") courses can be used toward fulfillment of the biological sciences distribution requirement except *BIO G 200* (unless permission is obtained), *BIO G 209*, or *BIO SM 204*. The following courses are especially suitable for the distribution requirement because they have no prerequisites: BIO G 101–104, 105–106, 107–108, 109–110, 170; BIO AP 212; BIO EE 154, 207, 275; BIO GD 184; BIO MI 192; BIO NB 111; BIO PL 240, 241.

In the College of Human Ecology, the natural sciences distribution requirement is for at least

6 credits selected from BIO G 109–110, 101 and 103 plus 102 and 104, 105–106 or 107–108 or from specified courses in chemistry or physics.

Switching between BIO G 109–110 and either BIO G 101–104 or 105–106 at midyear may not be possible because of variation in presentation of topics. Students must receive permission of the instructor to switch sequences. Taking sequences in reverse order is strongly discouraged in BIO G 101–104.

### USE OF ANIMALS IN THE BIOLOGICAL SCIENCES CURRICULUM: CORNELL UNIVERSITY

Students wishing to enroll in biology ("BIO") courses should know and understand the following criteria relative to the use of animals in the teaching program, as passed by the faculty of the Division of Biological Sciences in 1988, and reaffirmed in 1997:

1. "Live animals will be used for teaching in certain courses in the biological sciences. Some animals will require humane euthanasia after they have been used for teaching."
2. Courses bearing the "BIO" description conform to the rules for the care of such animals as outlined in *Guiding Principles in the Care and Use of Animals* (as approved by the Council of the American Physiological Society), the Guide for the Care and Use of Laboratory Animals (DHEW publication 86–23, revised 1996; see p. 7, *Courses of Study*), the Animal Welfare Act, and the New York State Public Health Law. Within these regulations, and in keeping with the principle of Academic Freedom of the Faculty, the use of animals to aid in teaching any biological sciences discipline is at the discretion of the professor in charge.
3. Each course, as well as research projects, in which animals are used receives a formal review annually by the Cornell University Institutional Animal Care and Use Committee (IACUC).
4. Any concerns regarding the use of live animals in teaching should be addressed first to the faculty member responsible for that course. He or she is required to be in compliance with all applicable regulations and guidelines. Alternatively, students may choose to address their concerns to the director of the Cornell Center for Research Animal Resources, Dr. Michele Bailey, at 253–3520. The director may initiate discussion with the faculty member responsible for a particular course without involving the student if he or she would prefer to remain anonymous.

5. Enrollees in those courses in the biological sciences in which animal use is a component may, at the professor's discretion, be asked to sign copies of this statement (USE OF ANIMALS . . .) at the first meeting of the course."

### ADVANCED PLACEMENT

For information on credit for advanced placement in biological sciences, see [www.biology.cornell.edu/advising/ap.html](http://www.biology.cornell.edu/advising/ap.html).

### THE MAJOR

The major of biological sciences is available to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. The undergraduate program is coordinated for students in both colleges by the Office of Undergraduate Biology. By completion of the sophomore year, all students who intend to major in biological sciences must declare the major and a program of study through the Office of Undergraduate Biology, in 216 Stimson Hall.

Whenever possible, students should include the introductory biology, chemistry, and mathematics sequences in their freshman schedule and complete the organic chemistry lecture course in their sophomore year. Biology majors should regularly monitor their progress in the major, and should assess as realistically as possible the likelihood of achieving at a level that is consistent with their academic and personal goals. Weak performance in core courses, particularly after the freshman year, may indicate a need to reevaluate aptitude and genuine interest in the major. Students with questions, particularly with concerns about their ability to complete the major, are encouraged to consult with their biology advisor and to take advantage of the advising and counseling resources of the Office of Undergraduate Biology as well as those of the university and their college.

The requirements for the biological sciences major are listed below. Requirements 1–9 must be taken for a letter grade. Courses taken for the program of study should be taken for a letter grade unless the course is offered for S–U grades only or if the student's advisor grants permission.

1. **Introductory biology for majors** (one year): BIO G 101 and 103 plus 102 and 104, or 105–106. BIO G 107–108, offered during the eight-week Cornell summer session for 8 credits, also satisfies the introductory biology requirement for majors.
2. **General chemistry**: CHEM 207–208 or 215. Students who, via advanced placement, take only CHEM 208 or only 215 should be aware that some professional and graduate schools require 8 credits of general chemistry.

These students may wish to take both CHEM 215 and 208 or 215 and 216. Students may wish to consult with their faculty advisor or advisors in the Office of Undergraduate Biology for further clarification.

3. **College mathematics** (one year): one semester of calculus (MATH 106, 111, 191, or their equivalent) plus one semester selected from the following:
  - a. a second semester of calculus (MATH 112, 192, or their equivalents).
  - b. a course in finite mathematics (BTRY 101, 417, MATH 105, 231).
  - c. a course in statistics (BTRY 301, MATH 171, AEM 210, ILR 212, PSYCH 350, PAM 210, ECON 319, ECON 321, SOC 301).
4. **Organic chemistry**: CHEM 257 and 251, or 357–358 and 251, or 357–358 and 301, or 359–360 and 251, or 359–360 and 301.
5. **Physics**: PHYS 101–102, 207–208,\* or 112–213.\* Those who take PHYS 112–213 are advised to complete PHYS 214 as well.
6. **Genetics**: BIOGD 281.
7. **Biochemistry**: BIOBM 330, or 331 and 332, or 333.
8. **Evolutionary Biology**: BIOEE 278 or BIOPL 448. Note: BIOPL 241 Botany is a prerequisite course to BIOPL 448.
9. **A program of study** selected from the outline below.

Although not required for the biological sciences major, a course in statistics is recommended for students planning graduate study or a research career. Students should consult their faculty advisors when choosing appropriate courses in statistics.

Note: Core courses cannot count toward the program of study requirements.

## Programs of Study and Requirements

As noted in the list of requirements above, students accepted into the biological sciences major must choose a program of study. Whereas the core requirements of the biology curriculum provide the common foundation deemed essential for all biology majors, the role of the program of study is to provide either a concentration in a particular area of biology or, in the case of the general biology program of study, a survey of biology that is broad but not superficial. The program of study requirement can be met by taking 13 to 15 credit hours of courses chosen by the student in consultation with his or her biology advisor. Programs of study for particular subject areas are designed by faculty members specializing in the subject. Typically, the program of study consists of one or more courses that provide foundation in the subject and a list of optional courses from that area or related areas, many of which are at an advanced level (300 or higher). Because biology is an experimental science, most programs of study require one or more laboratory courses. The laboratory requirement in some programs of study can be met by participation in the independent research course (BIO G 499). The possible

programs of study and their requirements are listed below:

1. **Animal Physiology**: BIOAP 311  
Introductory Animal Physiology, BIOAP 316 Cellular Physiology, plus a minimum of 7 credit hours selected from the following lecture and laboratory courses, of which at least 4 credit hours must be a laboratory course.
  - a. Lecture courses: BEE 454 Physiological Engineering; AN SC 300 Animal Reproduction and Development; AN SC 410 Nutritional Physiology and Metabolism; AN SC 427 Fundamentals of Endocrinology; BIO G 305 Basic Immunology; BIOAP 214 Biological Basis of Sex Differences; BIOAP 458 Mammalian Physiology; BIOBM 407 Nature of Sensing and Response: Signal Transduction in Biological Systems; BIOBM 437 Eukaryotic Cell Proliferation; BIOGD 385 Developmental Biology; BIOGD 400 A Genomics Approach to Studying Life; BIOGD 401 Genomic Analysis; BIOGD 483 Molecular Aspects of Development; BIONB 322 Hormones and Behavior; BIONB 325 Neurodiseases-Molecular Aspects; BIONB 326 The Visual System; BIONB 492 Sensory Function; NS 331 Physiological and Biochemical Bases of Human Nutrition.
  - b. Laboratory courses: BEE 454 Physiological Engineering; AN SC 301 Animal Reproduction and Development; BIO G 401 Introduction to Scanning Microscopy; BIO G 403 Transmission Electron Microscopy for Biologists; BIOAP 413 Histology: The Biology of the Tissues; BIOAP 319 Animal Physiology Laboratory; BIOAP 416 Cellular Physiology and Genomics Laboratory; BIOBM 440 Laboratory in Biochemistry and Molecular Biology; BIONB 491 Principles of Neurophysiology.
2. **Biochemistry**: BIOBM 440 Laboratory in Biochemistry and Molecular Biology; physical chemistry (CHEM 287–288 or 389–390 or 389–288); 6 credits of organic chemistry (CHEM 357–358 or CHEM 359–360); plus one of the following two alternatives. Students wanting to maximize their background in chemistry should take CHEM 300 Quantitative Chemistry and CHEM 301 Honors Experimental Chemistry I. Students wanting to gain further depth in biochemistry and related disciplines should take BIOBM 432 Survey of Cell Biology and either CHEM 300 Quantitative Chemistry or CHEM 252 Elementary Experimental Organic Chemistry. Students choosing the first alternative are encouraged to take BIOBM 432.

Note: CHEM 288 is designed for biologists. Five hours of biochemistry are recommended (331 and 332, or 330 and 334 or 333 and 334). Students interested in graduate work in biochemistry should take PHYS 207–208 and should consider taking CHEM 389–390 and its prerequisites. They should be sure to complete CHEM 207–208 or 215–216 during their freshman year.

Note: Biology majors in the College of Agriculture and Life Sciences who select this program of study are allowed to take up to 61 credit hours in the endowed colleges because of the high number of required endowed courses for this program of study.

3. **Computational Biology**: Computation has become essential to biological research. Genomic databases, protein databanks, MRI images of the human brain, and remote sensing data on landscapes contain unprecedented amounts of detailed information that are transforming almost all of biology.

Problems investigated by computational biologists include topics as diverse as the genetics of disease susceptibility; comparing entire genomes to reveal the evolutionary history of life; predicting the structure, motions, and interactions of proteins; designing new therapeutic drugs; modeling the complex signaling mechanisms within cells; predicting how ecosystems will respond to climate change; and designing recovery plans for endangered species. The computational biologist must have skills in mathematics, statistics, and the physical sciences as well as in biology. A key goal in training is to develop the ability to relate biological processes to computational models. Cornell faculty work primarily in four subareas of computational biology: biomolecular structure, bioinformatics and data mining, ecology and evolutionary biology, and statistical and computational methods for modeling biological systems. Specific topics of study include DNA databases, protein structure and function, computational neuroscience, biomechanics, population genetics, and management of natural and agricultural systems.

Beyond core skills in mathematics, physical sciences, and biology, the computational biology program of study requires additional course work in mathematics and computer programming, a “bridging” course aimed at connecting biology to computation, and an advanced course where the theoretical/computational component of one aspect of biology is studied. Students should enroll in the more rigorous courses in the physical and mathematical sciences and may wish to take additional courses in these areas.

Computational biology has applications as broad as biology itself. The problems of interest and the tools available to study them are constantly evolving, so students are encouraged to gain fundamental skills that will serve them throughout their careers. There is great, and increasing, demand for research scientists and technical personnel who can bring mathematical and computational skills to the study of biological problems. The program is also an excellent preparation for graduate study in any area of biology or computational biology.

## Required Courses for Program of Study in Computational Biology

- a. One course in computer programming (COM S 100 Introduction to Computer Programming or BEE 151 Introduction to Computing)

- b. One additional course in mathematics (MATH 221 Linear Algebra and Calculus; or MATH 231 Linear Algebra; or MATH 294 Engineering Mathematics II; or MATH 420 Differential Equations and Dynamical Systems; or BTRY 408 Theory of Probability; or BTRY 421 Matrix Computation)
- c. A bridging course, i.e., a course in mathematical modeling applied to biology (BIOEE 362 Dynamic Models in Biology; BIOEE 460 Theoretical Ecology; COM S 321/BIOBM 321, Numerical Methods in Computational Molecular Biology; BTRY 382 Introduction to Statistical Genomics and Bioinformatics, BTRY 494 Quantitative Genetics, or COM S 428 Introduction to Computational Biophysics)
- d. One course from the following list of advanced courses:

AN SC 420 Quantitative Animal Genetics; BIOBM 631 Protein Structure and Function; BIOGD 481 Population Genetics; BIOGD 484 Molecular Evolution; BIOGD 487 Human Genomics; BIOEE 460 Theoretical Ecology; BIONB 330 Introduction to Computational Neuroscience; BIONB 422 Modeling Behavioral Evolution; BIOPL 440 Phylogenetic Systematics; BTRY 408 Theory of Probability; BTRY 482/682 Statistical Genomics; BTRY 494 Quantitative Genetics; BTRY 652 Computationally Intensive Statistical Inference; CIS 409 Data Structures and Algorithms for Computational Science; COM S 211 Computers and Programming; COM S 426 Introduction to Computational Biology; COM S 626 Computational Molecular Biology; COM S 627 Computational Biology: The Machine Learning Approach; MATH 420 Differential Equations and Dynamical Systems; NTRES 310 Applied Population Ecology; NTRES 411 Quantitative Ecology of Fisheries; NTRES 412 Wildlife Population Analysis: Techniques and Models; NTRES 670 Spatial Statistics; OR&IE 360 Engineering Probability and Statistics II; OR&IE 361 Introductory Engineering Stochastic Processes

#### Notes

- It is strongly recommended that students complete the Core physics requirement using the PHYS 207-208 option.
- It is strongly recommended that students complete the Core organic chemistry requirement using the CHEM 257/251 option and that the time saved be used to take either COM S 211 or a second mathematics course from the list above
- MATH 221 Linear Algebra and Calculus, MATH 231 Linear Algebra, MATH 294 Engineering Mathematics II, or BTRY 421 Matrix Computation is recommended for bridging course COM S 321/BIOBM 321. MATH 221 Linear Algebra and Calculus, MATH 231 Linear Algebra, or MATH 420 Differential Equations and Dynamical Systems is recommended for bridging course BIOEE 460.

- Courses may not be used to simultaneously satisfy two different requirements. For example, BTRY 408 can be used to satisfy either requirement (2) or requirement (4), but not both.
  - Students who use BTRY 408 to fulfill the additional mathematics requirement should not use OR&IE 360 Engineering Probability and Statistics II to fulfill the requirement for an advanced course.
  - Biology majors in the College of Agriculture and Life Sciences who select this program of study are allowed to take up to 61 credit hours in the endowed colleges due to the high number of required endowed courses for this program of study.
4. **Ecology and Evolutionary Biology:** BIOEE 261 Ecology and the Environment. *Effective fall semester 2005*, new students must also complete 10 credits from the following lists: (a) Principles, (b) Organisms, and (c) Ecological and Evolutionary Processes. One course must be chosen from list (a) and a second either from list (b) or (c). The remaining credits can be satisfied with courses from all three lists. Students are encouraged to take at least one course from each list.

- a. Principles: BIOEE 453 Speciation; BIOEE 458 Community Ecology; BIOEE 460 Theoretical Ecology; BIOEE 464 Macroevolution; ENTOM 470 Ecological Genetics; BIOEE 478 Ecosystem Biology; NTRES 310 Applied Population Ecology.
- b. Organisms: BIOEE 274 The Vertebrates: Structure, Function, and Evolution; BIOEE 373 Biology of the Marine Invertebrates or BIOSM 376 Marine Invertebrate Zoology; BIOEE 450 and 451 Mammalogy, lec and lab; BIOEE 470 and 472 Herpetology lec and lab; BIOEE 475 Ornithology; BIOEE 476 Biology of Fishes; ENTOM 212 Insect Biology; BIOPL 241 Introductory Botany; BIOPL 448 Plant Evolution and the Fossil Record; PL PA 309 Fungi; BIOSM 449 Seaweeds, Plankton, and Seagrass.
- c. Ecological and Evolutionary Processes: BIOEE 263 Field Ecology; BIOEE 275 Human Biology and Evolution; BIOEE/EAS 350 Dynamics of Marine Ecosystems; BIOEE/MATH 362 Dynamic Models in Biology; BIOEE 446 Plant Behavior—Induced Plant Responses to Biotic Stresses; BIOEE/ENTOM 455 Insect Ecology; BIOEE/NTRES 456 Stream Ecology; BIOEE 457 and 459 Limnology: Ecology of Lakes, lec and lab; BIOEE/EAS 462 Marine Ecology; BIOEE 463 and 465 Plant Ecology and Population Biology, lec and lab; BIOEE 466 and 468 Physiological Plant Ecology, lec and lab; BIOEE/HORT 473 Ecology of Agricultural Systems; NTRES 420 Forest Ecology; BIOSM 413 Research in Marine Biology; NTRES 422 and 423 Wetland Ecology and Management, lec and lab; BIOMI 418 Microbial Ecology; CSS/HORT 466 Soil Ecology; BIOPL/ENTOM 440 Phylogenetic Systematics; BIOPL 447 Molecular Systematics;

BIOPL/ENTOM 453 Principles and Practice of Historical Biogeography; BIOEE/EAS 479 Paleobiology; BIOGD 484 Molecular Evolution.

Note: Students also are encouraged to gain experience in some aspect of field biology through course work at a biological field station and can apply up to 6 credits in the place of courses from lists (b) or (c). For example, students may apply 6 credits from the following courses taken at the Shoals Marine Laboratory (BIOSM): BIOSM 308 Marine Microbial Ecology; BIOSM 309 Climates and Ecosystems; BIOSM 310 Marine Symbiosis; BIOSM 374 Field Ornithology; BIOSM 377 Diversity of Fishes; BIOSM 477 Marine Vertebrates; and BIOSM courses in lists b and c. The Ecology and Evolutionary Biology program offers a specialization in Marine Biology and Oceanography (for a description, see "Courses in Marine Science"). The Organization for Tropical Studies (OTS) offers an Undergraduate Semester Abroad Program, featuring two courses (Fundamentals in Tropical Biology and Field Research in Tropical Biology) that can count as two 3-credit courses toward the concentration. Six credits can be applied from the 15-week fall "Semester in Environmental Science" program offered by the Woods Hole Marine Biological Laboratory.

- 5. **General Biology:** The program of study in general biology requires a minimum of 13 credit hours in addition to courses counted toward requirements 1-10 on pages 152-153. These 13 credits must include:

- a. One course from each of three different programs of study in biology. Only those courses specifically listed as fulfilling a program of study requirement are acceptable without permission of advisor.
- b. A course with a laboratory.
- c. A minimum of two upper-level (300 and above) courses of 2 or more credits each.

100-level courses are not acceptable for meeting any of these requirements. BIO G 498 may not be used to fulfill the requirements of this program of study. BIO G 499 (minimum of 2 credits, but no more than 3 credits) may count as one of the upper-level courses, and may count as the laboratory course with approval of the advisor, but it cannot count as a course representing a program of study.

Note: It is possible to use a single course to fulfill more than one requirement. For example, BIOAP 413 Histology could count in all three areas: as a course in the Animal Physiology program of study, as an upper-level course, and as a course with a lab.

- 6. **Genetics and Development:** A minimum of 13 credits, usually chosen from the following courses: BIOGD 385 Developmental Biology; BIOGD 400 A Genomics Approach to Studying Life; BIOGD 401 Genomics Analysis; BIOGD 450 Vertebrate Development; BIOGD

480 Seminar in Developmental Biology; BIOGD 481 Population Genetics; BIOGD 482 Human Genetics and Society; BIOGD 483 Advanced Developmental Biology; BIOGD 484 Molecular Evolution; BIOGD 486 Advanced Eukaryotic Genetics; BIOGD 487 Human Genomics; BIOGD 489 Mammalian Embryology; BIOGD 490 Manipulating the Mouse Genome; BIOGD 610–624 Genomics Modules; BIOGD 640 Stem Cell Biology; BIOGD 682 Fertilization and the Early Embryo; BIOGD 684 Advanced Topics in Population Genetics; BIOGD 687 Developmental Genetics; BIOGD 689 Cellular Basis of Development; BIOMI 420 Microbial Genomics; BIOMI 485 Bacterial Genetics; ENTOM 400 Insect Development; BIOAP 475 Mechanisms Underlying Mammalian Developmental Defects; BIONB 493 Developmental Neurobiology; BIONB 495 Molecular and Genetic Approaches to Neuroscience; BIOBM 437 Cell Proliferation and Senescence; BIOBM 439 Molecular Basis of Human Disease; NS 608 Epigenetics; BIOBM 633 Biosynthesis of Macromolecules; BIOBM 639 The Nucleus; BIOEE 453 Speciation; PL BR 403 Genetic Improvement of Crop Plants; PL BR 606 Advanced Plant Genetics; BIOPL 343 Molecular Biology and Genetic Engineering of Plants; BIOPL 482 Plant Molecular Biology II; BIOPL 483 Plant Molecular Biology I; BIOPL 641 Laboratory in Plant Molecular Biology.

Up to 3 credits for this program of study may be chosen from other biological sciences courses, including BIO G 499 Independent Undergraduate Research in Biology, with approval from the faculty advisor.

7. **Insect Biology:** ENTOM 212 Insect Biology plus a minimum of three additional courses totaling at least 9 credits selected from the following two groups. At least one of the three additional courses must be selected from group a.

**Group a:** ENTOM 322 Insect Morphology; ENTOM 331 Introductory Insect Systematics; ENTOM 333 Larval Insect Biology; ENTOM 400 Insect Development; ENTOM 455 Insect Ecology; ENTOM 483 Insect Physiology

**Group b:** ENTOM 315 Spider Biology; ENTOM 325 Insect Behavior; ENTOM 344 Insect Conservation Biology; ENTOM 352 Medical and Veterinary Entomology; ENTOM 369 Chemical Ecology; ENTOM 370 Pesticides, Environment, and Human Health; ENTOM 394 Circadian Rhythms; ENTOM 443 Entomology and Pathology of Trees and Shrubs; ENTOM 444 Integrated Pest Management; ENTOM 452 Herbivores and Plants; ENTOM 453 Principles and Practice of Historical Biogeography; ENTOM 456 Stream Ecology; ENTOM 463 Invertebrate Pathology; ENTOM 470 Ecological Genetics; ENTOM 477 Biological Control; ENTOM 490 Insect Toxicology

8. **Microbiology:** Students in the Microbiology program of study must complete BIOMI 290 General Microbiology, Lec; BIOMI 291 General Microbiology, Lab. At least 8 additional credits are required, which must include at least one of the following courses: BIOMI 414 Bacterial Diversity; BIOMI 416

Bacterial Physiology; BIOMI 418 Microbial Ecology; BIOMI 485 Bacterial Genetics.

Additional approved courses are included in the list below. Students are invited to complete their requirements in one of three areas of interest (these are only recommended areas of interest; students can design their own course list as long as they meet the requirements described above): (a) Prokaryotic Biology, (b) Molecular Microbiology and Biotechnology, and (c) Pathogenic Microbiology. Courses acceptable to the program of study that cover topics related to a particular area of interest are:

**Prokaryotic Biology:** BIOMI 391 Advanced Microbiology Laboratory; BIOMI 414 Bacterial Diversity; BIOMI 416 Bacterial Physiology; and BIOMI 418 Microbial Ecology.

**Molecular Microbiology and Biotechnology:** BIOMI 391 Advanced Microbiology Laboratory; BIOMI 416 Bacterial Physiology; BIOMI 420 Microbial Genomics; BIOMI 485 Bacterial Genetics; and BIOMI 394 Applied and Food Microbiology.

**Pathogenic Microbiology:** BIOMI 404 Pathogenic Bacteriology and Mycology; BIOMI 409 Viruses and Disease; BIOMI 417 Medical Parasitology; and BIOMI 485 Bacterial Genetics.

9. **Molecular and Cell Biology:** CHEM 357–358 or 359–360; BIOBM 432 Survey of Cell Biology; BIOBM 440 Laboratory in Biochemistry and Molecular Biology, or BIONB 430 Experimental Molecular Neurobiology; and at least 7 additional credits of courses that have a cell biological or molecular biological orientation. The 7 additional hours should include at least two courses from the following list: BIOAP 416 Cellular Physiology and Genomics Laboratory; BIOBM 434 Applications of Molecular Biology; BIOBM 437 Regulation of Cell Proliferation, Senescence, and Death; BIOBM 439 Molecular Basis of Human Disease; BIO G 305 Immunology; BIOGD 385 Developmental Biology; BIOGD 400 A Genomics Approach to Studying Life; BIOGD 461 Development and Evolution; BIOGD 483 Advanced Developmental Biology; BIOGD 484 Molecular Evolution; BIOGD 486 Advanced Eukaryotic Genetics; BIOGD 487 Human Genomics; BIOGD 490 Manipulating The Mouse Genome; BIOMI 409 Principles of Virology; BIOMI 420 Microbial Genomics; BIOMI 485 Bacterial Genetics; BIONB 425 Molecular Neurophysiology; BIONB 495 Molecular and Genetic Approaches to Neurosciences; BIOPL 343 Molecular Biology and Genetic Engineering of Plants; BIOPL 347 Laboratory in Molecular Biology and Genetic Engineering of Plants; BIOPL 444 Plant Cell Biology. Students graduating in spring 2008 or earlier may include BIOMI 290 General Microbiology, Lec, and BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology. Graduate-level courses such as BIOBM 631 Protein Structure and Function; BIOBM 633 Biosynthesis of Macromolecules; BIOBM 636 Functional Organization of Eukaryotic Cells; and BIOBM 639 The Nucleus are also acceptable by permission of advisor. Five hours of biochemistry are

recommended (BIOBM 331 and 332, or 330 and 334, or 333 and 334). CHEM 207–208 or 215–216 should be completed in the freshman year.

10. **Neurobiology and Behavior:** The two-semester introductory course sequence Neurobiology and Behavior I and II (BIONB 221 and 222) with discussion section (4 credits per semester) and 7 additional credits. The 7 additional credits must include at least one ADVANCED COURSE from the BIONB offerings. "Topics" courses (BIONB 420s and 720s) and independent study (BIO G 499) may be used as supplemental credits but do not qualify as ADVANCED courses.

Note: Students who declare the program of study in Neurobiology and Behavior after taking BIONB 221 or 222 for only 3 credits must still take the 1-credit discussion section in BIONB 221 and 222. To arrange this, the student should consult the professors in charge of the two courses.

11. **Nutrition:** NS 331 Physiological and Biochemical Bases of Human Nutrition (4 credits) and at least 9 credits of additional course work in the biological aspects of nutrition, such as NS 222 Maternal and Child Nutrition; NS 315 Obesity and the Regulation of Body Weight; NS 332 Methods in Nutritional Sciences; NS 341 Human Anatomy and Physiology; NS 347 Human Growth and Development; NS 361 Biology of Normal and Abnormal Behavior; NS 421 Nutrition and Exercise; NS 431 Mineral Nutrition and Chronic Disease; NS 441 Nutrition and Disease; NS 452 Molecular Epidemiology and Dietary Markers of Chronic Diseases; NS 455 Nobel Prizes in Biomedical Research; NS 475 Mechanisms Underlying Mammalian Developmental Defects; NS 602 Lipids; NS 603 Mineral Nutrition: Metabolic, Health, and Environmental Aspects; and NS 614 Topics in Maternal and Child Nutrition. Some courses require NS 115 Nutrition Health and Society, which may be used as part of the additional 9 credits. Independent study credits cannot be used toward the 13-credit minimum.

Note: For students in the College of Agriculture and Life Sciences, credits in NS courses count toward the required 55 CALS credits. For students in the College of Arts and Sciences, NS credits will count toward the 100 hours required in A&S if those credits fulfill major requirements.

12. **Plant Biology:** Students choose one area of study from the following two options:

Option (a) Botany: Students are required to take BIOPL 241 Introductory Botany. Students should then choose, with the aid of their faculty advisor, a minimum of three of the following courses, for a total of at least 10 additional credits, to round out their botanical training: BIOPL 242 and 244 Plant Function and Growth, Lec and Lab; BIOPL 243 Taxonomy of Cultivated Plants; BIOPL 245 Plant Biology; BIOPL 247 Ethnobotany; BIOPL 248 Taxonomy of Vascular Plants; BIOPL 340 Methods in Biological and Biochemical Prospecting; BIOPL 342 and 344 Plant Physiology, Lec and Lab; BIOPL 343 and 347 Molecular Biology and Genetic Engineering of Plants, Lec and Lab; BIOPL 345 Plant Anatomy;



BIOPL 348 The Healing Forest; BIOPL 359 Biology of Grasses; BIOPL 380 Strategies and Methods in Drug Discovery; BIOPL 404 Crop Evolution, Domestication, and Diversity; BIOPL 422 Plant Development; BIOPL 440 Phylogenetic Systematics; BIOPL 442 Current Topics in Ethnobiology; BIOPL 444 Plant Cell Biology; BIOPL 447 Molecular Systematics; BIOPL 448 Plant Evolution and the Fossil Record; BIOPL 449 Green Signals and Triggers—The Plant Hormones; BIOPL 452/454 Systematics of Tropical Plants and Field Lab; BIOPL 453 Principles and Practice of Historical Biogeography; BIOPL 462 Plant Biochemistry; BIOEE 452 Herbivores and Plants; BIOEE 463 and 465 Plant Ecology and Population Biology, Lec and Lab; or BIOEE 466 and 468 Physiological Plant Ecology, Lec and Lab.

Option (b) Plant Biotechnology: Students are required to take BIOPL 343 and 347 Molecular Biology and Genetic Engineering of Plants, Lec and Lab. Students choose, in consultation with their faculty advisor, a minimum of 10 additional credits from the following list: BIOPL 241 Introductory Botany; BIOPL 242 and 244 Plant Function and Growth, Lec and Lab; BIOPL 342 and 344 Plant Physiology, Lec and Lab; BIOPL 422 Plant Development; BIOPL 444 Plant Cell Biology; BIOPL 462 Plant Biochemistry; BIOPL 482, 483 Plant Molecular Biology I and II modules; PL BR 401 Plant Cell and Tissue Culture; or PL BR 402 Plant Tissue Culture Laboratory.

13. **Systematics and Biotic Diversity:** A minimum of 13 credits from the following two groups, including at least 7 credits from group a and three from group b and at least two laboratory courses (marked with \*). BIO G 499, Independent Undergraduate Research in Biology, with approval of the advisor, can be used in fulfillment of up to 4 credits in group (a), and can count as one laboratory course if it has a laboratory component of 2 or more credits.

a. \*BIOEE 264 Tropical Field Ornithology; \*BIOEE 274 The Vertebrates: Structure, Function, and Evolution; BIOEE 371 Human Paleontology; \*BIOEE 373 Biology of the Marine Invertebrates; BIOEE 405 Biology of the Neotropics; BIOEE 470 Herpetology, Lec; \*BIOEE 471 Mammalogy; \*BIOEE 472 Herpetology, Lab; \*BIOEE 475 Ornithology; \*BIOEE 476 Biology of Fishes; BIOEE 477 Marine Invertebrates Seminar; BIOMI 290 General Microbiology, Lec; \*BIOMI 291 General Microbiology, Lab; BIOMI 414 Prokaryotic Diversity, Lec; \*BIOPL 241 Introductory Botany; \*BIOPL 243 Taxonomy of Cultivated Plants; \*BIOPL 245 Plant Biology; BIOPL 247 Ethnobiology; \*BIOPL 248 Taxonomy of Vascular Plants; BIOPL 348 The Healing Forest; BIOPL 359 Biology of Grasses; BIOPL 452 Systematics of Tropical Plants; \*BIOPL 454 Systematics of Tropical Plants: Field Laboratory; \*ENTOM 212 Insect Biology; ENTOM 215 Spider Biology: Life on a Silken Thread; ENTOM 315 Spider Biology; \*ENTOM 322 Comparative Insect Morphology;

\*ENTOM 331 Introductory Insect Systematics; \*ENTOM 333 Maggots, Grubs, and Cutworms: Larval Insect Biology; \*ENTOM 631 Systematics of the Coleoptera; PL PA 309 Introductory Mycology; \*PL PA 319 Field Mycology.

b. BIOEE 453 Speciation; BIOEE 464 Macroevolution; BIOEE 479 Paleobiology; \*BIOPL 440 Phylogenetic Systematics; BIOPL 442 Current Topics in Ethnobiology; BIOPL 447 Molecular Systematics; \*BIOPL 448 Plant Evolution and the Fossil Record; \*BIOPL 453 Principles and Practices of Historical Biogeography.

14. **Independent Option:** Students who want to undertake a course of study not covered by the existing programs of study may petition the Biological Sciences Curriculum Committee. Information on independent option and Curriculum Committee petition forms are available in the Office of Undergraduate Biology, 216 Stimson Hall.

### The Minor in Biological Sciences

The minor in biological sciences has been designed to provide students with a broad background in biology while allowing them some flexibility to choose courses of interest. Students must have completed one full year of introductory biology (or its equivalent) to declare the minor. Students will complete 12 to 15 credits by taking either all three biology core course requirements (listed below) or two biology core course requirements and 5 or more biology credits from the lists of approved program of study courses (found in *Courses of Study*) or from the following list of courses:

AN SC 300, 301, 410, 420, 427

BEE 454

BTRY 382, 482/682

COM S 426, 626, 627

CSS 421

EAS 350, 479

ENTOM 212, 213, 215, 315, 322, 325, 331, 333, 344, 352, 369, 370, 394, 400, 443, 444, 452, 453, 455, 456, 463, 470, 471, 477, 483, 490, 631

NS 222, 315, 331, 332, 341, 347, 361, 421, 431, 441, 452, 455, 475, 602, 603, 614

NTRES 305, 310, 411, 412, 418, 419, 608, 670

PL BR 401, 402, 403, 606

PL PA 309, 319

Biology core courses

1. Biochemistry: BIOBM 330, 333, or 331-332; one year of general chemistry and organic chemistry lecture (CHEM 257 or 357-358) are prerequisites
2. Evolutionary biology: BIOEE 278 or BIOPL 448
3. Genetics: BIOGD 281

Notes:

- BIO G 499 Independent Research may not be used to fulfill any requirement for the minor. No course substitutions are allowed. With the exception of transfer and study abroad students, no biology courses taken at other institutions will count toward the minor.

- All courses for the minor must be taken for a letter grade unless a course is offered S-U only.
- Applications for the minor are located in 216 Stimson Hall. See Bonnie Comella or Wendy Aquadro for academic advising and for certifying completion of the minor.

### Independent Research and Honors Program

Biology majors are encouraged to consider participating in individual research under the direction of a Cornell faculty member. Students interested in beginning research should contact faculty members who have compatible research interests. Information about faculty research interests and undergraduate research opportunities is available in the Office of Undergraduate Biology, 216 Stimson Hall, and at [www.biology.cornell.edu](http://www.biology.cornell.edu).

Faculty members may consider the student's previous academic accomplishments, interests and career goals, and the availability of space and equipment when agreeing to supervise a student in their laboratory. Students conducting research for the first time must enroll in BIO G 299, an S-U course designed to introduce students to research. After the first semester, students enroll in BIO G 499. Registration for both of these classes is done in the Office of Undergraduate Biology in 216 Stimson Hall. Students may work with faculty in any department on campus as long as the research topic is biological. Students may not earn credit for research done off campus, unless supervised by a Cornell faculty member. Up to 3 credits of research may be used to complete the program of studies in general biology, genetics and development, systematic and biotic diversity, as well as 4 credits in neurobiology and behavior.

The honors program in biological sciences is designed to offer advanced training in laboratory or field research through the performance of an original research project under the direct guidance of a member of the Cornell faculty. Applications for the honors program are available in the Office of Undergraduate Biology, 216 Stimson Hall, and must be submitted in October of the senior year to the Honors Program Committee by the announced deadline. To qualify for the program, students must have been accepted into the biological sciences major, have completed at least 30 credits at Cornell, and have a cumulative Cornell grade point average (GPA) of at least 3.0. In addition, students must have at least a 3.0 cumulative Cornell GPA in all biology, chemistry, mathematics, and physics courses. (Grades earned in courses in other departments that are used to fulfill biology major requirements are included in this computation.) In addition, candidates must find a Cornell faculty member to supervise their research. An honors candidate usually enrolls for credit in BIO G 499 Undergraduate Research in Biology under the direction of the faculty member acting as honors supervisor, although the honors program does not require enrollment for credit. Students accepted into the honors program are required to participate in honors research seminars during their senior year; submit an acceptable honors thesis; complete all major requirements; and maintain a 3.00 Cornell cumulative and science GPA through



graduation. Recommendation to the faculty that a candidate graduate with honors and at what level of honors is the responsibility of the Honors Program Committee. The student's final GPA and quality of his or her thesis are factors in determining the level of honors recommended.

Students interested in the honors program are strongly encouraged to begin their research projects in their junior year and to consider spending the following summer at Cornell engaged in full-time research on their honors project. Students interested in staying for the summer also are encouraged to apply to the Cornell Hughes Scholars Program.

Biology majors who are considering study abroad and graduating with honors are encouraged to meet with their academic and research advisor during their sophomore year to carefully plan their academic schedule to meet the requirements of the honors program.

Application forms, requirements, deadline dates for the honors program and the Hughes Scholars Program, and information pertaining to faculty research may be obtained at the Office of Undergraduate Biology, 216 Stimson Hall, and at [www.biology.cornell.edu](http://www.biology.cornell.edu).

## CURRICULUM COMMITTEE

Many decisions pertaining to the curriculum and to the programs of study are made by the Biology Curriculum Committee. The committee consists of faculty and elected student members and welcomes advice and suggestions from all interested parties.

## ADVISING

Students in need of academic advice are encouraged to consult their advisors or go to the Office of Undergraduate Biology, 216 Stimson Hall.

Students interested in marine biology should visit the Shoals Marine Laboratory Office, G14 Stimson Hall.

Students interested in the multidisciplinary program biology and society should see "Special Programs and Interdisciplinary Studies" in the "College of Arts and Sciences" section of this catalog.

## TRANSFERRING CREDIT

Students wishing to transfer biology credit to Cornell must receive approval from the director of advising, 216 Stimson Hall. Biology majors are required to complete all three biology core courses at Cornell. External transfer and study abroad students may be allowed to transfer a limited number of biology credits upon approval from the director of advising.

Online course credit is not acceptable to transfer for any biology course.

## GENERAL COURSES (BIO G)

Three introductory biology course sequences are taught during the academic year: BIO G 101-104, 105-106, and 109-110; and one during the eight-week summer session: BIO G 107-108. BIO G 101-104, 105-106, and 107-108 are intended for biological sciences majors and other students needing 8 credits from an introductory sequence for majors (e.g., students in a premedical curriculum). Any of these sequences meet the prerequisite for upper-level courses listing "one year of introductory biology for majors" as a prerequisite. BIO G 109-110 is a course sequence intended for nonmajors and meets the prerequisite for many, but not all, upper-level courses listing "one year of introductory biology" as a prerequisite. Students can earn a maximum of 8 credits in introductory biology (including advanced placement credits).

### BIO G 101-102(1101-1102) Biological Sciences, Lectures

101, fall; 102, spring. 2 credits each semester. Corequisite: BIO G 103 (fall) or 104 (spring). Prerequisite: for 102, passing grade (D or better) in 101 or permission of instructor. May not be taken for credit after BIO G 105-106 or 109-110. S-U grades optional by permission of instructor. First lec of fall semester, F Aug. 25. Evening prelims: fall, Sept. 21 and Oct. 31; spring, Feb. 22 and Apr. 3. Fall, staff; spring, staff.

Designed both for students who intend to specialize in biological sciences and for those who want to obtain a thorough knowledge of biology as part of their general education. The fall semester covers the chemical and cellular basis of life, energy transformations, physiology, neurobiology, and behavior. The spring semester covers genetics, development, evolution, and ecology. Each topic is considered in terms of modern evolutionary theory, and discussions of plant and animal systems are integrated.

### BIO G 103-104(1103-1104) Biological Sciences, Laboratory

103, fall; 104, spring. 2 credits each semester. Corequisite: BIO G 101 (fall) or 102 (spring). Prerequisite: for 104, passing grade (D or better) in 103 or permission of instructor. Students registered for lab courses who are more than 10 minutes late for first meeting of lab forfeit registration in that course; no admittance after second week of classes. S-U grades optional by permission of instructor. K.-c. Chen.

Designed to provide lab experience with major biological phenomena to support an understanding of the important concepts, principles, and theories of modern biology. A second objective is to help students gain expertise in the methods used by biologists to construct new knowledge. Students are exposed to basic concepts, research methods, including laboratory and data transformation techniques, and instrumentation in the major areas of biology. First-semester topics include biochemistry, physiology, plant biology, and behavior. In the second semester, laboratory experience is provided in genetics, biotechnology, invertebrate diversity, plant and animal development, and ecology. During the first semester, students dissect a doubly pitheated frog (pithing is done by the staff). Students dissect several invertebrates during the second semester. For those students who object to animal dissection, alternative materials are available for study. However,

testing involves identification of important structures in real organisms.

### BIO G 105-106(1105-1106) Introductory Biology

105, fall; 106, spring. 4 credits each semester; 2 credits by permission of instructor. Limited to 200 students. Taking 105-106 in sequence preferred but not required. May not be taken for credit after BIO G 101-104 or 109-110. No admittance after first week of classes. S-U grades optional by permission of instructor. First lec of fall semester R Aug. 24, 9:05; additional study and lab. D. Campbell.

Designed primarily for biology majors, preprofessionals, and other students who desire a challenging, broad introduction to fundamental concepts of biology. Cell biology, physiology, anatomy, and biochemistry are strongly emphasized in the fall semester. The spring semester covers genetics, development, ecology, evolution, behavior, and the diversity of organisms. Students who plan to concentrate in anatomy and physiology should consider taking this course because of the strong emphasis on organismal biology. Because some testing involves the use of predissected specimens, students who object to dissections should take BIO G 101-104. The course uses an autotutorial format and offers considerable flexibility in scheduling. Completion of the course requires mastery of a group of core units. Testing on these units is primarily by oral examination. Students who elect to take the course must be able to meet deadlines. Four formal laboratory sessions are offered each semester; additional laboratory work is included in the core units. Evaluation is based on written reports on experimental work, practical exams, and a comprehensive final exam.

### BIO G 107-108(1107-1108) General Biology

Summer, 8-week session; 107, weeks 1-4; 108, weeks 5-8. 4 credits each. 107-108 fulfills introductory biology requirement for majors and forms suitable introductory biology course sequence for students intending to go to medical school. Prerequisite: one year of college or permission of instructor; for BIO G 108, a grade of D or better in the prerequisite courses (BIO G 101, 103, 105, or 107). Fee for weeks 1-4: \$25; for weeks 5-8, \$25. Staff.

Designed for students who plan further study in biology or who want a broad course in biology as part of their general education. 107 covers biological metabolism, first at the molecular level and then progressively to the organ system level. The laboratory work involves an introduction to some major techniques, vertebrate dissection, and a survey of plant organization. 108 seeks to integrate the topics of genetics, developmental biology, population biology, and ecology in a general consideration of biological evolution. The laboratory work is a continuation of the material covered in 107 and involves more techniques, a survey of animal organization, and the design and performance of a field study. For those students who object to animal dissection, alternative materials are available for study. However, testing involves identification of important structures in real organisms.

**BIO G 109-110(1109-1110) Biological Principles**

109, fall; 110, spring. 3 credits each semester. Limited to 600 students. Nonmajors survey course, not appropriate for major in biological science or premed requirement. Both BIO G 109 and 110, taken in either order, are required to fulfill distribution requirement in CALS and Human Ecology. Either course fulfills Arts and Sciences distribution requirement. Students with transfer credit must consult with course instructors for appropriate course placement. Due to overlap in content, BIO G 109 may not be taken after BIO G 102 or 106, or equivalent, and BIO G 110 may not be taken after BIO G 101, 105, or equivalent. Note: This course may not satisfy prerequisite for upper-level courses in biology. Letter grades only. Lab sec assignments made in first class. Prelims: fall (in class), Sept. 21 and Oct. 31; spring (evening), Feb. 22 and Apr. 5. D. Winkler, R. Wayne, and staff.

Offers a comprehensive knowledge of biology as part of a general education. Broad goals of the course encompass an understanding of the potential benefits and limitations of science, the complexity and workings of the natural world, and the internal machinery of how our bodies and those of other animals and plants work. Fall: biological diversity, genetics, evolution, ecology, behavior, and conservation biology; Spring: human physiology, plant development, genetic engineering, infectious diseases, and human health. Laboratory sections (16 maximum) are used for problem-solving experiments, demonstrations, discussions, and dissections (preserved vertebrate, invertebrate, and plant materials); for those students who object to dissection, alternative materials are available for study without grade penalty. Testing on dissection labs involves identification of important structures in real organisms.

**BIO G 170(1700) Evolution of the Earth and Life (also EAS 102[1102])**

Spring. 3 credits. S-U grades optional. J. L. Cisne.

For description, see EAS 102.

**BIO G 200(2000) Special Studies in Biology**

Fall, spring, or summer. 1-3 credits. Prerequisite: written permission from Office of Undergraduate Biology. Students must register in 216 Stimson Hall. S-U grades optional by permission of instructor. Staff.

Registration device for students who want to take only a portion of a regular biological sciences course—for example, only the lectures or only the laboratory in a course that includes both. Only students who have already had training equivalent to the portion of the regular course that is to be omitted may register in this manner. This course may not be substituted for 100-level courses and may not be used to fulfill college distribution requirements except by permission from the Office of Undergraduate Biology.

**BIO G 201(2010) Seminar: Your Future in Biology at Cornell and Beyond**

Fall. 1 credit. Limited to 40 students. Prerequisite: one year introductory biology; sophomores and new junior transfer students. S-U grades only. Lec, 2 hours each week. J. Doyle and B. Comella.

Focuses on the academic and career interests of sophomore biology majors and new junior

transfer students. Biology faculty, Office of Undergraduate Biology staff, biology alumni, and upperclass students lead weekly sessions on diverse topics that may include the biology curriculum, bioethics, burgeoning fields and careers in biology, faculty and undergraduate research, biology in the post-9/11 era, and women in science.

**[BIO G 202(2020) The Diversity of Life**

Fall. 3 credits. S-U grades optional. Offered alternate years; not offered 2006-2007. J. I. Davis and J. J. Doyle.]

**BIO G 299(2990) Introduction to Research Methods in Biology**

Fall, spring, or summer. Variable credit; max. 3 suggested. S-U grades only. Recommended for freshmen and sophomores. Students must register for credit in Office of Undergraduate Biology, 216 Stimson Hall. Applications available in OUB and at [www.bio.cornell.edu](http://www.bio.cornell.edu). Add deadline is three days before university deadline. Any Cornell faculty member whose research field is biological in nature may serve as a supervisor for this course. Non-Cornell supervisors not acceptable.

Intended for students who are new to undergraduate research. Students enrolled in BIO G 299 may be reading scientific literature, learning research techniques, or assisting with ongoing research. The faculty supervisor determines the work goals and the form of the final report.

**BIO G 305(3050) Basic Immunology Lectures (also VETMI 315[3150])**

Fall. 3 credits. Highly recommended: basic courses in microbiology, biochemistry, and genetics. S-U grades optional. Lec. J. A. Marsh.

For description, see VETMI 315.

**BIO G 400(4000) Undergraduate Seminar in Biology**

Fall or spring. Variable credit; 1-3 assigned for individual seminar offerings; may be repeated for credit. S-U grades optional. Staff.

Specialized seminars on topics of interest to undergraduates presented by biology faculty including visiting faculty. For description, see BIOGD 480.

**[BIO G 401(4010) Introduction to Scanning Electron Microscopy**

Spring, weeks 1-8. 1 credit. Limited to 8 students. S-U grades optional. Fee may be charged. Lec, lab. Offered alternate years; not offered 2006-2007. Staff.

Introductory course that includes the principle and use of the scanning electron microscope. Students use biological material to explore and understand some of the fine biological architecture. In addition to preparing the specimens, students use the scanning electron microscope to study and obtain micrographs of features that interest them.]

**[BIO G 403(4030) Transmission Electron Microscopy for Biologists**

Fall. 1, 3, or 4 credits (4 credits if student takes both sections). Limited to 8 students; minimum of 4. Prerequisites: BIOAP 313, BIOPL 345 or 443. S-U grades optional. Two sec: 01, 1 credit, weeks 1-4; 02, 3 credits, weeks 5-12. Students may register for one or both sec. Fee may be charged. Lec, lab. Not offered 2006-2007. Staff.

Section 01 covers the principles and use of the transmission electron microscope (TEM), with emphasis on proper operation of the

instrument and interpretation of images obtained. Negatively stained materials are used for viewing with the transmission electron microscope. Section 02 covers the principles and techniques of preparing biological material for transmission electron microscopy. Using animal, plant, and microbe materials, this section studies chemical fixtures, cryofixations, ultrathin sectioning, immunogold localization, quantitative microscopy, and metal shadowing techniques. Students have two additional weeks to complete laboratory assignments at the end of each section.]

**BIO G 404(4040) Planning for Graduate Study in Biology**

Fall. 1 credit. S-U grades only. L. E. Southard.

For students who plan to pursue a graduate degree leading to a research career. Selected topics include information on academic and industrial research careers, selecting appropriate graduate programs, and options for funding. Features faculty, graduate student, and outside speakers. Students write and receive feedback on personal statements.

**BIO G 408(4080) Presentation Skills for Biologists**

Spring. 1 credit. S-U grades only. Prerequisite: research experience. Priority given to students accepted into Biology Honors Program. L. Southard and G. Hess.

Covers oral and written communication skills used in presenting research to other scientists. Topics include organization and writing of scientific papers, presentation tips for research seminars, and preparation of visual aids using Microsoft Power Point. All students present a 10-minute seminar on their research and evaluate other presentations.

**BIO G 410(4100) Teaching High School Biology**

Fall. 3 credits. Prerequisite: one year introductory biology; permission of instructor. S-U grades optional. Offered alternate years. L. Southard.

Gives students the opportunity to experience teaching high school science. Students select an important biological concept, then develop inquiry-based teaching plans appropriate for high school students. The first part of the course consists of lectures, discussion, and laboratory experiments, which familiarize the students with the scientific content. Students then work in teams with high school teachers to develop their curriculum. The final part of the course includes practice presentations and teaching at regional high schools.

**BIO G 431(4310) Frontiers in Biophysics**

Fall, full day of lec, S, Sept. 16, 9 A.M.-4 P.M., Racker Room, Biotechnology Bldg. 0.5 credit. S-U grades only. G. Feigenson and staff.

Overview of current research in biophysics at Cornell by faculty from different departments across the university. Designed for undergraduates considering a career in biophysics and for graduate students interested in biophysics research opportunities at Cornell.

**BIO G 450(4500) Light and Video Microscopy for Biologists**

Fall. 3 credits. Limited to 12 students. Prerequisites: one year introductory biology and permission of instructor. Lec, lab. R. O. Wayne.

Students learn the relationship between reality and the image using philosophy, mathematics, and physical theory. Next they apply these tools theoretically and in practice to understand and become experts at image formation and analysis using brightfield, darkfield, phase-contrast, fluorescence, polarization, interference, differential interference and modulation contrast microscopes. They build upon our knowledge and experience to understand how analog image processors and digital image processors can influence, enhance and analyze the images gathered by the microscope. Last they learn about many other kinds of microscopes, including confocal, near field, x-ray, acoustic, nuclear magnetic resonance, infrared, centrifuge, atomic force, and scanning tunneling microscopes.

#### **BIO G 498(4980) Teaching Experience**

Fall or spring. 1–4 credits. Limited enrollment. Prerequisites: previous enrollment in course to be taught or equivalent. Note: Arts students may not count this course toward graduation but may, upon petition (one time only) to their class dean, carry fewer than 12 other credits and remain in good standing. This would affect Dean's List eligibility but not eligibility for graduating with distinction. S-U grades optional by permission of instructor. Staff.

Designed to give qualified undergraduate students teaching experience through actual involvement in planning and assisting in biology courses. This experience may include supervised participation in a discussion group, assisting in a biology laboratory, assisting in field biology, or tutoring.

#### **BIO G 499(4990) Independent Undergraduate Research in Biology**

Fall, spring, or summer. Variable credit. S-U grades optional. Note: Arts students may not register for more than 6 credits per semester with one supervisor or 8 credits per semester with more than one supervisor. Students in CALS may use up to 15 credits of independent study (BIO G 499, 498) toward graduation. Up to 3 credits of research may be used to complete programs of study in General Biology, Genetics and Development, and Systematics and Biotic Diversity, and 4 credits of research in Neurobiology and Behavior. Prerequisite: one semester of BIO G 299 or equivalent.

For students continuing their Cornell research. Students enrolled for this credit should be doing independent work on their own project. Registration forms are available in OUB and on the web at [www.bio.cornell.edu](http://www.bio.cornell.edu). **Add deadline is three days before university deadline.** Each student must submit proposed research project description during course registration. Any Cornell faculty member whose research field is biological in nature may serve as supervisor for this course. Non-Cornell supervisors not acceptable.

#### **BIO G 504(5040) Research Experience for Teachers (also EDUC/PL BR 504[5040])**

Spring. 3 credits. S-U or letter grades. T. Fulton.

For description, see EDUC 504.

#### **BIO G 600(6000) Graduate Seminar in Biology**

Fall or spring. Variable credit (1–3 credits assigned for individual seminar offerings). May be repeated for credit. S-U grades optional. Staff.

Specialized seminars on topics of interest to graduate students presented by biology faculty including visiting faculty.

#### **BIO G 663(6630) Nanobiotechnology (also A&EP 663[6630])**

Spring. 3 credits. Letter grades only. C. Batt. For description, see A&EP 663.

#### **[BIO G 705(7050) Advanced Immunology Lectures (also VETMI 705[7050])]**

Spring. 3 credits. Prerequisite: basic immunology course or permission of instructor. Offered alternate even years; not offered 2006–2007. Lec. Coordinator: J. A. Marsh.

For description, see VETMI 705.]

#### **[BIO G 706(7060) Immunology of Infectious Diseases (also VETMI 719[7190])]**

Spring. 2 credits. Prerequisite: BIO G 305 or permission of instructor. S-U grades optional. Offered odd alternate years; next offered 2007–2008. Coordinator: E. Denkers.

For description, see VETMI 719.]

### **ANIMAL PHYSIOLOGY (BIOAP)**

#### **BIOAP 214(2140) Biological Basis of Sex Differences (also B&SOC 214(2141), FGSS 214[2140])**

Fall. 3 credits. Prerequisite: one year introductory biology. S-U grades optional. Offered alternate years. J. E. Fortune.

Examines the structural and functional differences between the sexes. Emphasizes mechanisms of mammalian reproduction; where possible, special attention is given to studies of humans. Current evidence on the effects of gender on nonreproductive aspects of life (behavior, mental and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and with a basis for objective evaluation of sex differences in relation to contemporary life.

#### **BIOAP 311(3110) Introductory Animal Physiology, Lectures (also VTBS 346[3460])**

Fall. 3 credits. Prerequisites: one year college biology, chemistry, and mathematics. Recommended: previous or concurrent physics course. S-U grades optional by permission of instructor. Evening prelims. E. R. Loew.

General course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure/function relationships are stressed along with underlying physico-chemical mechanisms.

#### **BIOAP 312(3120) Farm Animal Behavior (also AN SC 305[3050])**

Spring. 2 credits. Prerequisites: one year introductory biology, and introductory animal physiology (AN SC 100 and 150 or equivalent is sufficient or BIOAP 311). Recommended: at least one animal production course or equivalent experience. S-U grades optional. P. Perry and K. A. Houpt.

For description, see AN SC 305.

#### **BIOAP 316(3160) Cellular Physiology**

Spring. 3 credits. Pre- or corequisite: BIOBM 330 or 331 and 332 or 333. Evening prelims. A. Quaroni.

Comprehensive course covering the general characteristics of eukaryotic cells; the structure, composition, and function of subcellular organelles; and the major signal transduction pathways regulating a variety of physiological cell activities. Among the main subjects covered are absorption and transport processes, mechanism of action of signaling molecules (hormones), the cell cycle and regulation of cell proliferation, cell-cell communication, extracellular matrix, and carcinogenesis.

#### **BIOAP 319(3190) Animal Physiology Experimentation**

Fall. 4 credits. Limited to 40 students per lab sec. Pre- or corequisite: BIOAP 311 or permission of instructor. For pre-med, pre-vet juniors and seniors and graduate students interested in biomedical science. E. R. Loew, N. A. Lorr, and staff.

Student-conducted in vitro and in vivo experiments designed to illustrate basic physiological processes, physiological research techniques, instrumentation, experimental design, and interpretation of results. Techniques include anesthesia, surgical procedures, dissection, and real-time computer recording and analysis. Experiments with isolated living tissues or live anesthetized animals examine properties of membranes and epithelia, blood, nerves, skeletal and smooth muscle; cardiovascular, respiratory, renal, and reproductive function and their regulation by the nervous and endocrine systems.

#### **BIOAP 413(4130) Histology: The Biology of the Tissues**

Spring. 4 credits. Prerequisite: one year introductory biology. Recommended: BIOBM 330 or 331, or equivalents. S-U or letter grades. S. Suarez and L. Mizer.

Provides students with a basis for understanding the microscopic, fine-structural, and functional organization of vertebrates (primarily mammals), as well as methods of analytic morphology at the cell and tissue levels. Emphasizes dynamic interrelations of structure, composition, and function in cells and tissues.

#### **BIOAP 416(4160) Cell Physiology and Genomics Laboratory**

Spring. 4 credits. Limited to 24 students. For pre-med, pre-vet, juniors, seniors, and graduate students interested in biomedical science. Pre- or corequisite: BIOAP 316 or BIOBM 432 or permission of instructor. A. Quaroni, N. A. Lorr, and staff.

A laboratory course introducing modern methods and instrumentation in cell physiology and genomics, while pursuing a research project. Students learn: (1) primary cell culture, cell cloning; (2) imaging using fluorescence and electron microscopy; (3) karyotyping: chromosome spreading, staining, and FISH; (4) flow cytometry; (5) protein electrophoresis, Western blotting; (6) recombinant DNA technology: restriction analysis cloning, plasmid isolation, and transfection; (7) analysis of gene expression using RT-PCR, real time-PCR and microarray analysis; and (8) analysis of electrogenic transport in epithelia mounted in Ussing chambers. Students will review with an independent project.

**[BIOAP 425(4250) Gamete Physiology and Fertilization (also AN SC 425(4250))]**

Fall. 2 credits. Limited to 50 students. Prerequisite: AN SC 300 or equivalent. Offered alternate years; next offered 2007-2008. Lec. J. E. Parks.]

**[BIOAP 427(4270) Fundamentals of Endocrinology (also AN SC 427(4270))]**

Fall. 3 credits. Prerequisite: animal or human physiology course or permission of instructor. Lec. P. A. Johnson.

For description, see AN SC 427.

**[BIOAP 458(4580) Mammalian Physiology]**

Spring. 3 credits. Auditors allowed. Prerequisite: BIOAP 311 or equivalent. Recommended for biological sciences majors, pre-med and pre-vet students, and beginning graduate students in physiology, nutrition, and animal science. Evening prelims. K. W. Beyenbach.

The course offers a treatment of selected topics in vertebrate and human physiology that emphasizes concepts and a working knowledge of physiology. The first course half surveys biological design and the functional strategies of multicellular animals. Topics include mammalian fluid compartments, homeostasis, and membrane and epithelial transport. The second half examines the mechanism and the regulation of cardiovascular, gastrointestinal, and renal systems. Course concluding lectures aim to illustrate the integration of systems in the regulation of acid/base balance. Clinical examples of dysfunction will underscore the role of normal function, and some diseases will be traced to the deepest roots of their molecular etiology. Weekly problem sets count 50 percent of the final grade.

**[BIOAP 475(4750) Mechanisms Underlying Mammalian Developmental Defects (also NS 475(4750))]**

Spring. 3 credits. Prerequisites: BIOBM 330, 331-332, or 333 (may be taken concurrently). Offered alternate years; next offered 2007-2008. D. Noden and P. Stover.

Focuses on the causes of developmental defects and how genetic changes or teratogenic insults disrupt developmental regulatory and metabolic pathways.]

**[BIOAP 489(4890) Mammalian Embryology (also BIOGD 489(4890))]**

Spring. 3 credits. Prerequisite: introductory biology. Offered alternate years; next offered 2007-2008. D. M. Noden.

Examines the early formation of the mammalian body and placenta, emphasizing comparative aspects, and morphogenesis and histogenesis of each organ system.]

**[BIOAP 619(6190) Lipids (also NS 602(6020))]**

Fall. 2 credits. A. Bensadoun.

For description, see NS 602.

**[BIOAP 710-718(7100-7180) Special Topics in Physiology]**

Fall or spring. 1 or 2 credits per topic; may be repeated for credit. Enrollment in each topic may be limited. S-U grades optional by permission of instructor.

Lectures, laboratories, discussions, and seminars on specialized topics.

**[BIOAP 711(7110) Readings in Applied Animal Behavior]**

Fall. 1 credit. Prerequisite: BIOAP 311 or equivalent. Offered alternate years; next offered 2007-2008. Lec. K. A. Houpt.]

**[BIOAP 714(7140) Cardiac Electrophysiology]**

Fall. 1 credit. S-U grades only. Offered alternate years. R. Gilmour.

Survey of cardiac potentials, passive membrane properties, ion channels, and cardiac arrhythmias. Emphasizes nonlinear dynamic aspects of cardiac electrophysiology and cardiac arrhythmias.

**[BIOAP 715(7150) Stress Physiology: To Be Discussed as Part of Animal Welfare]**

Fall. 1 credit. Prerequisite: BIOAP 311 or equivalent. Offered alternate years. K. A. Houpt.

Emphasizes physiological assessment of stress.

**[BIOAP 720(7200) Animal Physiology and Anatomy Seminar]**

Spring and fall. 1 credit each semester.

Prerequisite: admission to graduate field of physiology. M. Roberson.

Designed to train graduate students in the field of physiology to become professional scientists. Students are required to give a seminar on their research. Advice and feedback are provided. Throughout the semester, advice is provided on subjects such as preparation of manuscripts, seminars, and grant proposals.

**[BIOAP 757(7570) Current Concepts in Reproductive Biology]**

Fall. 3 credits. Limited to 20 students.

Prerequisites: undergraduate degree in biology and strong interest in reproductive biology. S-U grades optional. Offered alternate years; next offered 2007-2008. J. E. Fortune, W. R. Butler, and staff.

Team-taught survey course in reproductive physiology/endocrinology. Lectures by a number of reproductive biologists on various aspects of male reproductive function (endocrine regulation, testis function, spermatogenesis, sperm physiology/function); female reproductive function (endocrinology, ovarian development and function, oocyte physiology/function); fertilization and gamete transport; pregnancy; parturition; lactation; aging; reproductive technology. Student participation in the form of discussions and/or presentations.]

**Related Courses in Other Departments**

Advanced Work in Animal Parasitology (VETMI 737)

Animal Reproduction and Development (AN SC 300)

Comparative Insect Morphology (ENTOM 322)

Developmental Biology (BIOGD 385)

Fundamentals of Endocrinology (AN SC 427)

Research in Marine Biology (BIOBM 413)

Sensory Function (BIONB 492)

Teaching Experience (BIO G 498)

Undergraduate Research in Biology (BIO G 499)

**BIOCHEMISTRY, MOLECULAR AND CELL BIOLOGY (BIOBM)****[BIOBM 132(1320) Orientation Lectures in Molecular Biology and Genetics (also BIOGD 132(1320))]**

Spring, weeks 1-3. 0 credits. Primarily for freshmen, sophomores, and transfer students. S-U grades only. Lec. J. Calvo.

Six professors discuss their research and promising new areas for research in the future.

**[BIOBM 321(3210) Numerical Methods in Computational Molecular Biology (also COM S 321(3510))]**

Fall. 3 credits. Prerequisites: at least one course in calculus (e.g., MATH 106, 111, or 191) and course in linear algebra (e.g., MATH 221 or 294 or BTRY 417). No particular course in programming required, but student should have some familiarity with iteration, arrays, and procedures.

Offered alternate years; next offered 2007-2008.

For description, see COM S 321.]

**[BIOBM 330-332(3300-3320) Principles of Biochemistry]**

Introductory biochemistry is offered in three formats: individualized instruction (330) and lectures (331 and 332) during the academic year, and lectures (333) during the summer.

*Individualized instruction is offered to a maximum of 250 students each semester. Lectures are given fall semester (331), spring semester (332), and summer (333).*

**[BIOBM 330(3300) Principles of Biochemistry, Individualized Instruction]**

Fall or spring. 4 credits. Prerequisites: one year introductory biology and one year general chemistry and CHEM 257 or 357-358 (CHEM 358 may be taken concurrently) or equivalent, or permission of instructor. Recommended: concurrent registration in BIOBM 334. May not be taken for credit after BIOBM 331, 332, or 333. S-U grades optional by permission of instructor. Evening prelims: fall, Sept. 28 and Oct. 31; spring, Feb. 22 and Apr. 3. J. E. Blankenship, P. C. Hinkle, and staff.

Fourteen units that cover protein structure and function, enzymes, basic metabolic pathways, DNA, RNA, protein synthesis, and an introduction to gene cloning. No formal lectures, autotutorial format.

**[BIOBM 331(3310) Principles of Biochemistry: Proteins and Metabolism]**

Fall. 3 credits. Prerequisites: one year introductory biology, one year general chemistry, and CHEM 257 or 357-358 (CHEM 257 or 357 should not be taken concurrently) or equivalent, or permission of instructor. May not be taken for credit after BIOBM 330 or 333. S-U grades by permission of instructor. Lec; evening prelim Oct. 19.

G. W. Feigenson.

The chemical reactions important to biology, and the enzymes that catalyze these reactions, are discussed in an integrated format. Topics include protein folding, enzyme catalysis, bioenergetics, and key reactions of synthesis and catabolism.



**BIOBM 332(3320) Principles of Biochemistry: Molecular Biology**

Spring. 2 credits. Prerequisites: one year introductory biology and previous or concurrent registration in organic chemistry, or permission of instructor. May not be taken for credit after BIOBM 330 or 333. S-U grades optional by permission of instructor. Lec. B. K. Tye.

Comprehensive course in molecular biology that covers the structure and properties of DNA, DNA replication and repair, synthesis and processing of RNA and proteins, the regulation of gene expression, and the principles and applications of recombinant DNA technologies, genomics, and proteomics.

**BIOBM 333(3330) Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology**

Summer, six-week session. 4 credits. Prerequisites: one year introductory biology, one year general chemistry, and CHEM 257, or 357–358, or equivalents, or permission of instructor. May not be taken for credit after BIOBM 330, 331, or 332. S. Ely.

Topics include the structure and function of proteins, enzyme catalysis, metabolism, and the replication and expression of genes.

**BIOBM 334(3340) Computer Graphics and Molecular Biology**

Fall or spring. 1 credit. Prerequisite: BIOBM 333 or 331–332 (BIOBM 332 may be taken concurrently). Corequisite: BIOBM 330. J. E. Blankenship, P. C. Hinkle, and staff.

Visualization of complex biomolecules using Silicon Graphics computers. Group presentations on current topics in molecular biology.

**BIOBM 432(4320) Survey of Cell Biology**

Spring. 3 credits. Prerequisite: BIOBM 330, 333, or 331, and previous or concurrent registration in 332, or equivalent.

Recommended: BIOGD 281. Lec. Evening prelims Mar. 6 and Apr. 19. V. M. Vogt.

Survey of a wide array of topics focusing on the general properties of eukaryotic cells. Topics include methods used for studying cells, the structure and function of the major cellular organelles, and analyses of cellular processes such as mitosis, endocytosis, cell motility, secretion, cell-to-cell communication, gene expression, and oncogenesis. Some of the material is covered in greater depth in BIOBM 437, BIOGD 483, and BIOBM 632, 636, and 639.

**BIOBM 434(4340) Applications of Molecular Biology to Medicine, Agriculture, and Industry**

Fall. 3 credits. Prerequisites: BIOBM 330 or 333 or 331/332. Recommended: BIOGD 281. S-U grades optional. Lec. J. M. Calvo and S. Ely.

Lecture topics include large-scale sequencing of genomes, drug discovery based on genomics, combinatorial approaches to chemical libraries, pharmacogenetics, antibiotics derived from innate immune system, DNA and edible vaccines, transgenic animals, engineering plants resistant to insects, and gene therapy. About one-quarter of the course is devoted to exploring factors that are required for commercializing ideas and to some social ramifications of biotechnology.

**BIOBM 435–436(4350–4360) Undergraduate Biochemistry Seminar**

1 credit; may be repeated. Prerequisites: upperclass standing; BIOBM 330, 333, or 331–332, or written permission of instructor. S-U grades only. D. Wilson.

Selected papers from the literature on a given topic are evaluated critically during 12 one-hour meetings.

**BIOBM 437(4370) Regulation of Cell Proliferation, Senescence, and Death (also BIOGD/TOX 437(4370))**

Spring. Variable credit; students may take lec for 2 credits or lec and disc for 3 credits. Limited to 20 students per disc; priority given to graduate students. Prerequisite: BIO G 101–102 or 105–106 and BIOBM 330 or 331/332.

Recommended: BIOGD 281 and BIOBM 432. S-U grades optional. S. Lee.

Covers a wide spectrum of issues related to cell proliferation in eukaryotes. Lectures include various aspects of the regulation of cell division cycle and signal transduction pathways, with additional topics on oncogenesis, cell aging, and cell death. The facts as well as concepts and logics behind findings are presented in the lectures. Research articles are analyzed and discussed in depth during discussion section.

**[BIOBM 439(4390) Molecular Basis of Human Disease (also BIOGD 439(4390))]**

Fall. 3 credits. Prerequisites: biochemistry and molecular biology (e.g., BIOBM 330, 331–332, or 333) and genetics (e.g., BIOGD 281) or permission of instructor. Recommended: cell biology (e.g., BIOBM 432 or BIOAP 316) and physiology (e.g., BIOAP 311 or 458). S-U grades optional. Lec. Not offered 2006–2007; next offered 2007–2008. W. L. Kraus.

This course examines how changes in the expression, structure, and activity of gene products caused by genetic mutations, epigenetic phenomena, and environmental agents lead to human diseases.

**BIOBM 440(4400) Laboratory in Biochemistry and Molecular Biology**

Fall, spring, or summer (three-week session). 4 credits. Limited enrollment. Priority given to undergraduate biology majors in Biochemistry or Molecular and Cell Biology programs of study and to graduate students with minor in field of biochemistry. Prerequisites: BIOBM 330 or 333 or 331–332 (at least one of 331–332 completed but one may be taken concurrently). S. Ely and H. Nivison.

Experiments related to molecular biology (includes PCR, DNA cloning, hybridization analysis, restriction mapping, and DNA sequence analysis), protein purification and analysis (salt fractionation, ion exchange chromatography, affinity chromatography, SDS-PAGE, and immunoblotting), and determination of enzyme kinetic parameters.

**BIOBM 443(4430) Experimental Molecular Neurobiology (also BIONB 430(4300))**

Spring. 4 credits. Limited to 12 students. Corequisite: BIOBM 440 lab. Letter grades only. Disc, lab. Offered alternate years. D. L. Deitcher.

For description, see BIONB 430.

**BIOBM 450(4500) Principles of Chemical Biology (also CHEM 450(4500))**

Fall. 3 credits. Prerequisites: CHEM 357–358, 359–360, or equivalent. T. P. Begley. For description, see CHEM 450.

**[BIOBM 483(Sec 04)][4530] Molecular Aspects of Plant Development I (also BIOPL 483.4)**

Fall. 1 credit. 12 lec TBA. Not offered 2006–2007; next offered 2007–2008.

J. B. Nasrallah.

For description, see BIOPL 483.4.

**BIOBM 485(4850) Bacterial Genetics (also BIOMI/BIOGD 485(4850))**

Fall. 2 credits. Prerequisite: BIOGD 281. Recommended: BIOMI 290 and BIOBM 330 or 331 and 332 or 333. Lec.

J. E. Peters.

For description, see BIOMI 485.

**BIOBM 615(6150) Nuclear Hormone Receptors (also NS 615(6150))**

Spring. 2 credits. S-U or letter grades. N. Noy.

For description, see NS 615.

**BIOBM 631(6310) Protein Structure and Function**

Fall. 3 credits. Prerequisites: BIOBM 330 or 333 or 331–332 and organic chemistry.

Recommended: physical chemistry course. S-U grades optional. Lec. L. Nicholson.

Presentations on the principles of protein structure and the nature of enzymatic catalysis. Specific topics include protein folding, stability, dynamics and evolution, folded conformations and structure prediction, ligand binding energetics, and the structural basis of catalysis.

**[BIOBM 632(6320) Membranes and Bioenergetics]**

Spring. 2 credits. Prerequisite: BIOBM 330 or 333 or 331–332 or equivalent. Lec.

Offered alternate years; next offered 2007–2008. P. C. Hinkle.

Structure and dynamics of biological membranes, ion-transport ATPases, mitochondrial and chloroplast electron transfer chains, transport in animals, bacteria and structures of membrane proteins.]

**BIOBM 633(6330) Biosynthesis of Macromolecules**

Fall. 2 credits. Prerequisite: BIOBM 330 or 333 or 331–332. Recommended: BIOGD 281. Lec. J. W. Roberts and D. B. Wilson.

Synthesis of DNA, RNA, and proteins, and regulation of gene expression.

**BIOBM 636(6360) Advanced Cell Biology**

Spring. 3 credits. Prerequisites: BIOBM 330 or 333 or 331–332, and 432, or equivalents. Lec. A. P. Bretscher and W. J. Brown.

Aims to provide an integrated view of eukaryotic cell organization as elucidated using biochemical molecular, genetic, and cell biological approaches. Major topics include the cytoskeleton, membrane traffic, and cell polarity. Together with BIOBM 437, 632, and 639 this course provides broad coverage of the cell biology subject area.

**BIOBM 638(6380) Macromolecular Interactions and Cell Function**

Spring. 2 credits. Prerequisite: BIOBM 330 or 333 or 331–332. Recommended: BIOBM 631 or 633. S-U grades optional. Lec. J. Fu.

Lectures focusing on the principles of protein-protein and protein-nucleic acid interactions that underlie cellular processes such as signal transduction, intracellular traffic, gene regulation, and cell development. The



emphasis throughout is on the structural basis of these processes as related to cell function. Some specific topics are signal amplification, nuclear import and export, transcription by RNA polymerases, RNA processing and export, and translation of mRNAs.

**BIOBM 639(6390) The Nucleus**

Spring. 2 credits. Prerequisite: BIOBM 330 or 333 or 331-332, or equivalent.

Recommended: BIOGD 281. Lec. J. T. Lis. Lectures on topics of eukaryotic genome organization, chromatin structure, regulation of gene expression, RNA processing, the structure and movement of chromosomes, and nuclear export and import. Covers the structure and function of the nucleus at the molecular and cell biological levels and, together with BIOBM 437, 632 and 636, provides broad coverage of the cell biology subject area.

**BIOBM 641(6410) Laboratory in Plant Molecular Biology (also BIOPL 641(6410))**

Fall. 4 credits. Prerequisites: BIOGD 281 or equivalent, BIOBM 330 or 331 or equivalent, and permission of instructor. S-U grades by permission of instructor. Lab. M. R. Hanson and K. Van Wijk. For description, see BIOPL 641.

**[BIOBM 730(7300) Protein NMR Spectroscopy (also VETMM 707(7070))]**

Spring. 2 credits. Prerequisites: CHEM 389 and 390, or 287 and 288, or permission of instructor. S-U grades optional. Offered alternate years; next offered 2007-2008. Lec. L. K. Nicholson and R. E. Oswald. Students acquire the tools necessary for understanding multidimensional NMR of proteins. NMR fundamentals and schemes for magnetization transfer, water suppression, decoupling, and others are presented.]

**BIOBM 732-737(7320-7370) Current Topics in Biochemistry**

Fall or spring. 0.5 or 1 credit for each topic; may be repeated for credit. Prerequisite: BIOBM 330 or 333 or 331-332 or equivalent. S-U grades only. Lectures and seminars on specialized topics. Topics for fall and spring to be announced in the division's course supplement published at the beginning of each semester or the department mini-courses web site, mbg.cornell.edu/about/mini\_courses.cfm.

**BIOBM 738(7380) Macromolecular Crystallography (also CHEM 788(7880))**

Fall. 3 credits. Prerequisite: permission of instructor. Lec. S. E. Ealick. For description, see CHEM 788.

**BIOBM 751(7510) Ethical Issues and Professional Responsibilities**

Spring. 1 credit. Prerequisite: graduate students beyond first year. S-U grades only. Organizational meeting first W of semester. Sem. P. Hinkle. Ethical issues in research and the professional responsibilities of scientists are discussed based on readings and occasional lectures. The topics are intended to cover the requirements for ethical training of graduate students on training grants and follow the recommendations of the Office of Research Integrity.

**[BIOBM 761(7610) Topics in Cancer Cell Biology (also VETMM 709(7090))]**

Spring. Series of 0.5- or 1-credit graduate sections that reflect cancer expertise of Cornell faculty. Course director, B. U. Pauli. For description, see VETMM 709.

**BIOBM 830(8300) Biochemistry Seminar**

Fall or spring. 0 credits. Prerequisite: graduate students in Biochemistry, Molecular, and Cell Biology. Lec open to everyone. V. Vogt. Lectures on current research in biochemistry, presented by distinguished visitors and staff members.

**BIOBM 831(8310) Advanced Biochemical Methods I**

Fall. 6 credits. Requirement for, and limited to, first-year graduate students in field of biochemistry, molecular, and cell biology. S-U grades only. Lab and disc. Organizational meeting first R of semester 10:10. T. C. Huffaker.

The first half of this course comprises an intensive laboratory covering fundamental aspects of modern molecular biology and cell biology. The second half comprises research in the laboratory of a professor chosen by the student (see BIOBM 832). Students must enroll separately for each half.

**BIOBM 832(8320) Advanced Biochemical Methods II**

Spring. 6 credits. Requirement for, and limited to, first-year graduate students in field of biochemistry, molecular, and cell biology. S-U grades only. Lab. V. Vogt.

Research in the laboratories of two different professors chosen by the student. Arrangements are made jointly between the director of graduate studies and the research advisor.

**BIOBM 833(8330) Research Seminar in Biochemistry**

Fall or spring. 1 credit each semester; may be repeated for credit. Requirement for, and limited to, second-, third-, and fourth-year graduate students majoring in field of biochemistry, molecular and cell biology. S-U grades only. W. L. Kraus and V. M. Vogt.

Each student presents one seminar per year on his or her thesis research and then meets with instructors and thesis committee members for evaluation.

**BIOBM 836(8360) Methods and Logic in Biochemistry, Molecular and Cell Biology, Part I**

Spring. 1 credit. Prerequisite: first-year graduate students majoring in field of biochemistry, molecular, and cell biology. S-U grades only. Sem and disc. G. P. Hess. Seminar with critical discussion by students of original research papers selected by faculty members of the field of biochemistry, molecular and cell biology.

**BIOBM 838(8380) Methods and Logic in Biochemistry, Molecular and Cell Biology, Part II**

Spring. 2 credits. Prerequisite: second-year graduate students majoring in field of biochemistry, molecular and cell biology or field of genetics and development. S-U grades only. D. Shalloway.

Interactive seminar to develop the general skills needed to support a career in scientific research: experimental design, writing scientific papers and grants, oral presentation, basic statistical and computational methods,

and managing a research laboratory. Exercises focus on the preparation of a mock research grant proposal.

**Related Courses in Other Departments**

Advanced Development Biology (BIOGD 483)

Lipids (BIOAP 619, NS 602)

Molecular Techniques for Animal Biologists (AN SC 650)

Teaching Experience (BIO G 498)

Undergraduate Research in Biology (BIO G 499)

**ECOLOGY AND EVOLUTIONARY BIOLOGY (BIOEE)**

**BIOEE 154(1540) Introductory Oceanography, Lectures (also EAS 154(1540))**

Fall. 3 credits; optional 1-credit laboratory offered as BIOEE/EAS 155. S-U or letter grades. B. C. Monger and C. H. Greene. For description, see EAS 154.

**BIOEE 155(1550) Introductory Oceanography, Laboratory (also EAS 155(1550))**

Fall. 1 credit. Corequisite: BIOEE/EAS 154. S-U or letter grades. B. C. Monger and C. H. Greene. For description, see EAS 155.

**BIOEE 207(2070) Evolution (also HIST/ S&TS 287(2870))**

Fall or summer (six-week session). 3 credits. Intended for students with no background in college biology. May not be taken for credit after BIOEE 278. Does not meet evolutionary biology requirement for biological sciences major. S-U or letter grades. W. B. Provine.

Evolution is the central concept in biology. This course examines evolution in historical and cultural contexts. This course aims to understand the major issues in the history and current status of evolutionary biology and explore the implications of evolution for culture. Issues range from controversies over mechanisms of evolution in natural populations to the conflict between creationists and evolutionists.

**BIOEE 261(2610) Ecology and the Environment**

Fall or summer (three-week session). 4 credits. Prerequisite: one year introductory biology. S-U or letter grades. Fall: A. S. Flecker and J. P. Sparks. Summer: one weekend field trip. A. T. Vawter.

Fall: Explores interactions between the environment and organisms in the context of individuals, populations, communities, and ecosystems. Emphasizes basic ecological principles and processes intrinsic to understanding the world around us and in more advanced studies in the environmental sciences, including management-oriented disciplines. Major topics include adaptive strategies of organisms, population dynamics, species interactions, community structure and ecosystem function, biodiversity, biogeochemistry, productivity, human influences on ecosystems, and sustainable practices.

Summer: Introduction to principles of ecology, concerning the interactions between organisms and their environment. Deals with both terrestrial and aquatic ecology, drawing

examples from both plant and animal studies. Phenomena that occur at the individual, population, community, and ecosystem levels of organization are examined through classroom lectures and discussion and through a series of lab and field experiences in natural habitats around Ithaca and in the Adirondack Forest Preserve. Ecological principles are applied extensively to current environmental problems and issues.

**BIOEE 263(2630) Field Ecology**

Fall. 3 credits. Pre- or corequisite: BIOEE 261. Letter grades only. One weekend field trip. A. Agrawal.

Field exercises designed to give students direct experience with fieldwork, with emphasis on developing observational skills, journal keeping, and a landscape perspective. Topics include plant succession, niche relationships of insects, influence of herbivores and competition on plant performance, decomposition of soil litter, foraging behavior, census methods, and use of scientific collections.

**BIOEE 264(2640) Tropical Field Ornithology**

Winter, Jan. 4–18, 2007, two-week, full-time course. 3 credits. Limited to 12 students; minimum of 8. Prerequisite: permission of instructor. Intended for students with limited or no bird knowledge. S-U or letter grades. Daily fieldwork, disc, reading, and individual project. Cost of tuition covers airfare, food, and lodging. A. A. Dhondt.

Provides students with the opportunity to study birds intensively in a neotropical environment. Students learn observational and field techniques, participate in group research projects and in daily seminars. The group is housed in the Biodiversity Center at Punta Cana. One or two field trips are taken to national parks in the Dominican Republic.

**BIOEE 265(2650) Tropical Field Ecology and Behavior**

Winter, field course based in Kenya, Africa. 4 credits. Limited to 15 students. Prerequisites: one introductory biology course and permission of instructors. Letter grades only. I. J. Lovette and D. Rubenstein.

Gives students a broad hands-on understanding of tropical biology, ecology, and behavioral ecology. Students gain experience with experimental design and data collection, field methods, basic statistics, interpretation and evaluation of primary scientific literature, and scientific paper writing. Most in-country costs (e.g., ground transportation, room, board) are covered by course tuition, but students pay separately for their international airfare and there may also be a small supplementary laboratory fee.

**[BIOEE 267(2670) Introduction to Conservation Biology**

Fall. 3 credits. Intended for both science and nonscience majors. May not be taken for credit after NTRES 410(450). Completion of BIOEE 267 not required for NTRES 410. S-U or letter grades. One Sat. a.m. field trip. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. W. Fitzpatrick.]

**BIOEE 274(2740) The Vertebrates: Structure, Function, and Evolution**

Spring. 4 credits. Prerequisite: one year introductory biology. Fee: \$25. S-U or letter grades. K. R. Zamudio.

Introductory course in vertebrate organismal biology that explores the structure and function of vertebrates with an emphasis on trends in vertebrate evolution. Lectures cover topics such as the origin and evolution of various vertebrate groups, sensory systems, thermoregulation, life history, locomotion, feeding, size, and scaling. Laboratories include dissections of preserved vertebrate animals and noninvasive live animal demonstrations.

**[BIOEE 275(2750) Human Biology and Evolution (also ANTHR/NS 275[2750])**

Fall. 3 credits. Letter grades; S-U grades by permission of either instructor. Not offered 2006–2007; next offered 2007–2008. K. A. R. Kennedy and J. D. Haas.]

**BIOEE 278(2780) Evolutionary Biology**

Fall, spring, or summer. Fall or spring; 3 or 4 credits; 4-credit option involves writing component and two disc per week; 4-credit option limited to 20 students per sec each semester. (Students may not preregister for 4-credit option; interested students complete application form on first day of class.) Limited to 300 students. Prerequisite: one year introductory biology or permission of instructor; first-semester freshmen by permission of instructor. S-U or letter grades. Evening prelims: spring, Mar. 1 and Apr. 3. Fall, I. J. Lovette; spring, M. J. Shulman. Summer (three-week session): 4 credits. Prerequisite: one year introductory biology or equivalent or permission of instructor. Letter grades only. Two all-day Sat. field trips. I. J. Lovette.

Considers explanations for patterns of diversity and for the apparent good fit of organisms to the environment. Topics include the genetic and developmental basis of evolutionary change, processes at the population level, the theory of evolution by natural selection, levels of selection, concepts of fitness and adaptation, modes of speciation, long-term trends in evolution, rates of evolution, and extinction. Students taking the fall or spring 4-credit option read additional materials from the primary literature and write a series of essays in place of the regular prelims. The 4-credit, summer version also considers special topics such as sexual selection and evolutionary perspectives on disease and medicine and offers expanded hands-on activities, greater exposure to current research and the primary literature, and an emphasis on students' interpretive learning as reflected in essays and other writing assignments.

**[BIOEE 350(3500) Dynamics of Marine Ecosystems (also EAS 350[3500])**

Fall. 3 credits. Limited to 25 students. Prerequisites: one year of calculus and semester of oceanography (i.e., BIOEE/EAS 154), or permission of instructor. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. C. H. Greene and R. W. Howarth. For description, see EAS 350.]

**BIOEE 351(3510) Marine Ecosystems Field Course (also EAS 351[3510])**

Spring, full-time, three-week course. 4 credits. Limited to 25 students. Prerequisites: enrollment in Cornell Abroad Earth and Environmental Sciences Semester in Hawaii; one semester of calculus and two semesters of biology or permission of instructor. Letter grades only. C. H. Greene, C. D. Harvell, and B. C. Monger.

For description, see EAS 351.

**[BIOEE 362(3620) Dynamic Models in Biology (also MATH 362[3620])**

Spring. 4 credits. Prerequisites: two semesters introductory biology (BIO G 101–102, 105–106, 107–108, 109–110 or equivalent) and completion of mathematics requirements for Biological Sciences major or equivalent. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. S. P. Ellner and J. M. Guckenheimer.]

**BIOEE 363(3630) Field Methods in Ornithological Research**

Summer (eight-week session). 5 credits. Limited to 15 students. Prerequisites: introductory biology or equivalent, interest and ability to spend all day in the field under variable weather conditions, including intense sun and periods of rain, and permission of instructor. S-U or letter grades. P. H. Wrege, D. W. Winkler, C. B. Cooper, and D. N. Bonter.

Detailed, hands-on experience with the methods commonly used in ornithological field research, focusing on different methodologies used to obtain data on organismal structure and function, life history characteristics, and behavior. While being immersed in an ongoing, intensive research program in the Ithaca area, students learn about the types of evolutionary and ecological questions that can be addressed through use of different research methodologies, experimental design, and basic statistical analysis techniques.

**BIOEE 369(3690) Chemical Ecology (also BIONB/ENTOM 369[3690])**

Spring. 3 credits. Prerequisites: one semester of introductory biology for majors or nonmajors and one semester of introductory chemistry for majors or nonmajors or equivalents, or permission of instructor. S-U or letter grades. A. Agrawal, G. Jander, A. Kessler, and J. S. Thaler.

Why are chilies so spicy? This course examines the chemical basis of interactions between species and is intended for students with a basic knowledge of chemistry and biology. Focuses on the ecology and chemistry of plants, animals, and microbes. Stresses chemical signals used in diverse ecosystems, using Darwinian natural selection as a framework. Topics include: plant defenses, microbial warfare, communication in marine organisms, and human pheromones.

**[BIOEE 371(3710) Human Paleontology (also ANTHR 371[3710])**

Spring. 4 credits. Limited to 18 students. Prerequisite: one year introductory biology or ANTHR 101 or permission of instructor. Letter grades only. Occasional field trips. Not offered 2006–2007; next offered 2008–2009. K. A. R. Kennedy.]

**[BIOEE 373(3730) Biology of the Marine Invertebrates**

Fall (but course must be taken previous summer at Shoals Marine Laboratory [SML]), three-week, full-time course. 5 credits (students enroll for credit during fall semester). Limited to 24 students. Prerequisites: one year introductory biology for majors; permission of faculty because off campus. Letter grades only. Daily and evening lec, lab, and fieldwork. Total cost for room, board, and overhead at SML: \$1,200. Offered alternate years; not offered 2006–2007; next offered 2007–2008. C. D. Harvell and J. G. Morin.]

**[BIOEE 405(4050) Biology of the Neotropics]**

Spring. 2 credits. Limited to 18 students. Prerequisite: BIOEE 261 or permission of instructor. S-U or letter grades. Not offered 2006-2007; next offered 2008-2009. A. S. Flecker.]

**[BIOEE 446(4460) Plant Behavior—Induced Plant Responses to Biotic Stresses]**

Spring. 3 credits. Limited to 12 students. Prerequisite: BIOEE 261 or permission of instructor. S-U or letter grades. A. Kessler. How do plants respond to herbivore attack? What are the molecular, plant hormonal, metabolic mechanisms of these responses? What ecological consequences do these responses have for the plant's and their attackers' fitness? The course provides an overview of the plant's myriad responses to herbivores and compares them to responses to pathogens. It gives an introduction to the study of induced plant responses in the lectures as well as practical independent and group-intensive work.

**[BIOEE 450(4500) Mammalogy, Lectures]**

Spring. 3 credits. Recommended: BIOEE 274. Letter grades; S-U grades by permission only. Offered alternate years. B. A. McGuire. Lectures cover the evolution, diversity, functional morphology, behavior, ecology, and biogeography of living mammals. Selective coverage of mammalian fossils, conservation status, domestication, and diseases.

**[BIOEE 451(4510) Mammalogy, Laboratory]**

Spring. 1 credit. Limited to 24 students. Pre- or corequisite: BIOEE 450. Letter grades; S-U grades by permission only. Fee: \$15. Travel to Cornell University Museum of Vertebrates (CUMV) at the Laboratory of Ornithology is necessary. One all-day field trip may be scheduled. Offered alternate years. B. A. McGuire. Laboratory topics include systematics, morphology, and behavior. Focus is on terrestrial mammals of North America. Most laboratories involve studies of skeletons and museum specimens; dissection of preserved material is possible. Live animals may be studied in the field and used in the laboratory for nondestructive experiments and demonstrations.

**[BIOEE 453(4530) Speciation]**

Spring. 4 credits. Limited to 40 students. Prerequisites: BIOEE 278 and BIOGD 281 or equivalents, or permission of instructor. S-U or letter grades. Offered alternate years. R. G. Harrison. Advanced course in evolutionary biology focusing on the pattern and process of speciation and the nature and origin of intrinsic barriers to gene exchange. Lecture topics include species concepts and definitions, the history of ideas about speciation, the biological basis of intrinsic barriers to gene exchange, current models for the origin of such barriers, genetic architecture of speciation, rates of speciation. Emphasis is on developing a rigorous conceptual framework for discussing speciation and on detailed analysis of a series of case histories.

**[BIOEE 455(4550) Insect Ecology (also ENTOM 455(4550))]**

Fall. 4 credits. Recommended: ENTOM 212 or BIOEE 261 or permission of instructor. S-U or letter grades. Offered alternate years. J. S. Thaler. For description, see ENTOM 455.

**[BIOEE 456(4560) Stream Ecology (also NTRES 456(4560))]**

Fall. 4 credits. Limited to 40 students. Prerequisite: BIOEE 261 or permission of instructor. S-U or letter grades. Field project with lab papers. One Sat. field trip. Offered alternate years; not offered 2006-2007; next offered 2007-2008. A. S. Flecker and C. E. Kraft. For description, see NTRES 456.]

**[BIOEE 457(4570) Limnology: Ecology of Lakes, Lectures]**

Spring. 3 credits. Prerequisite: BIOEE 261 or written permission of instructor. Recommended: introductory chemistry. Letter grades; S-U grades by permission only. Offered alternate years; not offered 2006-2007; next offered 2007-2008. N. G. Hairston, Jr.]

**[BIOEE 458(4580) Community Ecology]**

Spring. 4 credits. Prerequisites: BIOEE 261, 278, or permission of instructor. S-U or letter grades. Offered alternate years; not offered 2006-2007; next offered 2007-2008. M. A. Geber and A. Agrawal.]

**[BIOEE 459(4590) Limnology: Ecology of Lakes, Laboratory]**

Spring. 2 credits. Pre- or corequisite: BIOEE 457. Letter grades; S-U grades by permission only. One weekend field trip. Fee for food on field trip: \$12. Offered alternate years; not offered 2006-2007; next offered 2008-2009. N. G. Hairston, Jr. and staff.]

**[BIOEE 460(4600) Theoretical Ecology]**

Spring. 4 credits. Limited enrollment. Prerequisites: completion of Biological Sciences mathematics requirement or equivalent, and either one additional semester of mathematics, statistics, or modeling (e.g., BEE 260/453/475, NTRES 310/411, BIONB 422) or permission of instructor. S-U or letter grades. Offered alternate years. S. P. Ellner. Introduction to the models used to construct ecological theory and analyze data on ecological dynamics, and to the mathematical and computer methods used to analyze these models. Applications from individual decision-making through multispecies and spatial dynamics introduce the main themes in theoretical ecology: optimization, dynamics, and the links between process and pattern. The lab includes instruction in computer programming and review of mathematical methods.

**[BIOEE 462(4620) Marine Ecology (also EAS 462(4620))]**

Fall. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Letter grades; S-U grades by permission only. Offered alternate years. C. D. Harvell and C. H. Greene. Lectures and discussion focus on current research in broad areas of marine ecology with an emphasis on processes unique to marine systems. A synthetic treatment of multiple levels of organization in marine systems including organismal, population, community, ecosystems, and evolutionary

biology. Examples are drawn from all types of marine habitats, including polar seas, temperate coastal waters, and tropical coral reefs.

**[BIOEE 463(4630) Plant Ecology and Population Biology, Lectures]**

Fall. 3 credits. Prerequisite: BIOEE 261 or 278 or equivalents, or permission of instructor. Recommended: some taxonomic familiarity with vascular plants and concurrent enrollment in BIOEE 465. Letter grades only. Not offered 2006-2007; next offered 2008-2009. M. A. Geber and P. L. Marks.]

**[BIOEE 464(4640) Macroevolution]**

Spring. 4 credits. Limited to 35 students. Prerequisite: BIOEE 278 or permission of instructor. Interested graduate students strongly encouraged to preregister. Letter grades; S-U grades by permission only. Offered alternate years; not offered 2006-2007; next offered 2007-2008. A. R. McCune.]

**[BIOEE 465(4650) Plant Ecology and Population Biology, Laboratory]**

Fall. 1 credit. Corequisite: BIOEE 463. Letter grades only. Not offered 2006-2007; next offered 2008-2009. M. A. Geber and P. L. Marks.]

**[BIOEE 466(4660) Physiological Plant Ecology, Lectures]**

Spring. 3 credits. Limited to 30 students. Prerequisite: BIOEE 261 or introductory plant physiology. Letter grades; S-U grades by permission only. Offered alternate years. J. P. Sparks.

Detailed survey of the physiological approaches used to understand the relationships between plants and their environment. Lectures explore physiological adaptation; limiting factors; resource acquisition and allocation; photosynthesis, carbon, and energy balance; water use and water relations; nutrient relations; linking physiology, development, and morphology; stress physiology; life history and physiology; the evolution of physiological performance; and physiology at the population, community, and ecosystem levels. Readings draw from the primary literature and textbooks.

**[BIOEE 467(4670) Seminar in the History of Biology (also HIST 415(4150), B&SOC/S&TS 447(4471))]**

Fall or summer (six-week session). 4 credits. Limited to 18 students. S-U or letter grades. W. B. Provine and K. A. R. Kennedy. Specific topic changes each year.

**[BIOEE 468(4680) Physiological Plant Ecology, Laboratory]**

Spring. 2 credits. Limited to 15 students. Pre- or corequisite: BIOEE 466. Letter grades only. Offered alternate years. J. P. Sparks.

Detailed survey of the physiological approaches used in understanding the relationships between plants and their environment. Laboratories apply physiological techniques to specific ecological problems and cover aspects of experimental design and computer-aided data analysis. Most laboratories run past the three-hour period, with students spending an average of three hours per week in additional lab time for this course.

**[BIOEE 469(4690) Food, Agriculture, and Society (also B&SOC/S&TS 469[4691])]**

Spring. 3 credits. Limited to 20 students. Prerequisite: introductory ecology course or permission of instructor. S-U or letter grades. Not offered 2006–2007; next offered 2008–2009. A. G. Power.]

**BIOEE 470(4700) Herpetology, Lectures**

Spring. 2 credits. Limited to 50 students. Recommended: BIOEE 274 and concurrent enrollment in BIOEE 472. Letter grades; S-U grades by permission only. Offered alternate years. H. W. Greene.

Lectures cover various aspects of the biology of amphibians and reptiles, including evolution, zoogeography, ecology, behavior, and physiology.

**BIOEE 472(4720) Herpetology, Laboratory**

Spring. 2 credits. Limited to 35 students. Pre- or corequisite: BIOEE 470. Letter grades; S-U grades by permission only. Fee: \$30. Occasional field trips and special projects. Offered alternate years. H. W. Greene.

Laboratory topics include systematics, morphology, and behavior. Live animals are studied in the field and are used in the laboratory for nondestructive demonstrations and experiments. The systematics laboratory exercises are based on museum specimens and dissection of preserved materials.

**BIOEE 473(4730) Ecology of Agricultural Systems (also HORT 473[4730])**

Fall. 3 credits. Limited to 45 students. Prerequisite: BIOEE 261 or permission of instructor. S-U or letter grades. During first six weeks of class, Thurs. meetings may run later because of field trips. L. E. Drinkwater and A. G. Power.

Analysis of the ecological processes operating in agricultural systems, with an emphasis on understanding relationships between agroecosystem structure and function and interactions among organisms. Examines agroecological theory and research through readings and discussions. The first part of this course emphasizes understanding biogeochemical processes, population and community ecology with emphasis on plant-herbivore and plant-microbial interactions, and evolutionary processes in agroecosystems. The latter part focuses on the application of ecological knowledge to the design and management of multifunctional agroecosystems. Field trips to local farms and case studies from both the tropics and the temperate zone are used to illustrate important concepts.

**[BIOEE 475(4750) Ornithology]**

Spring. 4 credits. Limited to 35 students. Prerequisite: permission of instructor by preregistering in E141 Corson Hall. Recommended: BIOEE 274. Letter grades; S-U grades by permission only. Carpooling to Lab of Ornithology necessary. Fee: \$15. Occasional field trips and special projects. Offered alternate years; not offered 2006–2007; next offered 2007–2008. D. W. Winkler.]

**BIOEE 476(4760) Biology of Fishes**

Fall. 4 credits. Limited to 24 students. Recommended: BIOEE 274 or equivalent experience in vertebrate zoology. Letter grades; S-U grades by permission only. Small lab fee may be required. Two field

trips. Offered alternate years.

A. R. McCune.

Introduction to the study of fishes: their structure, physiology and functional morphology, behavior, ecology, diversity, evolution, classification, and identification. Emphasizes marine fishes from different habitats (temperate, tropical coral reef, intertidal, and deep sea); local freshwater species; and interesting freshwater fishes from around the world, especially South America and Africa. Two field trips, including one full-day weekend trip required. Live animals are studied in the field and are sometimes used in the laboratory for nondestructive demonstrations or experiments. The systematics and dissection laboratories use preserved specimens.

**[BIOEE 477(4770) Marine Invertebrates Seminar]**

Fall. 1 credit. Prerequisite: BIOEE 373 or permission of instructor. S-U grades only. Offered alternate years; not offered 2006–2007; next offered 2007–2008. C. D. Harvell and J. G. Morin.]

**BIOEE 478(4780) Ecosystem Biology**

Spring. 4 credits. Prerequisite: BIOEE 261 or equivalent. S-U or letter grades. Offered alternate years. C. L. Goodale and R. W. Howarth.

Analyzes ecosystems in terms of energy flow and nutrient cycles, emphasizing an experimental approach and comparative aspects of terrestrial, freshwater, and marine ecosystems. Considers anthropogenic effects on ecosystems, such as from acid precipitation and nitrogen pollution. Also analyzes climate change and regional environmental change from an ecosystem perspective.

**BIOEE 479(4790) Paleobiology (also EAS 479[4790])**

Fall. 4 credits. Prerequisites: one year introductory biology for majors and either BIOEE 274, 373, EAS 375, or permission of instructor. S-U or letter grades. Offered alternate years. W. D. Allmon.

For description, see EAS 479.

**[BIOEE 490(4900) Topics in Marine Biology]**

Spring. 2 credits; may be repeated for credit. Limited to 15 students. Prerequisite: permission of instructor. Primarily for undergraduates. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. G. Morin and M. J. Shulman.]

**BIOEE 660(6600) Field Studies in Ecology and Evolutionary Biology**

Fall or spring. Variable credit. Prerequisites: BIOEE 261, taxon-oriented course, and permission of instructor. Letter grades; S-U grades by permission only. Lec and field trips TBA. Estimated costs: TBA. Staff.

Provides students with opportunities to learn field techniques and new biota by participating in an intensive series of field exercises. Extended field trips may be scheduled during fall break, intersession, or spring break. The regions visited, trip objectives, and other details are announced by the various instructors at an organizational meeting held at the beginning of the semester. Meetings on campus are devoted to orientation and reports on completed projects.

**Sec 01 Tropical Field Ecology**

Spring. 2 credits. Prerequisite: for undergraduates, experience or course work with terrestrial, marine, or freshwater organisms. Extended field trip over winter break. Letter grades only. Fee to cover transportation and housing: TBA. Offered alternate years. C. D. Harvell, J. P. Sparks, and N. G. Hairston, Jr.

Field trip to the big island of Hawaii, the Yucatan Coast of Mexico, or similar environment; check with instructors for planned location. Students employ experimental approaches to study ecological and evolutionary questions across a range of tropical biomes.

**[Sec 02 Graduate Field Course in Ecology]**

Spring. 3 credits. Prerequisite: graduate standing. Letter grades only. Fee charged to help cover food and lodging for trip to Florida. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. P. Sparks.]

**BIOEE 661(6610) Environmental Policy (also ALS 661[6610], B&SOC 461[4611])**

Fall and spring. 3 credits each semester; students must register for 6 credits each semester since R grade given at end of fall semester. Limited to 12 students. Prerequisite: permission of instructor. Letter grades only. D. Pimentel.

Focuses on complex environmental issues. Ten to 12 students, representing several disciplines, investigate significant environmental problems. The research team spends two semesters preparing a scientific report for publication in *Science* or *BioScience*. Thus far, every study has been published.

**[BIOEE 668(6680) Principles of Biogeochemistry]**

Spring. 4 credits. Limited to 20 students. Prerequisite: solid background in ecology, environmental chemistry, or related environmental science; for undergraduates, permission of instructor. S-U or letter grades. Offered alternate years; not offered 2006–2007; next offered 2007–2008. R. W. Howarth and C. L. Goodale.]

**[BIOEE 671(6710) Palaeoanthropology of South Asia (also ANTHR 671[6371], ASIAN 671[6671])]**

Fall. 3 credits. Limited to 15 students. Letter grades only. Not offered 2006–2007; next offered 2008–2009. K. A. R. Kennedy.]

**[BIOEE 673(6730) Human Evolution: Concepts, History, and Theory (also ANTHR 673[6373])]**

Spring. 3 credits. Prerequisite: one year introductory biology or ANTHR 101 or permission of instructor. Letter grades only. Not offered 2006–2007; next offered 2008–2009. K. A. R. Kennedy.]

**BIOEE 675(6750) Current Topics in Plant Molecular Ecology**

Fall. 1 credit; may be repeated for credit. Limited to 20 students. Prerequisite: BIOEE 261 or permission of instructor. S-U or letter grades. Offered alternate years. A. Kessler.

Seminar with presentations and discussions of papers that utilize molecular genetic techniques to address consequential questions in plant ecology, evolution, and conservation. Independent and group-intensive study of current interest.



**BIOEE 750-760(7590-7600) Special Topics in Evolution and Ecology**

Fall or spring. 1-3 credits; may be repeated for credit. Limited enrollment. Letter grades; S-U grades by permission only. Staff.

Independent or group-intensive study of special topics of current interest. Content varies each semester.

**BIOEE 761(7610) Microsatellite DNA: Techniques**

Fall. 1 credit; may be repeated for credit. Limited to 12 students. Prerequisite: permission of instructor. Primarily for graduate students; undergraduates admitted only under exceptional circumstances. E-mail S. M. Bogdanowicz (smb31) by end of Aug. if interested. S-U grades only. Fee: TBA. R. G. Harrison and S. M. Bogdanowicz.

Construct and screen genomic DNA libraries for microsatellite loci. Lectures and group discussions regarding microsatellite isolation, characterization, and evolution. Informal presentations of student research projects.

**BIOEE 763(7630) Workshop in Biogeochemistry**

Fall or spring. 1-3 credits; may be repeated for credit. Limited to 15 students. Prerequisite: BIOEE 668. S-U grades only. Staff.

Workshop-forum in which graduate students interact with invited world leaders in biogeochemistry. Workshop topics change each semester. A one-week workshop is preceded by seven one-hour preparatory discussions of readings.

**BIOEE 764(7640) Plant-Insect Interactions Seminar**

Fall or spring. 1 credit; may be repeated for credit. Prerequisite: for undergraduates, permission of instructor. S-U grades only. A. Agrawal and J. S. Thaler.

Group-intensive study of current research in plant-insect interactions. Topics vary from semester to semester, but include: chemical defense, coevolution, insect community structure, population regulation, biocontrol, tritrophic interactions, and mutualism.

**BIOEE 767(7670) Current Topics in Ecology and Evolutionary Biology**

Fall. 4 credits. Prerequisite: for undergraduates, permission of instructor. S-U grades only. P. P. Feeny.

Critical evaluation and discussion of theory and research in ecology and evolutionary biology. Lectures by faculty and student-led discussions of topics in areas of current importance.

**BIOEE 899(8990) M.S. Thesis Research**

Fall or spring. 1-15 credits. Prerequisite: admission to field of ecology and evolutionary biology. S-U or letter grades. E&EB field faculty.

Thesis research conducted by an M.S. student in the field of ecology and evolutionary biology with advice and consultation of a major professor who is a member of the field.

**BIOEE 999(9990) Ph.D. Dissertation Research**

Fall or spring. 1-15 credits. Prerequisite: admission to field of ecology and evolutionary biology as Ph.D. student. S-U or letter grades. E&EB field faculty.

Dissertation research conducted by a Ph.D. student in the field of ecology and evolutionary biology with advice and

consultation of a major professor who is a member of the field.

**Related Courses in Other Departments**

Evolutionary Theory and Human Behavior (ANTHR 375/675)

Ethics and the Environment (B&SOC/S&TS 206, PHIL 246)

Physical Hydrology for Ecosystems (BEE 371)

Evolution of the Earth and Life (BIO G 170, EAS 102)

General Microbiology, Lectures (BIOMI 290)

Prokaryotic Diversity (BIOMI 414)

Microbial Ecology (BIOMI 418)

Neurobiology and Behavior I: Introduction to Behavior (BIONB 221)

Methods in Animal Behavior (BIONB 323)

Ecology of Animal Behavior (BIONB/BIOSM 329)

Modeling Behavioral Evolution (BIONB 422)

Animal Communication (BIONB 426)

Animal Social Behavior (BIONB 427)

Introductory Botany (BIOPL 241)

Taxonomy of Vascular Plants (BIOPL 248)

Phylogenetic Systematics (BIOPL/ENTOM 440)

Molecular Systematics (BIOPL 447)

Plant Evolution and the Fossil Record (BIOPL 448)

Principles and Practice of Historical Biogeography (BIOPL/ENTOM 453)

Field Ornithology (BIOSM 374)

Field Marine Biology and Ecology (FMBE) (BIOSM 375)

Seaweeds, Plankton, and Seagrass: The Ecology and Systematics of Marine Plants (BIOSM 449)

Biological Statistics I (BTRY/STBTRY 301, NTRES 313)

Statistical Genomics (BTRY/STBTRY 482)

Soil Science (CSS 260)

Geographic Information Systems (CSS 420)

Soil Ecology (CSS/HORT 466)

Practicum in Forest Farming as an Agroforestry System (CSS/HORT/NTRES 426)

Introductory Geological Sciences (EAS 101)

Evolution of the Earth System (EAS 301)

Introduction to Biogeochemistry (EAS/NTRES 303)

Insect Biology (ENTOM 212)

Insect Behavior (ENTOM 325)

Introductory Insect Systematics (ENTOM 331)

Maggots, Grubs, and Cutworms: Larval Insect Biology (ENTOM 333)

Ecological Genetics (ENTOM 470)

Techniques of Multivariate Analysis (ILRST 410)

Statistical Analysis of Qualitative Data (ILRST 411)

Environmental Conservation (NTRES 201)

Applied Population Ecology (NTRES 310)

Global Ecology and Management (NTRES 322)

Forest Ecology (NTRES 420)

Forest Ecology, Laboratory (NTRES 421)

Wetland Ecology and Management, Lec/Lab (NTRES 422/423)

Fungi (PL PA 309)

**GENETICS AND DEVELOPMENT (BIOGD)****BIOGD 132(1320) Orientation Lectures in Molecular Biology and Genetics (also BIOBM 132(1320))**

Spring, weeks 1-3. 0 credits. Primarily for freshmen, sophomores, and transfer students. S-U grades only. Lec, S. Staff. For description, see BIOBM 132.

**BIOGD 280(2800) Lectures in Genetics**

Fall, spring, or summer (eight-week session). 3 credits. Not open to freshmen in fall semester. Lec component of BIOGD 281. Not open to students majoring in biological sciences; may not be used to fulfill requirements for biological sciences major. Prerequisites: one year introductory biology or equivalent, or permission of instructor. Lec. Highly recommended: problem-solving sessions. T. D. Fox and R. J. MacIntyre.

For description, see BIOGD 281.

**BIOGD 281(2810) Genetics**

Fall, spring, or summer (eight-week session). 5 credits. Not open to freshmen fall semester. Prerequisite: one year introductory biology or equivalent. Lec, lab. Highly recommended: problem-solving sessions. T. D. Fox, R. MacIntyre, and D. Nero.

General study of the fundamental principles of genetics in eukaryotes and prokaryotes. Topics include gene transmission, gene linkage and recombination, gene structure, gene and chromosome mutations, gene expression, and the manipulation of genes.

**BIOGD 282(2820) Human Genetics**

Spring. 2 or 3 credits; 2 credits if taken after BIOGD 281. Limited to 20 students per disc. Prerequisite: one year introductory biology or equivalent. S-U grades optional. Lec. M. L. Goldberg. Designed for nonmajors. Lectures provide the technical background needed to understand controversial personal, social, and legal implications of modern genetics that are discussed in section meetings.

**BIOGD 385(3850) Developmental Biology**

Fall. 3 credits. Prerequisite: BIOGD 281. Lec. K. Kempthues.

Introduction to the morphogenetic, molecular and cellular, and genetic aspects of the developmental biology of animals.

**BIOGD 394(3940) Circadian Rhythms (also ENTOM/BIONB/PL PA 394(3940))**

Fall. 2 credits. Prerequisite: ENTOM 212 or BIOGD 281 or BIONB 221 or 222 or permission of instructor. S-U grades optional. Lec. K. Lee.

For description, see ENTOM 394.



**BIOGD 400(4000) A Genomics Approach to Studying Life**

Fall. 3 credits. Prerequisites: one year introductory biology plus BIOGD 281 or 330 or 333 or 331/332 or permission of instructor. S-U or letter grades. Lec. J. Schimenti.

Introduction to principles underlying the organization of genomes and the methods of studying them, emphasizing genome-wide approaches to research. Covers the application of genomics methodologies for addressing issues including evolution, complex systems, genetics and gene: phenotype relationships. Includes periodic, in-depth discussions of landmark or timely genomics papers.

**BIOGD 401(4010) Genomic Analysis**

Spring. 3 credits. Prerequisites: BIOGD 400 or permission of instructor. Lec. T. P. O'Brien.

Overview of approaches and tools used in genomics research. Covers experimental and computational technologies as well as theoretical concepts important for the study of genomes and their function. Topics include high-throughput DNA sequencing and genotyping, genetic mapping of simple and complex traits, RNA expression profiling, proteomics, genome modification and transgenesis, and computational genomics.

**BIOGD 437(4370) Regulation of Cell Proliferation, Senescence, and Death (also BIOBM/TOX 437(4370))**

Spring. Variable credit; students may take lec for 2 credits or lec and disc for 3 credits. Limited to 20 students per disc; priority given to graduate students. Prerequisites: BIO G 101-102 and BIOBM 330 or 331/332. Recommended: BIOGD 281 and BIOBM 432. S-U grades optional. S. Lee.

For description, see BIOBM 437.

**[BIOGD 439(4390) Molecular Basis of Human Disease (also BIOBM 439(4390))]**

Fall. 3 credits. Prerequisites: biochemistry and molecular biology (e.g., BIOBM 330, 331/332, or 333) and genetics (e.g., BIOGD 281) or permission of instructor. Recommended: cell biology (e.g., BIOBM 432 or BIOAP 316) and physiology (e.g., BIOAP 311 or 458). S-U grades optional. Lec. Not offered 2006-2007; next offered 2007-2008. W. L. Kraus.

For description, see BIOBM 439.]

**BIOGD 452 Molecular Biology of Plant Organelles (also BIOPL 482, Sec 5)**

Spring. 1 credit. Prerequisites: BIOPL 483 Sec 1 or BIOGD 281 and permission of instructor. S-U or letter grades. M. R. Hanson and D. B. Stern.

For description, see BIOPL 482, Sec 5.

**BIOGD 481(4810) Population Genetics**

Fall. 4 credits. Prerequisite: BIOGD 281, BIOEE 278, or equivalents. Lec, disc. C. F. Aquadro and B. Lazzaro.

Population genetics is the study of the transmission of genetic variation through time and space. This course explores how to quantify this variation, what the distribution of variation tells us about the structure of natural populations, and about the processes that lead to evolution. Topics include the diversity and measurement of genetic variation, mating and reproductive systems, selection and fitness, genetic drift, migration and population structure, mutation, multilocus models, the

genetics of speciation, quantitative traits, and the maintenance of molecular variation. Emphasis is placed on DNA sequence variation and the interplay between theory and the data from experiments and natural populations. Specific case studies include the population genetic issues involved in DNA fingerprinting, the genetic structure and evolution of human populations, and the study of adaptation at the molecular level. Examples are drawn from studies of animals, plants, and microbes.

**BIOGD 482(4820) Human Genetics and Society**

Fall. 4 credits. Limited to 24 students. Prerequisite: biological sciences majors; priority given to seniors studying genetics and molecular and cell biology and biochemistry; BIOGD 281 and BIOBM 330 or 333 or 331 and 332. R. A. Calvo.

Presentation of some of the science and technology of human genetics, plus discussion of the ethical, social, and legal implications of recent advances in the field. Topics include assisted reproductive strategies, eugenics, genetic counseling, genetic screening (pre-implantation, prenatal, neonatal, pre-symptomatic, carrier, and workplace), wrongful life and wrongful birth, genetic effects of abused substances, genetics and behavior, human cloning, forensic uses of genetics, and therapy for genetic diseases. Students lead some discussions. There is a major writing component to the course.

**BIOGD 483(4830) Advanced Developmental Biology**

Spring. 3 credits. Prerequisites: BIOGD 281; BIOBM 332 or 330 or 333; and BIOGD 385 or permission of instructor. Lec. Offered alternate years. M. F. Wolfner.

An advanced course in developmental biology that emphasizes the molecular events that underlie development. Simultaneously, a molecular/cell biology course that focuses on how developmental pathways integrate the regulation of gene expression, signal transduction, and cell-cell communication. Course readings and discussion emphasize the latest results from the original scientific literature about developmental systems in microbes, invertebrate animals (e.g., fruit flies and nematodes), vertebrates (e.g., mice, frogs, and humans) and plants.

**BIOGD 484(4840) Molecular Evolution**

Spring. 3 credits. Prerequisites: BIOGD 281. Lec. D. Barbash.

Explores the various processes by which DNA and protein sequences evolve over time, and how this evolution at the molecular level relates to changes in the morphology, behavior, and physiology of organisms that have occurred over times scales ranging from thousands to billions of years. After developing basic principles the course discusses the evolution and organization of genomes from viruses to higher eukaryotes including humans, and the relationship between molecular evolution at the sequence level and the evolution of developmental pathways and systems.

**BIOGD 485(4850) Bacterial Genetics (also BIOMI/BIOBM 485(4850))**

Fall. 2 credits. Prerequisite: BIOGD 281. Recommended: BIOMI 290 and BIOBM 330 or 331 and 332 or 333. Lec. J. E. Peters.

For description, see BIOMI 485.

**BIOGD 486(4860) Advanced Eukaryotic Genetics**

Spring. 4 credits. Enrollment may be limited to 50 students. Prerequisites: BIOGD 281, BIOBM 330 or 333 or 331 and 332. S-U grades optional. E. E. Alani.

Develops fundamental skills in eukaryotic genetic analysis through lectures and by reading, analyzing, and presenting research articles. Concepts are presented within the context of a well-studied field, such as chromosome segregation. The basic tools that have been developed to study this field are used to analyze other topics such as vegetative and meiotic cell cycle control, embryonic development, pathogen resistance in plants, and human genetics.

**BIOGD 487(4870) Human Genomics**

Fall. 3 credits. Prerequisite: BIOGD 281. Lec. A. G. Clark.

Applies fundamental concepts of transmission, population, and molecular genetics to the problem of determining the degree to which familial clustering of diseases in humans has a genetic basis. Emphasizes the role of full genome knowledge in expediting this process of gene discovery. Stresses the role of statistical inference in interpreting genomic information. Population genetics, and the central role of understanding variation in the human genome in mediating variation in disease risk, are explored in depth. Methods such as homozygosity mapping, linkage disequilibrium mapping, and admixture mapping are examined. The format is a series of lectures with classroom discussion. Assignments include a series of problem sets and a term paper.

**[BIOGD 489(4890) Mammalian Embryology (also BIOAP 489(4890))]**

Spring. 3 credits. Prerequisite: introductory biology. Offered alternate years; not offered 2006-2007; next offered 2007-2008. D. M. Noden.

Examines the early formation of the mammalian body and placenta, emphasizing comparative aspects, and morphogenesis and histogenesis of each organ system.]

**BIOGD 490(4900) Manipulating the Mouse Genome (also NS 490(4900))**

Fall. 1 credit. Prerequisite: BIOGD 280, 281, or 282 and BIOBM 330, 332, or 333 or NS 320. Lec. P. D. Soloway.

For description, see NS 490.

**BIOGD 608(6080) Epigenetics (also NS 608(6080))**

Fall. 2 credits. Prerequisites: BIOGD 281 and BIOBM 330, 332, or 333 or NS 320. Letter grades only. P. Soloway.

For description, see NS 608.

**BIOGD 610(6100) Genomes as Chromosomes**

Fall. 3 credits. Limited to 15 students. Prerequisites: BIOGD 281 and BIOBM 330 or 333 or 331/332 or equivalent by permission of instructor. Letter grades only. T. P. O'Brien and P. E. Cohen.

The eukaryotic genome is partitioned into discrete structural units, the chromosomes. The course examines how chromosome organization is related to chromatin structure, gene expression, DNA replication, repair and stability. Special emphasis is placed on how the linear arrangement of sequence features along the chromosome, such as genes and regulatory modules, relate to the functional organization of the genome in the nucleus.

Experimental and computational approaches used to address chromosome structure and function are studied.

**BIOGD 611(6110) Genome Maintenance Mechanisms**

Fall. 1 credit. Limited to 25 students. Prerequisites: BIOGD 281, as well as BIOBM 330, or 333, or 331/332 (or equivalents). S-U or letter grades. R. Weiss.

The course focuses on the molecular mechanisms utilized by eukaryotic cells to preserve genomic integrity. Topics to be discussed include endogenous and exogenous sources of mutation, DNA repair pathways, and cell cycle checkpoint mechanisms. Also addressed will be how genome maintenance impacts genome plasticity and evolution, as well as the relationship between genomic instability and disease, especially cancer.

**BIOGD 612(6120) Overview of Model Genetic Organisms**

Spring. 1 credit. Limited to 20 students. Prerequisites: BIOGD 281 or 400 or permission of instructor. S-U or letter grades. J. Schimenti.

Presents the features of various model organisms and their relative merits for conducting various types of genomics/genetics research. Model systems discussed include: yeast, *Arabidopsis*, *Drosophila*, *C. elegans*, zebrafish, and mice.

**BIOGD 613(6130) Genomics, Biotechnology, and Society**

Spring, weeks 10-13. 1 credit. Prerequisite: BIOGD 281 or BIOGD 400 or permission of instructor. S-U or letter grades. Disc. S. Kresovich and S. Tanksley.

A multidisciplinary examination of four to six selected topics that relate to the applications of biological insights derived from genomic analysis. Technical, scientific, ethical, political, legal, and/or social aspects of each topic will be considered from various perspectives.

**[BIOGD 624(6240) Quantitative Trait Loci Analysis (also PL PA 624(6240))]**

Fall. 1 credit. Prerequisites: introductory statistics and BIOGD 281 or permission of instructor. S-U or letter grades. Offered alternate years; not offered 2006-2007; next offered 2007-2008. K. Lee.

For description, see PL PA 624.]

**BIOGD 638(6380) Filamentous Fungal Genomics and Development (also PL PA 638[6380])**

Spring, last four weeks of semester. 1 credit. S-U grades optional. Prerequisite: BIOGD 281 or equivalent, or permission of instructor. Lec. B. G. Turgeon.

For description, see PL PA 638.

**[BIOGD 640(6400) Stem Cell Biology: Basic Science and Clinical Applications]**

Spring. 2 credits. Limited to 30 students. Prerequisites: BIOBM 432 or BIOGD 385 or permission of instructor. Offered alternate years; not offered 2006-2007; next offered 2007-2008. T. Tumber.

This class covers basic molecular aspects of stem cell biology during development and in adulthood. Clinical applications are also discussed.]

**[BIOGD 682(6820) Fertilization and the Early Embryo]**

Spring. 2 credits. Prerequisites: BIOGD 281; BIOBM 332, 330 or 333; and BIOGD 385 or permission of instructor. Lec. Offered alternate years; not offered 2006-2007; next offered 2007-2008. M. F. Wolfner.

We explore the latest molecular/cell/genetic findings about the biology of gametes, fertilization and early development—and their application to fertility modulation, “cloning” and stem cells.]

**[BIOGD 687(6870) Developmental Genetics]**

Fall. 2 credits. Limited to 20 students. Prerequisites: BIOGD 281 and 385 or equivalents. S-U grades optional. Lec TBA. Offered alternate years; not offered 2006-2007; next offered 2007-2008. K. J. Kemphues.

Course focuses on methods of genetic analysis of fruitflies, nematodes, mice, and fish to understand mechanisms of development. No text. Lectures and problems from literature.]

**BIOGD 689(6890) Cellular Basis of Development**

Fall. 2 credits. Limited to 20 students. Prerequisites: BIOGD 281, 385, and either BIOBM 330 or 331-332. Lec. S-U grades optional. Offered alternate years. J. Liu.

Focuses on the integration of different cellular processes in various developmental contexts. Topics include cell migration, cell adhesion and fusion, cell growth and proliferation, cell-cell communication, and cell death. Students are required to read current literature and participate in discussions in class.

**BIOGD 780(7800) Current Topics in Genetics**

Fall or spring. 1 credit; may be repeated for credit. Limited to 20 students. Primarily for graduate students; priority given to majors in field of genetics. Prerequisite: for undergraduates, written permission of instructor. No auditors. S-U grades only, by permission of instructor. Seminar TBA. Staff.

**BIOGD 781(7810) Problems in Genetics and Development**

Fall. 2 credits. Prerequisite: first-year graduate students in field of genetics and development. Disc TBA. Staff.

Introduction to the research literature in selected areas through weekly problem sets and discussions.

**[BIOGD 782-783(7820-7830) Current Genetics/Development Topics]**

Spring. 0.5 or 1 credit for each topic; may be repeated for credit. S-U grades only. Lec and sem on specialized topics. Staff.]

**BIOGD 784(7840) Introduction to Quantitative Analysis**

Fall. 1 credit. Letter grades only. E. Alani (organizer), A. Clark, C. Bustamante, and M. Goldberg.

The goal of this course is to introduce bioinformatic and probability/statistical tools at an intuitive level that will be meaningful to first-year graduate students in Genetics and Development.

**BIOGD 786(7860) Research Seminar in Genetics and Development**

Fall and spring. 1 credit. Requirement for, and limited to second-, third-, and fourth-year graduate students in genetics and development. S-U grades only. Staff.

Each graduate student presents one seminar per year based on his or her thesis research. The student then meets with the thesis committee members for an evaluation of the presentation.

**BIOGD 787(7870) Seminar in Genetics and Development**

Fall and spring. 1 credit. Prerequisite: graduate students in Genetics and Development. S-U grades only. Sem, TBA. Staff.

Seminars in current research in genetics and developmental biology conducted by distinguished visitors and staff.

**Related Courses in Other Departments**

Advanced Plant Genetics (PL BR 606)

Biosynthesis of Macromolecules (BIOBM 633)

Current Topics in Biochemistry (BIOBM 732-737)

Evolutionary Biology (BIOEE 278)

Laboratory in Molecular Biology and Genetic Engineering of Plants (BIOPL 347)

Laboratory in Plant Molecular Biology (BIOPL 641)

Molecular Biology and Genetic Engineering of Plants (BIOPL 343)

Plant Cytogenetics (PL BR 446)

Plant Genome Organization (PL BR 483.3)

Plant Molecular Biology I (BIOPL 483)

Plant Molecular Biology II (BIOPL 482)

The Nucleus (BIOBM 639)

Undergraduate Research in Biology (BIO G 499)

Molecular Neurobiology BIONB 420/720 (also BIOBM 435/735)

**MICROBIOLOGY (BIOMI)**

**BIOMI 290(2900) General Microbiology Lectures**

Fall, spring, or summer (six-week session). 3 credits. Prerequisites: one year introductory biology for majors and one year college chemistry, or equivalent.

Highly recommended: concurrent registration in BIOMI 291. W. C. Ghiorse. Comprehensive overview of the biology of microorganisms, with emphasis on bacteria. Topics include microbial cell structure and function, physiology, metabolism, genetics, diversity, and ecology. Some material may overlap with BIOGD 281 and BIOBM 330. Also covers applied aspects of microbiology such as biotechnology, the role of microorganisms in environmental processes, and medical microbiology. 4-credit option involves one discussion per week led by faculty in the Department of Microbiology and will involve readings and a writing assignment. Students may not pre-register for 4-credit option: Interested students complete an application form on first day of class (enrollment will be limited to 20 students).

**BIOMI 291(2910) General Microbiology Laboratory**

Fall or spring, summer (six-week session).  
2 credits. Pre- or corequisite: BIOMI 290.  
S. M. Merkel.

Study of the basic principles and techniques of laboratory practice in microbiology, and fundamentals necessary for further work in the subject.

**BIOMI 292(2920) General Microbiology Discussion**

Spring. 1 credit. Pre- or corequisite: BIOMI 290. S-U grades only. Staff.

Series of discussion groups in specialized areas of microbiology to complement BIOMI 290.

**BIOMI 331(3310) General Parasitology (also VETMI 331[3310])**

Spring. 2 credits. Prerequisites: one year introductory biology. D. Bowman.

Introduction to the basic animal parasites, stressing systematics, taxonomy, general biology, ecological interactions, and behavior of nonmedically important groups. Introduces the major animal parasites: protozoan, nematode, platyhelminth, acanthocephalan, annelid, and arthropod.

**BIOMI 391(3910) Advanced Microbiology Laboratory**

Fall. 3 credits. Prerequisites: BIOMI 290, 291, and BIOBM 330 or 331 or 333. Priority given to biological sciences students in microbiology program of study. W. C. Ghiorse, J. P. Shapleigh, and S. H. Zinder.

Illustrates basic principles of experimental microbiology. The course is organized into four modules that last three weeks each: (1) ecology, (2) physiology, (3) genetics, and (4) structure and function. Students are encouraged to take this course during their third year of study.

**BIOMI 394(3940) Applied and Food Microbiology (also FD SC 394[3940])**

Fall. 2-3 credits. Prerequisites: BIOMI 290-291. C. A. Batt.

For description, see FD SC 394.

**BIOMI 397(3970) Environmental Microbiology (also CSS 397[3970])**

Spring. 3 credits. Prerequisites: BIOEE 261 or BIOMI 290 or CSS (SCAS) 260 or permission of instructor. Offered alternate odd years. E. L. Madsen.

Discusses the biological properties, evolution, and behavior of microorganisms in natural systems in relation to past and present environmental conditions on Earth and other living planets. Also considers the functional role of microorganisms in ecologically and environmentally significant processes through discussion of specific topics such as nutrient and toxic elemental cycles, transformation of pollutant chemicals, wastewater treatment, environmental biotechnology, and astrobiology.

**[BIOMI 404(4040) Pathogenic Bacteriology and Mycology (also VETMI 404[4040])]**

Spring. 2 or 3 credits; 3 credits with lec and sem. Prerequisites: BIOMI 290 and 291; for undergraduates, permission of instructor. Highly recommended: BIO G 305. Offered alternate even years. D. Debbie.

For description, see VETMI 404.

**BIOMI 409(4090) Principles of Virology (also VETMI/PL PA 409[4090])**

Fall. 3 credits. Prerequisites: BIOMI 290, 291 or permission of instructor. Recommended: BIOBM 330-332, 432. Letter grades only. G. R. Whittaker and S. G. Lazarowitz.

For description, see VETMI 409.

**BIOMI 414(4140) Prokaryotic Diversity**

Spring. 3 credits. Prerequisites: BIOMI 290 and 291. Recommended: BIOBM 330 or 331 or 333. Offered alternate odd years. S. H. Zinder.

Consideration of the evolutionary biology, physiology, ecology, genetics, and practical potential of important groups of prokaryotes. Topics include prokaryotic phylogeny, the evolution of diverse mechanisms of energy conservation, fixation of carbon and nitrogen, and adaptation to extreme environments.

**[BIOMI 416(4160) Bacterial Physiology**

Spring. 3 credits. Prerequisites: BIOMI 290, 291, and BIOBM 330 or 331, or equivalents. Offered alternate even years. J. P. Shapleigh.

Focuses on physiological and metabolic functions of bacteria. Consideration is given to chemical structure, regulation, growth, and energy metabolism. Special attention is given to those aspects of bacterial metabolism not normally studied in biochemistry courses.]

**BIOMI 418(4180) Microbial Ecology**

Spring. 3 credits. Prerequisites: BIOMI 290 and 291, or 398 and permission of instructor, and BIOBM 330 or 331 and 332. E. R. Angert.

Understanding the role of microorganisms in natural environments is one of the greatest challenges facing microbiologists. This course introduces current biochemical and macromolecule sequence-based methods to assess community diversity and microbial activity in a variety of ecosystems. Other topics discussed include bacterial growth and survival, population biology, and microbial interactions.

**BIOMI 420(4200) Microbial Genomics**

Spring. 2 credits. Prerequisites: BIOMI 290, BIO G 281, BIOBM 330, or equivalent. Offered alternate odd years. J. P. Shapleigh and J. D. Helmann.

Genomic information is revolutionizing biology. This course discusses the impact of genomic information on the study of microbial physiology, evolution, and biotechnology. Topics include both techniques (automated DNA sequencing, assembly, annotation, DNA chips) and applications (genome-wide analysis of transcription, functional genomics).

**BIOMI 431(4310) Medical Parasitology (also VETMI 431[4310])**

Fall. 2 credits. Prerequisites: zoology and biology courses. D. Bowman.

For description, see VETMI 431.

**[BIOMI 482(4640)(Sec 02) Molecular Plant-Microbe Interactions (also BIOPL 482, Sec 02, PL PA 464[4640])]**

Spring. 1 credit. Prerequisites: BIOGD 281, BIOBM 330 or 331 or 333, and BIOPL 483 (sec 01) or equivalents. S-U grades optional. Offered alternate even years. S. C. Winans.

For description, see BIOPL 482, Sec 02.]

**BIOMI 485(4850) Bacterial Genetics (also BIOGD/BIOBM 485[4850])**

Fall. 2 credits. Prerequisite: BIOGD 281. Recommended: BIOMI 290 and BIOBM 330 or 331 and 332 or 333. J. E. Peters. Students gain a detailed understanding of how bacteria maintain and pass on genetic information with a strong focus on the bacterium *Escherichia coli*. They discover the processes by which bacteria evolve through different mutations and the exchange of genetic information. The course explores how genes are regulated efficiently through negative and positive regulation and by global regulatory mechanisms. Upon completion of the course students should understand the tools used to manipulate bacterial genomes for the understanding of bacteria and other living organisms.

**BIOMI 610(6100) Introduction to Chemical and Environmental Toxicology (also TOX 610[6100])**

Fall. 3 credits. Prerequisite: graduate standing in field or permission of instructor. Letter grades. A. Hay.

Introduction to the general principles of toxicology including the sources, mechanisms, and targets of toxic agents. Gives special attention to the interaction between toxic agents and biological systems at both the organismal and ecological level. The effects of both anthropogenic and natural toxins are examined with respect to genetic and developmental toxicity as well as carcinogenesis and specific organ toxicity.

**BIOMI 651(6080) Genomics of Bacterium-Host Interactions (also PL PA 608[6080])**

Fall, second half of semester. 1 credit. Prerequisites: BIOMI 290 or equivalent or permission of instructor. S-U grades optional. Offered alternate even years. A. Collmer and S. Winans.

For description, see PL PA 608.

**BIOMI 690 Prokaryotic Biology**

Fall and spring. 4 weeks/8 lec. 1 credit per sec to be offered.

**Sec 1 Microbial Structure and Function**

Fall. J. P. Shapleigh. Discusses those macromolecules and assemblages of macromolecules that together define the structure of the prokaryotic cell. This includes external structures, such as cell wall, flagella, pili, and peptidoglycan and internal structures such as specialized vesicles and other large complexes.

**Sec 2 Environmental Microbiology**

Fall. E. L. Madsen. Core course of concepts, methods, and current literature that reveals the multidisciplinary nature of environmental microbiology and its relationship to prokaryotic biology. Discusses the crucial roles that microorganisms play in catalyzing biogeochemical reactions throughout the biosphere.

**Sec 3 Microbial Physiology/Diversity**

Fall. S. H. Zinder. Reviews the major energy-conserving modes of metabolism and their phylogenetic distributions among both bacteria and archaea. Topics include phylogenetic analysis, fermentation, respiration, photosynthesis, pathways of carbon and nitrogen fixation, and evolution of the three domains of life.

**Sec 4 Microbial Genetics**

Spring, J. D. Hermann.

Reviews the fundamental concepts of microbial genetics including mutations and their analysis, plasmids, conjugation, transformation, transduction, transposition, recombination, repair, and mutagenesis.

**Sec 5 Microbial Pathogenesis**

Spring, S. C. Winans.

Introduction to the fundamental concepts of bacterial pathogenesis including the normal flora, pathogen entry and colonization, the production and regulation of toxins, horizontal transfer of pathogenesis determinants, and the roles of both specific and nonspecific host defenses. Examples include bacterial pathogens of both animals and plants.

**BIOMI 699(6990) Toxicology Journal Club Sec 01—Environmental Toxicology (TOX 6990)**

Spring. 1 credit. Required for toxicology students until post A exam. A. G. Hay.

**BIOMI 725(7250) Mechanisms of Microbial Pathogenesis (also VETMI 725[7250])**

Spring. 3 credits. Prerequisites: for undergraduates, written permission of instructor; BIOMI 404, 409, 417, or equivalent. Highly recommended: completion of two of the three courses. D. Debbie, M. Hesse, H. Marquis, J. Parker, M. Scidmore, and G. Whittaker.

For description, see VETMI 725.

**BIOMI 740(6430) Veterinary Perspectives on Pathogen Control in Animal Manure (also VTMED/BEE 740[6430])**

Spring, eight weeks. 2 credits. Prerequisite: third- and fourth-year veterinary students. Letter grades only. D. D. Bowman.

For description, see VTMED 740.

**BIOMI 791(7910) Advanced Topics in Microbiology**

Fall or spring. 1 credit; may be repeated for credit. Prerequisite: graduate standing in microbiology. S-U grades only. Sec 01 Bacterial Genetics, S. C. Winans; Sec 02 Environmental Microbiology, E. R. Angert.

Reading and presentation by graduate students of current literature in selected areas of modern microbiology.

**BIOMI 796(7960) Current Topics in Microbiology**

Fall and spring. 0.5 or 1 credit for each topic; may be repeated for credit. Primarily for graduate students in microbiology. Prerequisite: upper-level courses in microbiology. S-U grades only. Lec. Staff.

Lectures and seminars on special topics in microbiology.

**BIOMI 797(7970) Scientific Communication Skills**

Fall and spring. 1 credit each semester. Requirement for graduate students in graduate field of microbiology for first two semesters; third semester optional. S-U grades only. Staff.

The ability to communicate effectively is essential for success as a scientist. The primary goal of this course is to provide students with an opportunity to develop self-confidence and refine their formal oral presentation skills. Students are asked to present topical seminars that are critically evaluated by the instructor. Feedback for improving the presentation and peer evaluations are emphasized.

**BIOMI 798(7980) Graduate Research Seminar in Microbiology**

Fall and spring. 1 credit each semester.

Requirement for graduate students in graduate field of microbiology. S-U grades only. Staff.

All graduate students in the field of microbiology are required to attend and present a seminar concerning their research at least once each year.

**BIOMI 799(7990) Microbiology Seminar**

Fall and spring. Requirement for all graduate students in graduate field of microbiology. Open to all who are interested. Staff.

**Related Courses in Other Departments**

Advanced Food Microbiology (FD SC 607)

Advanced Immunology Lectures (BIO G/VETMI 705)

Advanced Work in Bacteriology, Virology, or Immunology (VETMI 707)

Phylobacteriology Research Updates (PL PA 647)

Basic Immunology, Lectures (BIO G 305, VETMI 315)

Current Topics in Oomycete Biology (PL PA 644)

Food Microbiology, Laboratory (FD SC 395)

Food Microbiology, Lectures (FD SC 394)

Immunology of Infectious Diseases (BIO G 706, VETMI 719)

Introduction to Scanning Electron Microscopy (BIO G 401)

Fungi (PL PA 309)

Light and Video Microscopy for Biologists (BIO G 450)

Limnology: Ecology of Lakes, Lectures (BIOEE 457)

Magical Mushrooms, Mischievous Molds (PL PA 201)

Microbiology for Environmental Engineering (CEE 451)

Plant Virology (PL PA 645)

Principles of Biogeochemistry (BIOEE 668)

The Soil Ecosystem (CSS 366)

**NEUROBIOLOGY AND BEHAVIOR (BIONB)****BIONB 111(1110) Brain Mind and Behavior (also PSYCH/COGST 111[1110])**

Spring. 3 credits. Prerequisite: none.

Intended for freshmen and sophomores in humanities and social sciences; not open to juniors and seniors. Not recommended for psychology majors; biology majors may not use course for credit toward major. Letter grades only. Planned M W F 9:05.

E. Adkins-Regan and R. R. Hoy.

For description, see COGST 111.

**BIONB 221(2210) Neurobiology and Behavior I: Introduction to Behavior**

Fall. 3, 4, or 5 credits; 4 credits with one disc per week; 5 credits with two disc per week and participation in Writing in the Majors program; 4- or 5-credit option required of students in neurobiology and behavior program of study. Limited to 15 students per 4-credit disc. Priority given to students studying neurobiology and behavior. Limited to 12 students in 5-credit option (students may not preregister for 5-credit option; interested students complete

application form on first day of class). Not open to freshmen. Prerequisite: one year introductory biology for majors. May be taken independently of BIONB 222. S-U grades optional. Planned M W F 12:20; disc TBA. H. K. Reeve and staff.

General introduction to the field of animal behavior. Topics include evolution and behavior, behavioral ecology, sociobiology, chemical ecology, communication, orientation and navigation, and hormonal mechanisms of behavior.

**BIONB 221(2210) Neurobiology and Behavior I: Introduction to Behavior**

Summer, six-week session. 3 or 4 credits; 4 credits with one disc per week.

Prerequisite: one year introductory college biology. S-U grades optional. Course fee: none. Planned M-F 4:00-5:15. Staff.

General introduction to the field of animal behavior. Topics include evolution and behavior, behavioral ecology, sociobiology, chemical ecology, communication, orientation and navigation, and hormonal mechanisms of behavior.

**BIONB 222(2220) Neurobiology and Behavior II: Introduction to Neurobiology**

Spring. 3 or 4 credits; 4 credits with disc and written projects; 4-credit option required of students studying neurobiology and behavior. Limited to 15 students per disc; priority given to students studying neurobiology and behavior. Not open to freshmen. Prerequisites: one year introductory biology for majors and one year of chemistry. May be taken independently of BIONB 221. S-U grades optional. Planned M W F 12:20; disc TBA. R. Harris-Warrick and staff.

General introduction to the field of cellular and integrative neurobiology. Topics include neural systems, neuroanatomy, developmental neurobiology, electrical properties of nerve cells, synaptic mechanisms, neurochemistry, motor systems, sensory systems, learning, and memory. Some discussion sections include dissections of preserved brains.

**BIONB 231(2310) Sophomore Seminar: Topics in Cognitive Studies: Borges and I: A Quest for Self-Knowledge (also PSYCH 231/531[2310/6331], COGST 531[6331])**

Spring. 4 credits. 231 limited to 15 students. Planned M W 2:55-4:10. S. Edelman.

For description, see PSYCH 231.

**BIONB 322(3220) Hormones and Behavior (also PSYCH 322[3220])**

Fall. 3 credits. Prerequisites: junior or senior standing; any one of the following: PSYCH 223 or BIONB 221 or 222 or one year introductory biology plus psychology course. Two lec plus sec in which students read and discuss original papers in the field, give oral presentation, and write term paper. Letter grades only. Graduate students, see PSYCH 722. Planned M W F 11:15. E. Adkins-Regan.

For description, see PSYCH 322.

**[BIONB 323(3230) Methods in Animal Behavior**

Fall. 4 credits. Prerequisite: BIONB 221. Letter grades only. Offered alternate years; next offered 2007-2008. Planned M W 1:25-4:25. S. L. Vehrencamp and J. W. Bradbury.



Hands-on lab/field course in methods for studying animal behavior. Topics include sound recording, videography, radio-tracking, mapping, capture/marketing methods, behavioral statistics.]

**BIONB 324(3240) Biopsychology Laboratory (also PSYCH 324[3240])**

Fall. 4 credits. Limited to 20 students. Prerequisites: junior or senior standing; PSYCH 223 or, BIONB 221 or 222, and permission of instructor. Planned T R 1:25–4:25. T. J. DeVoogd.

For description, see PSYCH 324.

**BIONB 325(3250) Insect Behavior (also ENTOM 325[3250])**

Spring. 3 credits. Prerequisite: ENTOM 212 or BIONB 221. Intended for juniors, seniors, and beginning graduate students. S-U grades optional. Planned T R 10:10–11:25. L. S. Rayer.

For description, see ENTOM 325.

**[BIONB 326(3260) The Visual System**

Spring. 4 credits. Prerequisite: BIONB 222 or BIOAP 311 or permission of instructor. S-U grades optional. Planned M W F 10:10; disc TBA. Offered alternate years; next offered 2007–2008. H. C. Howland.

The visual systems of vertebrates are discussed in breadth and depth as well as some aspects of invertebrate vision.]

**BIONB 327(3270) Evolutionary Perspectives on Human Behavior**

Fall. 3 credits. Prerequisites: BIONB 221 and permission of instructor. Letter grades only. Planned M W 2:55–4:10. S. T. Emlen.

Socratically taught, discussion-based course dealing with evolutionary perspectives on human behavior. Topics include genes and behavior, the evolutionary environment of adaptation, the evolutionary function of emotions, human mating system, parenting strategies, and cooperation and conflict within family-based societies. All students read and discuss primary papers and recent books. Each student is responsible for leading multiple discussions, writing an original paper, and peer-reviewing papers of other class members.

**BIONB 328(3280) Biopsychology of Learning and Memory (also PSYCH 332[3320])**

Spring. 3 credits. Limited to 60 students. Prerequisites: one year of biology and either a biopsychology course or BIONB 222. S-U grades optional. Graduate students, see PSYCH 632. Planned M W F 11:15. T. J. DeVoogd.

For description, see PSYCH 332.

**BIONB 329(3290) Ecology of Animal Behavior (also BIOSM 329[3290])**

Summer. 4 credits. Prerequisite: one year introductory college biology. Recommended: ecology, psychology, or behavior course. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details and an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for two weeks. SML faculty.

For description, see BIOSM 329.

**BIONB 330(3300) Introduction to Computational Neuroscience (also PSYCH/COGST/BME 330[3300])**

Fall. 3 or 4 credits; 4 credits includes lab providing additional computer simulation exercises. Limited to 25 students.

Prerequisites: BIONB 222 or permission of instructor. S-U grades optional. Offered alternate years. Planned M W 2:55–4:10. C. Linster.

Covers the basic ideas and techniques involved in computational neuroscience. Surveys diverse topics, including neural dynamics of small networks of cells, neural coding, learning in neural networks and in brain structures, memory models of the hippocampus, sensory coding, and others.

**BIONB 331(3310) Human Sociobiology**

Spring. 3 credits. Prerequisite: BIONB 221 or PSYCH 223 or permission of instructor. S-U grades optional. Planned M W 2:55–4:10. P. Barclay.

Lecture-based course drawing on research in evolutionary biology and animal behavior to investigate various aspects of human social behavior. Findings are presented from areas such as evolutionary psychology, anthropology, human behavioral ecology, and evolutionary game theory. Topics may vary slightly from year to year, but include mating, cooperation (with kin and nonkin), conflict and aggression, parental behavior, costly signaling, and culture.

**BIONB 369(3690) Chemical Ecology (also BIOEE/ENTOM 369[3690])**

Spring. 3 credits. Prerequisites: one semester of introductory biology for majors or nonmajors and one semester of introductory chemistry for majors or nonmajors or equivalents, or permission of instructor. S-U grades optional. Planned M W F 11:15. A. Agrawal, G. Jander, A. Kessler, and J. Thaler.

For description, see BIOEE 369.

**[BIONB 392(3920) Drugs and the Brain**

Fall. 4 credits. Prerequisites: BIONB 222 or equivalent course in neurobiology by permission of instructor. Recommended: knowledge of biochemistry. S-U grades optional. Planned T R 10:10–11:25; disc TBA. Offered alternate years; next offered 2007–2008. R. M. Harris-Warrick and L. M. Nowak.

Introduction to neuropharmacology, emphasis on neural mechanisms of psychoactive drugs, including cocaine, heroin, psychedelics, marijuana, alcohol, and drugs for psychotic treatment.]

**BIONB 394(3940) Circadian Rhythms (also BIOGD/ENTOM/PL PA 394[3940])**

Fall. 2 credits. Prerequisite: 200-level biology course. S-U grades optional. Planned T 10:10–11:25. K. Lee.

For description, see ENTOM 394.

**[BIONB 396(3960) Introduction to Sensory Systems (also PSYCH 396/696[3960/6960])**

Spring. 4 credits. Limited to 25 students. Prerequisites: introductory biology or biopsychology, plus second course in behavior, biopsychology, cognitive science, neuroscience, or perception; knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Planned T R 10:10–11:25. Offered alternate years. B. P. Halpern.

For description, see PSYCH 396.]

**[BIONB 413(4130) Molecules of Social Behavior and Emotion**

Spring. 3 credits. Prerequisite: permission of instructor. Letter grades only. Planned T R 10:10–11:25. Offered alternate years; next offered 2007–2008. D. P. McCobb.

Neurotransmitters, hormones and receptors governing courtship, pair bonding, parental care, territoriality, cooperativity, stress responses, etc. Active-learning format.]

**BIONB 420(4200) Topics in Neurobiology and Behavior**

Fall or spring. Variable credit; may be repeated for credit. Primarily for undergraduates. S-U grades optional. Staff. Courses on selected topics in neurobiology and behavior; can include lecture and seminar courses. See department office (W363 Mudd Hall) for offerings.

**BIONB 421(4210) Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431/631[4310/6310])**

Fall. 3 or 4 credits; 4-credit option involves term paper or creation of relevant web site. Limited to 25 students. Prerequisites: introductory course in biology or psychology, plus second course in perception, neurobiology, cognitive science, or biopsychology. Planned T R 10:10–11:25. B. P. Halpern.

For description, see PSYCH 431.

**[BIONB 422(4220) Modeling Behavioral Evolution**

Spring. 4 credits. Limited to 25 students. Prerequisites: BIONB 221, one year of calculus, course in probability or statistics, and permission of instructor; advanced undergraduates and graduate students. S-U grades optional. Planned T R 2:55–4:10; computer lab TBA. Offered alternate years; next offered 2008–2009. H. K. Reeve.

Intensive lecture/computer lab course on modeling strategies in behavioral evolution. Population-genetic (including quantitative-genetic), static optimization, dynamic programming, game-theoretic methods.]

**BIONB 423(4230) Cognitive Neuroscience (also PSYCH 425/625[4250/6250])**

Fall. 4 credits. Prerequisites: introductory biology; biopsychology or neurobiology (e.g., PSYCH 223 or BIONB 221); and introductory course in perception, cognition, or language (PSYCH 102, 209, 214, or 215 essential). S-U grades optional. Graduate students, see PSYCH 625. Planned M W F 9:05. Offered alternate years. B. L. Finlay.

For description, see PSYCH 425.

**[BIONB 424(4240) Neuroethology (also PSYCH 424[4240])**

Spring. 4 credits. Prerequisites: BIONB 221 or 222, or one year introductory biology for majors and permission of instructor. S-U grades optional. Offered alternate years; next offered 2007–2008. C. D. Hopkins.

Introductory survey of neuroethology, including exotic senses, amazing motor programs, surprising integration.]

**[BIONB 425(4250) Molecular Neurophysiology**

Fall. 3 credits. Prerequisite: BIONB 222 or permission of instructor. S-U grades optional. Planned T R 2:55–4:10. Offered alternate years; next offered 2007–2008. D. P. McCobb.



Structure/function of ion channels responsible for electrical signals, in, e.g., learning/memory, sensing heat and jalapeños, epilepsy, directional plant growth.]

**[BIONB 426(4260) Animal Communication]**

Spring. 4 credits. Prerequisite: BIONB 221. Letter grades only. Planned T R 2:55-4:10; disc TBA. Offered alternate years; next offered 2007-2008. J. W. Bradbury and S. L. Vehrencamp.

How and why do animals communicate (topics include signal evolution, environmental effects on communication, cooperation vs. conflict signals, signal honesty, interspecific communication).]

**[BIONB 427(4270) Animal Social Behavior]**

Fall. 4 credits. Limited to 30 students. Prerequisites: BIONB 221 and BIOEE 261 or 278, and permission of instructor. Letter grades only. Planned T R 2:30-4:25. Offered alternate years; next offered 2007-2008. P. W. Sherman.

Writing-intensive advanced course for upper-division students. Lectures, discussions, student presentations examine topics in animal behavioral ecology, human sociobiology, Darwinian medicine.]

**[BIONB 428(4280) Clinical Neurobiology]**

Spring. 3 credits. Prerequisites: two courses from BIONB 222, BIOGD 281, BIOBM 330 or 331; co-registration in one of the two is acceptable by permission of instructor. Open to advanced undergraduates. S-U grades optional. Planned M W 2:30-4:25. Offered alternate years. R. Booker.

The goal of this course is to provide students with an appreciation of the current challenges facing researchers studying neurodegenerative diseases. The focus is on the etiology, epidemiology, cellular and molecular basis, and strategies for treating of a number of neurodegenerative diseases, including but not limited to Alzheimer's disease, Parkinson's disease, neural ischemia, depression, ADHD, eating disorders, and AIDS-related dementia. The course provides a health context that enriches the student's learning experience in other advanced courses in the biological sciences. Guest speakers include faculty from across the Ithaca campus and the Weill College of Medicine, Departments of Neurology and Neuroscience.

**[BIONB 429(4290) Olfaction and Taste: Structure and Function (also PSYCH 429[4290])]**

Spring. 3 or 4 credits; 4-credit option requires term paper or research project (research project can but does not need to study nonhuman vertebrates.) Priority given to junior and senior psychology and biology majors and graduate students. Graduate students, see PSYCH 629. Prerequisite: one 300-level course in biopsychology or equivalent. Planned T R 10:10-11:25. Offered alternate years; next offered 2008-2009. B. P. Halpern.

For description, see PSYCH 429.]

**[BIONB 430(4300) Experimental Molecular Neurobiology (also BIOBM 443[4430])]**

Spring. 4 credits. Limited to 12 students. Corequisite: BIOBM 440 lab. Letter grades only. Planned T all day; disc TBA. Offered alternate years. D. L. Deitcher.

Experiments include PCR, cloning of DNA fragments, RNA purification, restriction digests,

bacterial transformation, DNA sequencing, and protein interactions. Experiments emphasize how molecular techniques can be applied to studying neurobiological problems.

**[BIONB 431(4310) Genes and Behavior]**

Spring. 3 credits. Limited to 50 students. Prerequisite: BIONB 222. S-U grades optional. Planned T R 2:55-4:10. Offered alternate years; next offered 2007-2008. J. R. Fetcho.

Genes influence how we behave. Explores the current understanding of how genes influence the behavior of a variety of animals, including humans.]

**[BIONB 440(4400) Electronics in Neurobiology (also BME 440[4400])]**

Fall. 4 credits. Prerequisite: junior, senior, or graduate standing; calculus course. S-U grades optional. Planned T R 8:40-9:55; lab W 1:25-4:25. Offered alternate years; next offered 2007-2008. B. R. Land.

<http://instruct1.cit.cornell.edu/courses/bionb440/>]

**[BIONB 441(4410) Computers in Neurobiology (also BME 441[4410])]**

Fall. 4 credits. Prerequisite: junior, senior, or graduate standing; calculus course. S-U grades optional. Planned TR 8:40-9:55; lab W 1:25-4:25. Offered alternate years. B. R. Land.

Introduction to computer programming techniques and data reduction. Gives a basic understanding of the techniques for using a computer in a biological context. Includes techniques to convert raw data to scientific visualization. Includes some computer modeling examples drawn from practical neurobiological problems.

**[BIONB 470(4700) Biophysical Methods (also A&EP/VETMM 470[4700])]**

Fall. 3 credits. Prerequisites: solid knowledge of basic physics and mathematics through sophomore level. Recommended: knowledge of cellular biology. Letter grades only. Planned M W 2:55-4:10. M. Lindau.

For description, see A&EP 470.

**[BIONB 491(4910) Principles of Neurophysiology (also BME 491[4910])]**

Spring. 4 credits. Limited to 20 students. Prerequisite: BIONB 222 or written permission of instructor. S-U grades optional for graduate students by permission of instructor. Planned M W 10:10; lab planned M or T 12:20-4:25. B. R. Johnson.

Laboratory-oriented course designed to teach the theory and techniques of modern cellular neurophysiology including computer acquisition and analysis of laboratory results. Lecture time is used to introduce laboratory exercises and discuss results, to supplement laboratory topics, and to discuss primary research papers. Extracellular and intracellular recording and voltage clamp techniques explore motor neuron and sensory receptor firing properties, and examine the cellular basis for resting and action potentials and synaptic transmission. Invertebrate preparations are used as model systems. See [instruct1.cit.cornell.edu/courses/bionb491/index.html](http://instruct1.cit.cornell.edu/courses/bionb491/index.html).

**[BIONB 492(4920) Sensory Function (also PSYCH 492/692[4920/6920])]**

Spring. 4 credits. Limited to 25 students. Prerequisite: 300-level course in biopsychology, or BIONB 222, or BIOAP 311, or equivalent; knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Graduate students, see PSYCH 692. Planned M W F 10:10. Offered alternate years. H. C. Howland.

For description, see PSYCH 492.

**[BIONB 493(4930) Developmental Neurobiology]**

Fall. 3 credits. Prerequisite: BIONB 222 or permission of instructor. S-U grades optional by permission of instructor. Planned M W 2:55-4:10. Offered alternate years; next offered 2007-2008. R. Booker.

Focuses on both the morphological and molecular basis of neurodevelopment. Assigned readings are taken from original journal and review articles.]

**[BIONB 494(4940) Brain Evolution and Behavior]**

Spring. 3 credits. Intended for juniors, seniors, and graduate students. Prerequisite: BIONB 222 or equivalent. S-U grades optional. Planned T R 2:55-4:10. Offered alternate years; next offered 2007-2008. A. H. Bass.

Organization and evolution of neuroanatomical pathways as substrates for species-typical vertebrate behaviors.]

**[BIONB 495(4950) Molecular and Genetic Approaches to Neuroscience]**

Fall. 3 credits. Prerequisites: junior, senior, or graduate standing; BIONB 222 and BIOBM 330 or 332. Letter grades only. Planned T R 2:55-4:10. Offered alternate years; next offered 2008-2009. D. L. Deitcher.

Focuses on how molecular and genetic approaches have led to major advances in neuroscience. Lectures, student presentations, and discussions examine research articles.]

**[BIONB 496(4960) Bioacoustic Signals in Animals and Man]**

Fall. 3 credits. Limited to 12 students. Prerequisites: junior, senior, or graduate standing; one year introductory biology, PHYS 101-102 or 207-208, and permission of instructor. S-U grades optional. Planned M W 9:05; lab TBA. Offered alternate years. C. W. Clark and R. R. Hoy.

Teaches students about animal acoustic signaling by introducing them to various animal acoustic systems. Presents the physical properties of sound, physiological mechanisms for sound production and hearing, and the behavioral contexts in which sounds are used. Acoustic techniques are provided in the laboratory where students learn how to record, synthesize, and analyze sounds with the aid of recorders and Mac and/or PC computers running customized software. Labs are designed around the lecture material and provide practical "real-world" exercises designed to stimulate discovery of fundamental principles described in lectures. Class research projects on a selected topic in bioacoustics are required. Engineering students with interests in music, audio analysis, digital signal processing, and computer science are encouraged.

**BIONB 720(7200) Seminar in Advanced Topics in Neurobiology and Behavior**

Fall or spring. Variable credit; may be repeated for credit. Prerequisite: graduate standing or permission of instructor. S-U grades optional. Staff and students. Designed to provide several study groups each semester on specialized topics. A group may meet for whatever period is judged adequate to enable coverage of the selected topics. Ordinarily, topics are selected and circulated during the preceding semester. Discussion of current literature is encouraged. Suggestions for topics should be submitted by faculty or students to the chair of the Department of Neurobiology and Behavior.

**BIONB 721(7210) Introductory Graduate Survey in Neurobiology and Behavior**

Fall. 2 credits. Requirement for graduate students majoring in neurobiology and behavior. Concurrent registration in BIONB 221 and 222 not required. S-U grades only. Planned W 4:00–6:00. D. L. Deitcher and staff.

Lectures, readings, and discussion introduce first-year graduate students to the research activities of the faculty in the graduate field of neurobiology and behavior. Class meets weekly for two hours. Students also prepare a research proposal on a potential topic for their thesis research (in the format of an NSF or NIH grant). This proposal is prepared in consultation with one or more relevant faculty members.

**Related Courses in Other Departments**

Evolutionary Perspectives on Behavior (PSYCH 535)

Biopsychology of Normal and Abnormal Behavior (PSYCH/NS 361)

Developmental Biopsychology (PSYCH 422)

Evolution of Human Behavior (PSYCH 326)

Topics in Biological Anthropology (ANTHR 490)

Primate Behavior and Ecology (ANTHR 390)

Teaching Experience (BIO G 498)

The Brain and Sleep (PSYCH 440/640)

Undergraduate Research in Biology (BIO G 499)

OTS Undergraduate Semester Abroad Programs

Shoals Marine Laboratory Program

Spider Biology (ENTOM 215)

**PLANT BIOLOGY (BIOPL)****BIOPL 240(2400) Green World/Blue Planet**

Fall. 3 credits. S-U grades optional. Lec. T. Silva.

Focuses on helping individuals understand how scientific information relates to the issues they face as citizens, in management decision making, and in public policy. To what extent should genetic engineering of crop plants be permitted? Should we place limits on fossil fuel consumption as a means of limiting global warming and global climate change? Must human endeavors be restricted in certain areas to maintain diversity? The format of this course is interactive, with lectures and discussions about how we as a society deal with controversial issues.

**BIOPL 241(2410) Introductory Botany**

Fall. 3 credits. Lec, lab. K. J. Niklas. Introductory botany for those interested in the plant sciences. Emphasizes structure, reproduction, and classification of angiosperms and the history of life on earth. Laboratory emphasizes development of skills in handling plant materials, including identification. First and second weeks of laboratory are field trips, starting with the first day of classes. *Those who register for an evening laboratory are still required to attend the afternoon field trips.*

**BIOPL 242(2420) Plant Function and Growth Lectures**

Spring. 3 credits. Primarily for undergraduates in agricultural sciences but also for any biological sciences students wanting to know about plant function; suitable as second-level course for nonmajors to satisfy biology distribution requirement. Prerequisites: one year introductory biology and/or BIOPL 241. Corequisite for plant science undergraduates (and highly recommended for other science majors): BIOPL 244. Recommended: one year introductory chemistry. May not be taken for credit after BIOPL 342 except by written permission of instructor. S-U grades optional. Evening prelims. P. J. Davies.

How plants function and grow. Examples deal with crop plants or higher plants where possible, though not exclusively. Topics include cell structure and function; plant metabolism, including photosynthesis; light relations in crops; plant-water relations; water uptake, transport, and transpiration; irrigation of crops; sugar transport; mineral nutrition; growth and development—hormones, responses to light, flowering, fruiting, dormancy, and abscission; stress; tissue culture; and genetic engineering of plants.]

**BIOPL 243(2430) Taxonomy of Cultivated Plants (also HORT 243[2430])**

Fall. 4 credits. Prerequisite: one year introductory biology or written permission of instructor. May not be taken for credit after BIOPL 248. Lec, lab. Offered alternate years; not offered 2007–2008. M. A. Luckow.

Study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Particular emphasis is placed on gaining proficiency in identifying and distinguishing families and in preparing and using analytic keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.

**BIOPL 244(2440) Plant Function and Growth, Laboratory**

Spring. 2 credits. Limited to 14 students per sec. Corequisite: BIOPL 242. May not be taken for credit after BIOPL 344. Disc and lab; students must take lab and disc on same day. T. Silva.

Experiments exemplify concepts covered in BIOPL 242 and offer experience in a variety of biological and biochemical techniques, from the cellular to whole plant level.

**BIOPL 245(2450) Plant Biology**

Summer, six-week session. 3 credits. Limited to 24 students. Lec, lab. T. Silva. Introductory botany, including plant identification. Emphasizes structure, reproduction, and classification of flowering plants. Much of the laboratory work is conducted outdoors taking advantage of

several outstanding natural areas available for study. Those who lack college-level biology are expected to work closely with the instructor on supplemental instructional materials.

**BIOPL 247(2470) Ethnobiology**

Fall. 3 credits. S-U grades optional. Lec, disc. Offered alternate years; not offered 2007–2008. D. M. Bates.

Consideration of the principles, methods, and issues of ethnobiology. Emphasis is on the past and present ecological, evolutionary, economic, and cultural interrelationships of humans in traditional and lay societies with their plants and animals, as a means of understanding the place and future of humans in the biosphere. Traditional medicines, underutilized organisms, resource management, and ownership of nature, and methodology are among the topics covered.

**[BIOPL 248(2480) Taxonomy of Vascular Plants]**

Spring. 4 credits. Prerequisite: one year introductory biology. May not be taken for credit after BIOPL 243. S-U grades optional. Lec, lab. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. I. Davis.

Introduction to the classification of vascular plants, with attention to the goals of taxonomy, the processes of plant evolution, and the means of analyzing evolutionary relationships among plants. The laboratory presents an overview of vascular plant diversity, with particular attention to the flowering plants.]

**[BIOPL 340(3440) Methods in Biological and Biochemical Prospecting]**

Spring. 2 credits. Prerequisites: BIO G 101–104. Recommended: previous or concurrent enrollment in organic chemistry. Offered alternate years; not offered 2006–2007. E. Rodriguez.

Students learn theory and methodologies in ethnobotany, chemical ecology, and zoopharmacognosy as they apply in a multidisciplinary fashion to chemical prospecting. The use of techniques in the chemistry of natural products and biological assays in the discovery of chemicals and their role in nature is described. Classical examples of drug development, from quinine to taxol, in the course of chemical prospecting are discussed. An overall medicinal purpose in chemoprospecting is emphasized, with mention of specific worldwide spread of diseases pressing for new drugs.]

**BIOPL 342(3420) Plant Physiology, Lectures**

Spring. 3 credits. Prerequisites: one year introductory biology. Corequisite: BIOPL 344 or written permission of instructor. May not be taken for credit after BIOPL 242 unless written permission obtained from instructor. Lec. T. G. Owens.

Integrated and interdisciplinary study of the processes that contribute to the growth, competition, and reproduction of plants. Topics include, but are not limited to, plant-water relations, membrane properties and processes, photosynthesis, plant respiration, mineral and organic nutrition, stress physiology, control of growth and development, and responses to the environment. Emphasis is on the relationship between structure and function from the molecular to the whole-plant level.

**BIOPL 343(3430) Molecular Biology and Genetic Engineering of Plants**

Spring. 2 credits. Prerequisite: one year general biology or permission of instructor. S-U grades optional. Lec. M. E. Nasrallah.

Introduction to current studies involving recombinant DNA technology and its application to the improvement of plants. Emphasizes genetic transformation methodology, gene expression systems, and strategies for increasing productivity. The course is directed toward undergraduates who wish to become familiar with the theory and practice of plant biotechnology.

**BIOPL 344(3440) Plant Physiology, Laboratory**

Spring. 2 credits. Corequisite: BIOPL 342. May not be taken for credit after BIOPL 244. Similar to BIOPL 244 but at more advanced level. Lab, disc. T. Silva.

Experiments exemplify concepts covered in BIOPL 342 and offer experience in a variety of biological and biochemical techniques, from the cellular to whole plant level, with emphasis on experimental design.

**BIOPL 345(3450) Plant Anatomy**

Fall. 4 credits. Limited to 15 students. Prerequisite: one year introductory biology or a semester of botany. Lec, lab. A. Gandolfo.

Descriptive course with equal emphasis on development and mature structure. Lecture, laboratory, and reading are integrated in a study guide. The laboratory offers the opportunity to develop the practical skills required to make anatomical diagnoses and to write anatomical descriptions.

**BIOPL 347(3470) Laboratory in Molecular Biology and Genetic Engineering of Plants**

Spring. 2 credits. Limited to 24 students. Prerequisite: BIOPL 343 or permission of instructor. Recommended: concurrent enrollment in BIOPL 343. S-U grades optional. Lab. M. E. Nasrallah.

Companion to BIOPL 343 with laboratory activities that focus on the practice of plant biotechnology. Students transfer genes to plants by a variety of methods and analyze their expression in the host genome by use of reporter gene assays and by the preparation and analysis of nucleic acids.

**[BIOPL 348(3480) The Healing Forest**

Spring. 2 credits. Prerequisites: introductory biology or plant biology or permission of instructor. Lec/disc. Offered alternate years; not offered 2006-2007; next offered 2007-2008. D. M. Bates and E. Rodriguez.

Ethnobotanical and ethnopharmacological consideration of the role of plants, fungi, and insects in traditional and western medicine. Studies of indigenous and lay societies illustrate the ecological, systematic, biochemical, and cultural aspects of herbal medicines and are placed in the broader context of such interdependent themes as the conservation of biological and cultural diversity, human health, bioprospecting, compensation for indigenous knowledge, and sustainable development.]

**BIOPL 359(3590) Biology of Grasses**

Fall. 2 credits. Prerequisite: one year introductory biology or course in plant systematics or permission of instructor. S-U grades optional. Lec. Lab. Offered alternate years; not offered 2007-2008. J. I. Davis.

Systematics and related aspects of the biology of the graminoid plant families (grasses, sedges, and rushes), with the principal emphasis on grasses. Major topics include phylogenetics, taxonomy, physiology, reproductive biology, speciation, and biogeography. The roles of graminoid plants in natural and human-disturbed environments are discussed, as are the origins of cultivated species.

**BIOPL 380(3800) Strategies and Methods in Drug Discovery**

Spring. 2 credits. Prerequisite: one year introductory biology and organic chemistry course or permission of instructor. S-U grades optional. M. A. Aregullin.

Covers strategies and methodologies in chemotaxonomy, chemical ecology, and ethnobotany, as they are used in chemical prospecting for new pharmaceuticals. Discusses the biosynthesis and distribution of plant secondary metabolites, the use of techniques in isolation and structure elucidation of natural products, and biological assays in the discovery of chemicals with pharmacological activity.

**BIOPL 404(4040) Crop Evolution, Domestication and Diversity (also PL BR/IARD 404[4040])**

Fall. 2 credits. Prerequisites: BIOGD 281 or PL BR 225 or permission of instructor. S-U grades optional. Lec. S. Kresovich.

For description, see PL BR 404.

**BIOPL 422(4220) Plant Development**

Fall. 2 credits. Lec. Prerequisites: course work in molecular biology (e.g., BIOBM 330, 331/332, or 333), or genetics (e.g., BIOGD 281), or permission of instructor. S-U grades optional. J. Hua.

Introduction to plant development, studying the mechanisms of morphogenesis and cell fate determination at the organismal, cellular, and molecular levels.

**BIOPL 440(4400) Phylogenetic Systematics (also ENTOM 440[4400])**

Spring. 4 credits. Limited to 24 students. Prerequisite: introductory biology or permission of instructor. Lec, lab. Offered alternate years; not offered 2007-2008. K. C. Nixon.

Basic and advanced theory and methods of phylogenetic analysis. Introduces students to cladistic analysis using parsimony and gain experience with computer-aided analysis of taxonomic data, including both morphological and molecular data sources. Topics include applications of phylogenetic methods to biogeography and evolutionary studies.

**[BIOPL 442(4420) Current Topics in Ethnobiology**

Fall. 2 credits. Limited to 12 students. Prerequisite: permission of instructor. S-U grades optional. Lec/disc. Offered alternate years; not offered 2006-2007; next offered 2007-2008. D. M. Bates.

Explores the interrelationships of plants and animals with humans from a wide range of perspectives. Topics considered are contemporary issues, theory, and methodology of ethnobotany and ethnobiology, and the role of plants and animals in human lives, in subsistence and exchange, and in thought.]

**BIOPL 443(4430) Topics and Research Methods in Systematics**

Fall or spring. 1-2 credits; 1 credit per sec. Prerequisite: written permission of instructor. S-U grades optional. K. C. Nixon.

Series of 1-credit modules on specialized topics in systematics. Topics and instructors vary each semester. May not be taught every semester. Topics and instructors are listed in the division's catalog supplement issued at the beginning of the semester.

**[BIOPL 444(4440) Plant Cell Biology**

Fall. 4 credits. Limited to 24 students. Prerequisites: one year introductory biology or permission of instructor. Lec, lab. Not offered 2006-2007; next offered 2007-2008. R. O. Wayne.

Uses evidence from microscopy, physiology, biochemistry, and molecular biology to try to unravel the mystery of the living cell. Studies the dynamics of protoplasm, membranes, and the various organelles. The mechanisms of cell growth and division, the relationship of the cytoskeleton to cell shape and motility, the interaction of the cell with its environment, and the processes that give rise to multicellular differentiated plants are investigated.]

**[BIOPL 447(4470) Molecular Systematics**

Fall. 3 credits. Prerequisites: BIOEE 278 or BIOGD 281 or BIOBM 330, or BIOBM 332, or written permission of instructor. Lec. Offered alternate years; not offered 2006-2007; next offered 2007-2008. J. J. Doyle.

Theory and practice of using molecular evidence, particularly DNA sequence data, for addressing diverse systematic and evolutionary questions. Emphasis is on phylogeny reconstruction, particularly in eukaryotic systems. The organization and evolution of nuclear and organellar genomes is described from the standpoint of their suitability for systematic and evolutionary studies.]

**BIOPL 448(4480) Plant Evolution and the Fossil Record**

Spring. 3 credits. Prerequisite: BIOPL 241 or equivalent, or permission of instructor. Lec, lab. Offered alternate years; not offered 2007-2008. K. J. Niklas and W. L. Crepet.

Introduction to evolution, surveying major changes in plants from the origin of life to the present. Emphasizes plant form and function, adaptations to particular ecologic settings, and evolutionary theory as it relates to plants.

**[BIOPL 449(4490) Green Signals and Triggers—The Plant Hormones (also HORT 449[4490])**

Fall. 1 or 2 credits. Prerequisite: one year introductory biology and plant physiology (BIOPL 242 or 342) or permission of instructor. S-U grades optional. Offered alternate years; not offered 2006-2007; next offered 2007-2008. P. J. Davies.

Study of plant hormones and how they regulate plant growth and development. Topics include the discovery, role in growth and development, mode of action, and practical uses of the plant hormones auxin, gibberellins, cytokinins, abscisic acid, ethylene, and brassinosteroids.]

**BIOPL 452(4520) Systematics of Tropical Plants**

Fall. 3 credits. Prerequisite: BIOPL 243 or 248. Letter grades only. Lec, lab. Offered every three years. K. C. Nixon.

The families of plants encountered solely or chiefly in tropical regions are considered in a phylogenetic context in lectures, discussions, and laboratory, with the aim of providing basic points of recognition for, and an understanding of, diversity and relationships in these families.

**[BIOPL 453(4530) Principles and Practice of Historical Biogeography (also ENTOM 453(4530))]**

Fall. 3 credits. Prerequisite: systematics course or permission of instructors. S-U grades optional. Lec, lab. Offered alternate years; not offered 2006–2007; next offered 2007–2008. J. K. Liebherr and M. A. Luckow.

For description, see ENTOM 453.]

**BIOPL 454(4540) Systematics of Tropical Plants: Field Laboratory**

Spring. 1 credit. Limited to 15 students. Prerequisite: BIOPL 452 or permission of instructor. Letter grades only. For more details and application, contact L. H. Bailey Hortorium, 467 Mann Library. Offered every three years. K. C. Nixon.

Intensive orientation to families of tropical flowering plants represented in forests of the American Tropics. Emphasis is on field identification combined with laboratory analysis of available materials in a "whole-biology" context. Two-week field trip over winter break.

**BIOPL 462(4620) Plant Biochemistry**

Spring. 3 credits. Prerequisites: BIOPL 242 or 342 or equivalent and BIOBM 330 or 331 or equivalent or permission of instructor. Letter grades only. Lec. J. Rose and K. Van Wijk.

Focuses on biochemistry of plant specific processes, with the aim to obtain an integrative overview of plant biochemistry. Examples include processes such as cell wall biochemistry, pigment biosynthesis and degradation, secondary metabolism, senescence, defense mechanisms, amino acid biosynthesis, and small molecule transport. Genomics-based experimental tools such as proteomics and metabolomics are discussed.

**BIOPL 482 Plant Molecular Biology II**

Spring. 1–6 credits; 1 credit per sec. Prerequisites: BIOGD 281 and BIOBM 330 or 332, or equivalents. Recommended: BIOBM 331. S-U grades optional.

Series of four-week modules on specialized topics. Coordinator: J. B. Nasrallah.

**Sec 01 Molecular Plant-Pathogen Interactions I and II (also PL PA 462.1)**

1 credit. 12 lec. A. Collmer, S. G. Lazarowitz, G. Martin, and B. G. Turgeon.

Examination of the molecular and cellular factors that control pathogen-plant interactions from the perspectives of pathogen biology and plant responses to pathogen infection. Beginning spring 2004, alternate years focus on: (1) plant perception of microbial pathogens and the interplay of plant defenses and pathogen counterstrategies that result in resistance or susceptibility to disease production, with topics including the genetic nature of dominant and recessive resistance, induction of pathogen defense genes, apoptotic responses that limit infection, and RNA interference; and (2) the genetic

and molecular mechanisms of microbial pathogenesis, with an emphasis on fungal and bacterial virulence proteins, toxins, and their deployment systems.

**[Sec 02 Molecular Plant-Microbe Interactions (also BIOMI 482, Sec 2, PL PA 464)]**

1 credit. S-U grades optional. 12 lec. Offered alternate years; not offered 2006–2007; next offered 2007–2008. S. C. Winans.

Focuses on the interactions of *Agrobacterium* and *Rhizobium* with plants. Topics on *Agrobacterium*-plant interactions include plant-microbe recognition mechanisms, T-DNA transfer process, oncogenesis, and use of *Agrobacterium* to produce transgenic plants. Topics on *Rhizobium*-plant interactions include regulation of nitrogenase activity and expression, organization and function of the *sym* plasmid, nodule development, and plant genetics involved in plant-microbe interaction.]

**Sec 03 Light Signal Transduction in Plants**

1 credit. S-U grades optional. 12 lec. T. Brutnell.

In addition to providing plants with energy for photosynthesis, light plays an essential role in the development of higher plants. Light quality and intensity is carefully monitored by the plant to avoid neighboring vegetation, set the circadian clock, and adjust photosynthesis rates. This course focuses on recent studies that have illuminated the molecular basis of light signal transduction networks in higher plants. Readings are assigned from current literature with an emphasis on those that use genomics tools such as microarray analysis to address fundamental questions in red/far-red and blue light signal transduction.

**Sec 04 Plant Gene Evolution and Phylogeny**

1 credit. 12 lec. Offered alternate years; not offered 2007–2008. J. J. Doyle.

Practical applications of molecular systematics/evolution for plant molecular biologists and other non-systematists. The course focuses on two basic issues: methods and principles for inferring relationships among genes and the use of data to hypothesize relationships among plants. Evolutionary patterns and processes of genes and gene families are discussed, as well as rates of sequence evolution, paralogy and orthology, the effects of recombination and concerted evolution of gene phylogenies, and the implications of using gene or allele phylogenies to infer organismal evolutionary patterns.

**Sec 05 Molecular Biology of Plant Organelles (also BIOGD 452)**

1 credit. S-U grades optional. 12 lec. M. R. Hanson and D. B. Stern.

In-depth examination of the molecular biology of plant mitochondria and plastids. Topics include the organization, evolution, and expression of organelle genomes, RNA editing, and the expression of nuclear genes encoding structural or regulatory organelle proteins. Special topics include mitochondrially encoded cytoplasmic male sterility, transformation and expression of foreign genes in chloroplasts, and the use of genetics to investigate nucleus-organelle interactions.

**Sec 06 Plant Biotechnology (also PL BR 482.6, PL PA 462.2)**

1 credit. S-U grades optional. 12 lec. M. Zaitlin and E. D. Earle.

Deals with production and uses of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene

introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides, produce useful products, or have improved nutritional and food processing characteristics. Regulatory and social issues relating to plant biotechnology are discussed.

**Sec 07 Plant Cell Walls: Structure to Proteome**

1 credit. S-U grades optional. 12 lec. J. Rose.

Examines the structure and function of plant cell walls, exploring their dynamic nature and fundamental contribution to numerous aspects of plant growth and development. Topics include wall biosynthesis; wall structure and composition; regulation of cell expansion and differentiation; defense against pathogens and signaling; the apoplast as a metabolically active subcellular compartment; and analytical techniques: from biochemistry to proteomics.

**BIOPL 483 Plant Molecular Biology I**

Fall. 1–5 credits; 1 credit per sec.

Prerequisites: BIOGD 281 and BIOBM 330 or 332, or equivalents. Recommended: BIOBM 331. S-U grades optional.

Coordinator: J. B. Nasrallah.

Series of four-week modules on specialized topics.

**Sec 01 Concepts and Techniques in Plant Molecular Biology (also PL PA 463.01, PL BR 483.01)**

2 credits. Lec. S. R. McCouch, J. Giovannoni, and J. Rose.

Introductory module that provides a broad overview of molecular biology concepts relevant to the plant sciences. Serves as a prerequisite to other modules in the BIOPL 483 (fall) and BIOPL 482 (spring) series. The course is divided into three sections: (1) Gene discovery: covers genetic, molecular, and genomics approaches to the isolation of plant genes; (2) Gene characterization: covers DNA sequence analysis, assessment of gene expression, functional genomics approaches, and production of transgenic plants; (3) Analysis and characterization of proteins and metabolites: includes proteomics approaches to the analysis of plant proteins, protein-protein interactions, and metabolic profiling through emerging metabolomic techniques. This course consists of two lectures and one day of discussion per week. Course material is coordinated with BIOPL 641 (lab). Emphasis is on understanding techniques and approaches appropriate for different experiments and objectives.

**Sec 02 Proteomics in Plant Biology**

1 credit. S-U grades optional. 12 lec. K. van Wijk.

Introduction to proteomics and mass spectrometry and its application in plant biology. Includes discussion of protein separation, protein tagging and visualization techniques; principles of biological mass spectrometry and interpretation of spectra; bioinformatics tools in proteomics; comparative proteomics; phosphorylation mapping. Discusses limitations and possibilities of proteomics on plants for which little sequence information is available and experimental papers involving plant proteomics.

**Sec 03 Plant Genome Organization and Function (also PL BR 483.3)**

1 credit. 12 lec. Offered alternate years. S. D. Tanksley.



Covers the structure and variation of plant nuclear genomes, including changes in genome size, centromere/telomere structure, DNA packaging, transposable elements, genetic and physical mapping, positional gene cloning, genomic sequencing and comparative genomics.

**[Sec 04 Molecular Aspects of Plant Development I (also BIOBM 483.4)]**

1 credit. 12 lec. Not offered 2006-2007.  
J. B. Nasrallah.

Focuses on the molecular genetics of plant development with an emphasis on plant reproductive biology. Current approaches to the elucidation of the molecular signals and pathways that lead to the establishment of the differentiated state of floral cells and organs are discussed. Topics include cell-cell signalling in the establishment of pattern and differentiation of specialized cell types, and the control of developmental pathways by endogenous and external cues. The module is a companion to BIOPL 482, Sec 02 (Molecular Plant-Microbe Interactions).]

**[Sec 05 Molecular Breeding (also PL BR 483.5)]**

1 credit. 12 lec. Offered alternate years; not offered 2006-2007. S. D. Tanksley.

Application of DNA markers to the identification, manipulation, and isolation of genes important to plant and animal productivity using molecular genetic techniques. Students learn how to design and execute experiments to identify quantitative trait loci (QTLs), as well as how to apply molecular markers to plant and animal breeding programs.]

**[Sec 06 Plant Senescence (also HORT 625.2)]**

1 credit. S-U grades optional. (12 lec).  
S. Gan.

Introduces molecular, genetics, and genomics approaches in plant senescence and postharvest research. Topics include gene expression, regulation, and function associated with physiological and biochemical changes in senescing, maturing, and/or ripening plants or parts. Genetic manipulation of senescence/ripening processes are also discussed.

**BIOPL 641(6410) Laboratory in Plant Molecular Biology (also BIOBM 641(6410))**

Fall. 4 credits. Prerequisites: BIOGD 281 or equivalent, BIOBM 330 or 331 or equivalent, and permission of instructor. S-U grades by permission of instructor. Lab. M. R. Hanson, H. Wang, T. Brutnell, G. Jander, J. Hua, M. Scanlon, and K. van Wijk.

Includes selected experiments on gene expression, biolistic transformation, confocal microscopy, laser capture microdissection, microarray analysis, genetic mapping and mutant analysis, transposon tagging, proteomics, and metabolite analysis.

**[BIOPL 642(6420) Plant Mineral Nutrition (also CSS 642(6420))]**

Spring. 3 credits. Prerequisite: BIOPL 342 or equivalent. Lec. Offered alternate years; not offered 2006-2007; next offered 2007-2008. L. V. Kochian and R. M. Welch.

Detailed study of the processes by which plants acquire and use mineral nutrients from the soil. Topics include the uptake, translocation, and compartmentation of mineral elements; root-soil interactions; the metabolism of mineral elements; the involvement of mineral nutrients in various physiological processes; and the nutrition

of plants adapted to extreme environmental stresses (e.g., acid soils). Specific mineral elements are emphasized to illustrate these topics.]

**BIOPL 647(6470) Systematic Biology Journal Club**

Fall or spring. 1 credit; may be repeated for credit. Intended for graduate students and advanced undergraduates in systematic biology. S-U grades only. Disc TBA. Bailey Hortorium staff.

Discussions led by staff, visitors, and students on topics of current importance to systematic biology.

**BIOPL 649(6490) Solute Transport in Plants (also BEE 649(6490))**

Fall. 3 credits. Letter grades only. Lec. Offered alternate years; not offered 2007-2008. R. M. Spanswick.

For description, see BEE 649.

**[BIOPL 651(6510) Water Transport in Plants (also BEE 647(6470))]**

Fall. 2 credits. Letter grades only. Lec. Offered alternate years; not offered 2006-2007; next offered 2007-2008. R. M. Spanswick.

For description, see BEE 647.]

**[BIOPL 654(6540) Botanical Nomenclature]**

Fall. 1 credit. Prerequisite: written permission of instructor. S-U grades only. Lec and disc. Offered alternate years; not offered 2006-2007. M. A. Luckow.

Analysis of the International Code of Botanical Nomenclature and its application to various plant groups.]

**BIOPL 656(6560) Topics in Plant Evolution**

Spring. 1 credit. Prerequisite: BIOPL 448 or equivalent background in evolution, or written permission of instructor. Lab and disc. Offered alternate years. K. J. Niklas.

Series of selected topics to provide a background in plant evolution, paleobotanical literature, and evolutionary theory. Among the topics discussed are the origin of a terrestrial flora, the evolution of the seed plants, and the origin and adaptive radiation of the angiosperms.

**BIOPL 740(7400) Plant Biology Seminar**

Fall and spring. 0 credits (no official registration). Requirement for graduate students doing work in plant biology. W. L. Crepet.

Lectures on current research in plant biology, presented by visitors and staff.

**BIOPL 741(7410) Problems in Plant Cell and Molecular Biology**

Spring. 2 credits. Prerequisite: first- and second-year graduate students in Plant Cell and Molecular Biology Program. Disc.

Introduction to the research literature in plant molecular and cellular biology through weekly problem sets and discussions.

**BIOPL 742(7420) Current Papers in Plant Biology**

Fall or spring. 1 credit. Limited enrollment. Primarily for graduate students, with priority given to majors or minors in plant molecular biology. Prerequisite: for undergraduates, written permission of instructor. S-U grades only. Sem. Staff.

**BIOPL 743(7430) Faculty Research in Plant Cell and Molecular Biology**

Fall. 1 credit. Prerequisite: graduate standing or written permission from member of Plant Cell and Molecular Biology Program or from coordinator for undergraduates. Disc TBA. Staff.

Introduction for graduate students to the research being conducted by Cornell faculty in the Plant Cell and Molecular Biology Program.

**BIOPL 744(7440) Graduate Research in Plant Cell and Molecular Biology**

Fall or spring. 1 credit. Requirement for, and limited to, second-, third-, and fourth-year graduate students in Plant Cell and Molecular Biology. Sem. Staff.

Each student presents one seminar per year on his or her thesis research and then meets with the thesis committee members for evaluation.

**BIOPL 745(7450) Seminar in Systematic Botany**

Fall. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only. Sem. Bailey Hortorium staff.

Seminar with student presentations of current topics in systematics.

**BIOPL 746(7460) Seminar in Systematic Botany: Student Research**

Spring. 1 credit. Prerequisite: graduate standing or permission of instructor. Letter grades only. Sem. Bailey Hortorium staff.

Student-led seminar presentation based on his or her thesis research or a related topic.

**BIOPL 749(7490) Graduate Research in Botany**

Fall or spring. Variable credit; may be repeated for credit. S-U grades optional. Staff.

Similar to BIO G 499 but intended for graduate students who are working with faculty members on an individual basis.

**Related Courses in Other Departments**

Current Topics in Plant Molecular Ecology (BIOEE 675)

Fungi (PL PA 309)

Seaweeds, Plankton, and Seagrass: The Ecology and Systematics of Marine Plants (BIOSM 449)

Fungal Biology (PL PA 649)

Physiological Plant Ecology, Lectures and Laboratory (BIOEE 466/468) \*

Plant Behavior-Induced Plant Responses to Biotic Stresses (BIOEE 446)

Plant Ecology and Population Biology, Lectures and Laboratory (BIOEE 463/465)

Plant Cytogenetics Laboratory (PL BR 446)

Teaching Experience (BIO G 498)

Undergraduate Research in Biology (BIO G 499)

**COURSES IN MARINE SCIENCE**

Cornell offers an extensive listing of undergraduate courses in marine science.

Undergraduates interested in pursuing studies in marine science are encouraged to explore the undergraduate specialization in marine biology offered through the Office of Undergraduate Biology, the undergraduate specialization in ocean sciences offered



through the Science of Earth Systems Program, and the summer program of courses offered by the Shoals Marine Laboratory. Further information on these programs can be found at the Cornell Marine Programs Office, G14 Stimson Hall, or at [www.sml.cornell.edu](http://www.sml.cornell.edu).

#### Undergraduate Specialization in Marine Biology and Oceanography

Biological sciences majors in the Ecology and Evolutionary Biology program of study have the option of specializing their program of study in the area of Marine Biology. This specialization is intended for students with interests in understanding the unique aspects of organismal biology in the marine environment. In addition to fulfilling the major and the ecology and evolutionary biology program of study requirements, students in marine biology are encouraged to enroll in the following courses:

1. BIOEE 154 The Sea: An Introduction to Oceanography
2. BIOSM 364 Field Marine Science or BIOSM 375 Field Marine Biology and Ecology and at least one 400-level BIOSM field course at the Shoals Marine Laboratory
3. BIOEE 462 Marine Ecology

#### Undergraduate Specialization in Ocean Sciences

Science of Earth Systems majors have the option of specializing their program of study in the area of ocean sciences. This interdisciplinary specialization is intended for students with interests in understanding the interaction of biological, chemical, geological, and physical processes in ocean systems. In addition to fulfilling the Science of Earth Systems general requirements (see the SES program description in Interdisciplinary Centers, Programs, and Studies section of catalog), students in ocean sciences are required to take four advanced courses from the following list to fulfill their major requirements:

1. BIOEE 373 Biology of the Marine Invertebrates
2. BIOEE 457 Limnology
3. BIOEE 462 Marine Ecology
4. BIOEE 478 Ecosystem Biology
5. BIOEE 490 Topics in Marine Biology
6. BIOSM 377 Diversity of Fishes
7. BIOSM 310 Marine Symbiosis
8. BIOSM 309 Climates and Ecosystems
9. BIOSM 329 Ecology of Animal Behavior
10. BIOSM 364 Field Marine Science
11. BIOSM 365 Underwater Research
12. BIOSM 374 Field Ornithology
13. BIOSM 375 Field Marine Biology and Ecology
14. BIOSM 413 Research in Marine Biology
15. BIOSM 449 Seaweeds, Plankton and Seagrass
16. BIOSM 376 Marine Invertebrate Zoology (Note: Not same as BIOEE 373)
17. BIOSM 477 Marine Vertebrates
18. EAS 375 Sedimentology and Stratigraphy
19. EAS 455 Geochemistry

20. EAS 475 Special Topics in Oceanography

21. EAS 479 Paleobiology

#### Sea Semester

BIOSM 366 SEA: Introduction to Oceanography

BIOSM 367 SEA: Introduction to Maritime Studies

BIOSM 368 SEA: Introduction to Nautical Science

BIOSM 369 SEA: Practical Oceanography I

BIOSM 370 SEA: Practical Oceanography II

Students in both marine science specializations are exposed to an integrated program of study, emphasizing a natural progression of formal course work combined with ample opportunities for practical field experience.

These courses must be taken concurrently. Special program run by the Sea Education Association. Contact the Marine Programs office (255-3717) for more details.

## SHOALS MARINE LABORATORY (BIOSM)

G14 Stimson Hall, 255-3717

The objective of the Shoals Marine Laboratory (SML) is to provide undergraduates and other interested adults a unique opportunity to explore marine sciences in an island setting noted for its biota, geology, and history. SML has established a national reputation for excellence and has become North America's largest marine field station focusing on undergraduate education.

The summer population of Appledore Island is limited to about one hundred people at any one time. Participants and faculty members can literally and figuratively immerse themselves in their explorations, free from distractions common to most academic institutions. Because SML is a residential facility, a sense of community develops that makes courses and seminars at SML outstanding educational and intellectual experiences. Participants learn from and exchange ideas with a wide range of specialists whose primary interests are marine but whose perspectives often differ, providing fertile ground for lively discussions.

Credit courses at Shoals Marine Laboratory are full-time, intensive learning experiences. Courses may be taken sequentially, but not concurrently. A typical day combines lecture sessions, laboratory and field work, field trips to nearby islands and the mainland, and collecting and research excursions aboard the laboratory's 47-foot research vessel, *John M. Kingsbury*, or the 36-foot research vessel, *John B. Heiser*. Field experience is an integral component of all courses, using Appledore's extensive intertidal and subtidal zones, wading bird rookeries, and seabird colonies. Faculty, drawn from Cornell University, the University of New Hampshire, and other leading academic institutions, are selected based not only on their academic excellence but also on their teaching ability in the field. In addition, there are numerous guest lecturers including engineers, coastal planners, and specialists from private industry, government, and the academic community.

The Ithaca campus functions of the Shoals Marine Laboratory are centered in the Cornell Marine Programs office, G14 Stimson Hall. The

office serves as an advising center for students interested in the marine sciences, maintains a browsing library with updated information on graduate study and career opportunities as well as on marine programs at other institutions, and administers the SEA Semester, a 17-credit program offered in cooperation with the Sea Education Association (SEA).

The following marine sciences courses are currently administered by the Cornell Marine Programs Office. (Not all of these courses are offered each semester; consult the SML web site for current offerings: [www.sml.cornell.edu](http://www.sml.cornell.edu).)

#### BIOSM 123(1230) Ocean Sciences

Summer. 4 credits. Prerequisite: permission of instructor. Letter grades only. D. Taylor. An inquiry-based, hands-on introduction to marine biology using the rocky intertidal and open sea as a natural laboratory. Students will learn the skills necessary for success in science courses: understanding disciplinary discourse; reading scientific papers critically; generating scientific hypotheses; designing experiments and interpreting data using basic statistics; and constructing, presenting and understanding data in graphs and tables. Students will learn and apply these skills to field exercises centered on textbooks, primary literature, lectures, seminars and discussions.

#### BIOSM 160(1600) The Oceanography of the Gulf of Maine

Summer. 4 credits. Limited to 24 students. Special two-week course offered aboard a SEA vessel and at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall or Sea Education Association office, P.O. Box 6, Woods Hole, MA 02543. Daily lec, lab, and fieldwork for two weeks. SML faculty.

Exciting opportunity to explore the offshore and near-coastal environments of the Gulf of Maine for advanced high school students. Students spend 10 days aboard the Sea Education Association's sailing vessels round trip between Woods Hole, Mass., and the Isles of Shoals via Georges Bank and the Gulf of Maine. Besides operating the ship, students study the many characteristics of this unique ocean environment. Following the sea component, students spend seven days at the Shoals Marine Laboratory collecting data characteristic of the Isles of Shoals coastal environment.

#### BIOSM 161(1610) Introduction to Marine Science

Summer. 4 credits. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for two weeks.

Allows students who are not biology majors to experience the breadth of the marine sciences under field conditions at an island laboratory. Aspects of biology, geology, earth science, chemistry, and physics are included. Specific topics include beach, salt marsh, tidal mud flat, tide pool, and benthic offshore environments; identification of marine plants and animals; chemical and physical oceanography; marine geology; and ecology of kelp beds and urchin barrens.

**BIOSM 162(1620) Marine Environmental Science**

Summer. 3 credits. Prerequisite: open to high school students who have successfully completed two high school science courses. Special 12-day course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for 12 days. SML faculty.

Environmental studies have become an integral component of high school programs all around the country; however, opportunities to apply this course work to the marine environment are limited. Marine Environmental Science focuses on coastal marine habitats, with an emphasis on issues as they relate to global habitats and concerns. Laboratory exercises and fieldwork include explorations along Appledore Island's rocky intertidal zone and excursions to neighboring islands to observe harbor seal and seabird colonies. Offshore cruises include oceanographic sampling exercises and field trips to seabird and whale foraging grounds. Lectures and discussions expose MES students to topics ranging from fishes to fisheries, seaweeds to lobsters, and plankton to whales. Fundamental scientific research methods and equipment are introduced, and each student has the opportunity to be involved in group research projects.

**BIOSM 204(2040) Biological Illustration**

Summer. 2 credits. Special one-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily sessions for one week. SML faculty.

General discussion of scientific publishing, illustration labeling, color techniques, and printing processes. Provides the scientist or science student a chance to experience several illustration techniques with the goal of obtaining an overview of scientific and wildlife illustrations. The student may choose a single technique to explore in depth. Course size is limited so that individual attention can be emphasized.

**BIOSM 309(3090) Climates and Ecosystems**

Summer. 4 credits. Prerequisite: one year college-level biology; background preferred in physics/physical geography. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for two weeks. SML faculty.

Study of the fundamentals of organism-environment interaction developed through defining and measuring abiotic factors including solar radiation, temperature, atmospheric moisture, precipital wind, and currents. On-site exploration of the dynamics of meteorology and the role of abiotic and biotic factors in the life of coastal and marine plants and animals including humans.

**BIOSM 310(3100) Marine Symbiosis**

Summer. 4 credits. Prerequisite: one full year college-level biology. Recommended: background in microbiology or cell biology. S-U grades optional. Special two-

week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lecs and fieldwork for two weeks. SML staff.

Introduction to the concepts of symbiosis as applied to marine organisms, with an emphasis on microbial symbionts. Students develop the ability to analyze symbioses using a comprehensive set of criteria, including duration, propagation, specificity, integration and modes of interaction. Morning lectures are followed by afternoons collecting, preparing and studying live specimens. Each student learns to use a variety of light microscopic techniques, and contributes, through fieldwork and by written reports, to a comprehensive survey of symbiotic associations on and around Appledore Island.

**BIOSM 329(3290) Ecology of Animal Behavior (also BIONB 329(3290))**

Summer. 4 credits. Prerequisite: one year introductory college biology.

Recommended: course work in ecology, psychology, or behavior. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details and an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for two weeks. SML faculty.

The ecological significance of behaviors of coastal organisms, with emphasis on field and laboratory research methods. Lectures and readings address the major subareas of behavior (communication, orientation, social behavior, foraging, predator avoidance, and sensory mechanisms). Each student engages in short-term behavioral observation and prepares a research proposal for studying a problem within the course subject area.

**BIOSM 364(3640) Field Marine Science (FMS)**

Summer. 8 credits. Prerequisite: one year college biology. S-U grades optional. Special four-week course offered twice each summer at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. Students may not take FMS after taking FMBE (BIOSM 375). For more details or an application, contact SML Office, G14 Stimson Hall. Daily lec, lab, and fieldwork for four weeks. Three core faculty members assisted by up to 15 visiting lecturers, including representatives of governmental agencies. SML faculty.

Designed for the student who desires an initial overview of the marine sciences, this course emphasizes living material in natural habitats. Most of the course work is concerned with the biology of intertidal plants and animals, biological oceanography, ichthyology, and fisheries. Attention is also given to introductory physical and chemical oceanography and marine geology. Marine ecology and the effects of human activity on the marine environment are included. Students apply this knowledge by conducting a transect study toward the end of the course. FMS places emphasis on ichthyology, fisheries biology, general oceanography (biological, physical, and chemical), and marine geology. FMBE (BIOSM 375) places an additional emphasis on ecology, especially in the intertidal zone; ecological, evolutionary and physiological adaptations of marine organisms; and field experiments.

**BIOSM 365(3650) Underwater Research**

Summer. 4 credits. Prerequisites: one year college-level biology, recognized SCUBA certification, and medical exam. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec and fieldwork for two weeks.

Covers the philosophy of research, hypothesis testing and experimental design, sampling methods, various underwater techniques, diving physics and physiology, and use of dive tables. Emphasizes subtidal ecological research. Requirements include critical evaluation of several journal articles and production of a research proposal.

**[BIOEE 373(3730) Biology of the Marine Invertebrates**

Fall (but course must be taken previous summer at Shoals Marine Laboratory [SML]), three-week, full-time course. 5 credits (students enroll for credit during fall semester). Limited to 24 students. Prerequisites: one year introductory biology for majors; permission of faculty because off campus. Letter grades only. Daily and evening lec, lab, and fieldwork. Offered alternate years; not offered 2006-2007; next offered 2007-2008. C. D. Harvell and J. G. Morin.]

**BIOSM 374(3740) Field Ornithology**

Summer. 4 credits. Prerequisite: one year college-level biology. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec and fieldwork for two weeks. SML faculty.

Introduction to field ornithology focusing on the biology, ecology, and behavior of the avifauna on the Isles of Shoals. Focuses on fieldwork designed to observe and study many concepts frequently taught in the classroom setting including territoriality, breeding biology, and survivorship. Students learn and apply numerous ornithological field methods including various census techniques, territory mapping, banding, behavioral observations, and creating a field notebook.

**BIOSM 375(3750) Field Marine Biology and Ecology (FMBE)**

Summer. 8 credits. Prerequisites: one full year college-level biology. S-U grades optional. Four-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G-14 Stimson Hall. Daily lec, lab, and fieldwork for four weeks. SML faculty.

Designed for students seeking an introduction to the marine sciences and marine ecology; FMBE emphasizes fieldwork in natural habitats. Examines aspects of the biology and ecology of marine organisms, including intertidal plants and invertebrates, fishes, marine mammals and birds, biological oceanography, and human impacts on the marine environment. FMBE places a special emphasis on the ecology of the intertidal zone and ecological, evolutionary, and physiological adaptations of marine organisms. Students may not take FMBE after taking FMS (BIOSM 364).

**[BIOSM 376(3760) Marine Invertebrate Zoology**

Summer. 6 credits. Prerequisite: one year introductory biology and permission of instructors. Students may not take BIOSM 376 after taking BIOEE 373. S-U grades optional. Special three-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for three weeks. Offered alternate years; offered summer 2008. SML faculty.

Introduction to the biology and evolution of the major invertebrate phyla, concentrating on marine representatives. Emphasizes the evolution of form and function, and the ecology, behavior, physiology, chemical ecology, and natural history of invertebrates. Appledore Island's unique location provides an excellent venue for the study of freshly collected and *in situ* representatives of most of the major phyla.]

**BIOSM 377(3770) Diversity of Fishes**

Summer. 6 credits. Prerequisite: one full year college-level biology. Recommended: background in vertebrate biology. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec and fieldwork for two weeks. SML staff.

Intensive lecture, laboratory, and field course. Lectures cover the basic anatomy and physiology of fishes with examples drawn from a wide variety of fishes from throughout the world. The course emphasizes the diversity of fishes in two aspects, diversity of evolutionary solutions to problems faced by fishes and the great diversity of different types of fishes that inhabit the world. Laboratory exercises cover the anatomy and osteology of teleost fishes and identification of local species. Each student selects a different local species of teleost fish to study and dissect and prepares a comprehensive paper on its morphology, soft anatomy, and osteology.

**BIOSM 413(4130) Research in Marine Biology**

Summer. 6 credits. Prerequisite: one year college-level biology. Recommended: experience in ecology or physiology. S-U grades optional. Special three-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for three weeks. SML faculty.

Introduction to the physiological ecology and functional morphology of marine plants and animals, with emphasis on selected algal and invertebrate examples from the Gulf of Maine. Topics include photosynthesis in the marine environment; respiration in intertidal organisms; carbohydrates, proteins, and lipids as nutrients in the sea; acclimation and tolerance of tide-pool biota; and biological responses to competition and grazing. Field and laboratory exercises explore principles and procedures used to characterize the physical, chemical, and biotic environment of intertidal and shallow subtidal organisms, including determination of temperature, light, salinity, oxygen and nutrient levels, and *in vivo* functional analyses of metabolic phenomena. The process of scientific investigation is the predominant theme of the course.

**BIOSM 449(4490) Seaweeds, Plankton, and Seagrass: The Ecology and Systematics of Marine Plants**

Summer. 4 credits. Prerequisite: BIOSM 364 or one year introductory biology. S-U grades optional. Special two-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, consult SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for two weeks. SML faculty.

Overview of the major marine algal groups, including aspects of anatomy, morphology, development, life histories, physiology, and use. Laboratories and fieldwork emphasize relationships between distribution and major environmental parameters and involve student projects.

**BIOSM 477(4770) Marine Vertebrates**

Summer. 6 credits. Prerequisites: vertebrate biology course. S-U grades optional. Special three-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, consult SML office, G14 Stimson Hall. Daily lec, lab, and fieldwork for three weeks. SML faculty.

Topics in marine vertebrate biology emphasizing laboratory studies, field collections or observations, and readings from the current literature. Topics include systematics of fishes of the Gulf of Maine; elasmobranch physiology; interpretation of life history and parameters from otolith microstructure; teleost skeletomuscular structure and function; population biology and the contemporary Gulf of Maine fishery; Mesozoic marine reptiles; the biology of sea turtles in cold water; coloniality in sea birds; avian adaptations to life at sea; evolution and systematics of marine mammals; diving physiology; and ecology and conservation of existing marine mammal populations. Dissection of vertebrate animals is a part of one or more laboratory sessions.

**BIOSM 495(4950) Research Methods in Marine Biology**

Summer. 1 credit. Corequisite: BIOSM 499 or permission of instructor. Primarily for undergraduates. Special eight-week course offered at the Shoals Marine Laboratory (SML). For more details or an application, contact SML office, G14 Stimson Hall. Weekly sem for eight weeks. J. G. Morin and M. J. Shulman.

Seminar course on research methodology, experimental design, statistical analyses, and scientific writing. The course is designed to assist students in the research they are conducting while enrolled in BIOSM 499.

**BIOSM 499(4990) Research in Biology**

Summer. Variable credit; 2 credits per seven days on site. For more details and an application, contact SML office, G14 Stimson Hall.

**Section A: Independent Biological Research:**

Independent study with a member of the Shoals Marine Laboratory core faculty, based on student faculty interest and available facilities. A short proposal of research must be sent with application materials.

**Research Experiences for Undergraduates (REU)**

0 credits. The National Science Foundation (NSF) Research Experiences for Undergraduates (REU) program provides

support for undergraduates to pursue supervised, independent research projects at the Shoals Marine Laboratory. Nine students are selected from a competitive, national pool to participate in the eight-week summer program. For more information and an application, contact SML office, G14 Stimson Hall, or view SML's web site at [www.sml.cornell.edu](http://www.sml.cornell.edu).

**BIOSM 650(6500) Field Marine Ecology and Environmental Science for Teachers**

Summer. 2 credits. Prerequisites: one year college-level biology. Recommended: teaching experience. A special one-week course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G-14 Stimson Hall. Daily lec and fieldwork for one week. SML faculty.

Intended for teachers of grades 6–12 but also open to undergraduate junior and senior students interested in teaching. Teachers develop hands-on, experiential approaches to the marine sciences, with an emphasis on coastal and environmental issues. Extensions to freshwater ecology also are included. Fieldwork is emphasized, with numerous excursions to the rocky intertidal and with off-shore ocean sampling. Lectures focus on biodiversity, adaptations, predator-prey interactions, environmental sustainability, and how to engage and motivate students with aquatic projects.

**BIOSM 699(6990) Research in Biology for Teachers**

Summer. 2 credits per week. Prerequisite: BIOSM 650. Special course offered at Shoals Marine Laboratory (SML), located on an island off Portsmouth, N.H. For more details or an application, contact SML office, G14 Stimson Hall.

Opportunity for teachers who have taken BIOSM 650 to return to Shoals to pursue in greater depth a topic of their choosing under the direction of the BIOSM 650 faculty.

**BIOMI 650(6500) Molecular Plant Virology (also PL PA 606[6060])**

Spring, first seven weeks of semester. 1 credit. Prerequisites: BIOMI 409, cell biology course, or permission of instructor. S-U grades optional. Offered alternate years. S. G. Lazarowitz.

Introduces students to the molecular biology of plant virus replication and interactions with the host to produce disease. Material covered includes virus replication strategies, cell-to-cell and systemic movement, host defense responses and virus counterstrategies, and engineered resistance.

**BIOMI 651(6080) Genomics of Bacterium-Host Interactions (also PL PA 608[6080])**

Fall, second half of semester. 1 credit. Prerequisite: BIOMI 290 or equivalent or permission of instructor. S-U grades optional. Lec. Offered alternate years. A. Collmer and S. Winans.

Introduction to genomic approaches, tools, and discoveries involving the study of bacterial interactions with plant and animal hosts. Topics include the TIGRE Comprehensive Microbial Resource and Artemis tools, the pathogens *Yersinia pestis*, *V. enterocolitica*, *Pseudomonas syringae*, *Ralstonia solanacearum*, and *Agrobacterium tumefaciens* and the symbiont *Sinorhizobium meliloti*.

**BIOSM 366-372(3660-3720) SEA Semester**

In cooperation with the Sea Education Association (SEA), the Shoals Marine Laboratory offers a semester-length sequence of courses designed to provide college undergraduates with a thorough academic, scientific, and practical understanding of the sea. *This sequence is repeated approximately once every two months throughout the year.* Students spend the first half of SEA Semester (a six-week shore component) in Woods Hole, Mass., receiving instruction in oceanography, nautical science, and maritime studies. The second half of SEA Semester (a six-week sea component) is spent at sea aboard the SSV *Robert C. Seamans* or the SSV *Corwith Cramer*. Enrollment is open to both men and women judged capable of benefiting from SEA semester; a student must have successfully completed **at least one college-level laboratory science course** (or its equivalent) in order to be admitted to SEA Semester or SEA Summer Session. **No prior sailing experience is necessary.** Cornell students enrolled in the SEA Semester must take the entire sequence.

For more information, contact Shoals Marine Laboratory office, G14 Stimson Hall, or call SEA directly at 800-552-3633. Program costs are to be paid in place of regular Cornell tuition and fees.

Instructors for the SEA Semester include faculty of the Sea Education Association and the Woods Hole Oceanographic Institution and others.

**Shore Component (six weeks)****BIOSM 366(3660) SEA Introduction to Oceanography**

3 credits. Corequisites: BIOSM 367 and 368. Survey of the characteristics and processes of the global ocean. Introduces oceanographic concepts and develops them from their bases in biology, physics, chemistry, and geology. Provides a broad background in oceanography with special attention to areas pertinent to the subsequent cruise. Guest lecturers from the Woods Hole research community interpret current trends and activities in this rapidly evolving field. Students develop individual projects to be carried out at sea.

**BIOSM 367(3670) SEA Introduction to Maritime Studies**

3 credits. Corequisites: BIOSM 366 and 368. Interdisciplinary consideration of our relationship with the marine environment. Covers the elements of maritime history, law, literature, and art necessary to appreciate our marine heritage and to understand the political and economic problems of contemporary maritime affairs.

**BIOSM 368(3680) SEA Introduction to Nautical Science**

3 credits. Corequisites: BIOSM 366 and 367. An introduction to the technologies of operation at sea. The concepts of navigation (piloting, celestial and electronic), naval architecture, ship construction, marine engineering systems, and the physics of sail are taught from their bases in astronomy, mathematics, and physics. Provides the theoretical foundation for the navigation, seamanship, and engineering that students employ at sea.

**Sea Component (six weeks)**

Courses 369, 370, and 372 take place aboard the SSV *Robert C. Seamans*, a 134-foot steel auxiliary-powered brigantine schooner built in 2001, or the SSV *Corwith Cramer*, a 134-foot steel auxiliary-powered brigantine built in 1987 for SEA. Both ships normally put to sea with a ship's company of 34. The professional staff of nine includes the captain, the chief scientist, three science watch officers, three deck watch officers, an engineer, and a steward. In addition, one or more visiting investigators are frequently aboard. Up to 24 students round out the complement.

**BIOSM 369(3690) SEA Practical Oceanography I**

4 credits. Prerequisite: BIOSM 366. Theories and problems raised in the shore component are tested in the practice of oceanography at sea. Students are introduced to the tools and techniques of the practicing oceanographer. During lectures and watch standing, students are instructed in the operation of basic oceanographic equipment; in the methodologies involved in the collection, reduction, and analysis of oceanographic data; and in the attendant operations of a sailing oceanographic research vessel.

**BIOSM 370(3700) SEA Practical Oceanography II**

4 credits. Prerequisites: BIOSM 368 and 369. Building on the experience of Practical Oceanography I, students assume increasing responsibility for conducting oceanographic research and overseeing operations of the vessel. The individual student is ultimately responsible directly to the chief scientist and the master of the vessel for the safe and orderly conduct of research activities and related operations of the vessel. Each student undertakes an individual research project designed during the shore component.

**BIOSM 372(3720) SEA Practical Oceanography III**

Summer. 3 credits. Prerequisites: BIOSM 366, 367, and 368. Theories and problems raised in class are tested in the practice of oceanography at sea. During lectures and watch standing, students are instructed in the operation of basic oceanographic equipment, in the methodologies involved in the collection, analysis, and reduction of oceanographic data, and in the attendant operations of sailing an oceanographic research vessel. Group research projects are completed.

**FACULTY ROSTER****New York State College of Agriculture and Life Sciences**

Adler, Craig K., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior  
Agrawal, Anurag, Ph.D., U. of California, Davis. Assoc. Prof., Ecology and Evolutionary Biology/Entomology  
Alani, Eric E., Ph.D., Harvard U. Assoc. Prof., Molecular Biology and Genetics  
Anderson, John M., Ph.D., New York U. Prof. Emeritus, Molecular Biology and Genetics  
Angert, Esther R., Ph.D., Indiana U. Asst. Prof., Microbiology  
Barbash, Daniel A., Ph.D., U. of California, Berkeley. Asst. Prof., Molecular Biology and Genetics

Bates, David M., Ph.D., U. of California, Los Angeles. Prof., Plant Biology (Bailey Hortorium)  
Bemis, William E., Ph.D., U. of California, Berkeley. Prof., Ecology and Evolutionary Biology/Shoals Marine Laboratory  
Bruns, Peter J., Ph.D., U. of Illinois. Prof. Emeritus, Molecular Biology and Genetics  
Cade, Thomas J., Ph.D., U. of California, Los Angeles. Prof. Emeritus, Ecology and Evolutionary Biology  
Calvo, Joseph M., Ph.D., Washington State U. William T. Keeton Professor in Biological Sciences, Molecular Biology and Genetics  
Chabot, Brian F., Ph.D., Duke U. Prof., Ecology and Evolutionary Biology  
Clayton, Roderick K., Ph.D., California Inst. of Technology. Prof. Emeritus, Plant Biology  
Crepet, William L., Ph.D., Yale U. Prof., Plant Biology (Bailey Hortorium)\*  
Davies, Peter J., Ph.D., U. of Reading (England). Prof., Plant Biology  
Davis, Jerrold I., Ph.D., U. of Washington. Assoc. Prof., Plant Biology (Bailey Hortorium)  
Dhondt, André A., Ph.D., Ghent State U. (Belgium). Edwin H. Morgens Professor of Ornithology, Ecology and Evolutionary Biology/Laboratory of Ornithology  
Dondero, Norman C., Ph.D., Cornell U. Prof. Emeritus, Microbiology  
Doyle, Jeffrey J., Ph.D., Indiana U. Prof., Plant Biology (Bailey Hortorium)  
Dress, William J., Ph.D., Cornell U. Prof. Emeritus, Plant Biology (Bailey Hortorium)  
Eisner, Thomas, Ph.D., Harvard U. Jacob Gould Schurman Professor, Neurobiology and Behavior/Ecology and Evolutionary Biology\*  
Emlen, Stephen T., Ph.D., U. of Michigan. Jacob Gould Schurman Professor, Neurobiology and Behavior  
Feeny, Paul P., Ph.D., Oxford U. (England). Prof., Ecology and Evolutionary Biology  
Fitzpatrick, John W., Ph.D., Princeton U. Prof., Ecology and Evolutionary Biology/Laboratory of Ornithology  
Flecker, Alexander S., Ph.D., U. of Maryland. Assoc. Prof., Ecology and Evolutionary Biology  
Fox, Thomas D., Ph.D., Harvard U. Prof., Molecular Biology and Genetics  
Fu, Jianhua, Ph.D., U. Pittsburgh. Asst. Prof., Molecular Biology and Genetics  
Ghiorse, William C., Ph.D., Rensselaer Polytechnic Inst. Prof., Microbiology  
Gibson, Jane, Ph.D., U. of London (England). Prof. Emeritus, Molecular Biology and Genetics  
Goldberg, Michael L., Ph.D., Stanford U. Prof., Molecular Biology and Genetics  
Hanson, Maureen R., Ph.D., Harvard U. Prof., Molecular Biology and Genetics/Liberty Hyde, Prof., Plant Biology  
Harrison, Richard G., Ph.D., Cornell U. Prof., Ecology and Evolutionary Biology  
Harris-Warrick, Ronald M., Ph.D., Stanford U. Prof., Neurobiology and Behavior  
Harvell, C. Drew, Ph.D., U. of Washington. Prof., Ecology and Evolutionary Biology  
Hay, Anthony, Ph.D., U. of California. Assoc. Prof., Microbiology  
Helmann, John D., Ph.D., U. of California, Berkeley. Prof., Microbiology  
Henry, Susan, Ph.D., U. of California, Berkeley. Prof., Molecular Biology and Genetics and Dean CALS  
Hopkins, Carl D., Ph.D., Rockefeller U. Prof., Neurobiology and Behavior



Howarth, Robert W., Ph.D., Massachusetts Inst. of Technology/Woods Hole Oceanographic Institution. David R. Atkinson Professor of Ecology and Environmental Biology, Ecology and Evolutionary Biology

Hua, Jian, Ph.D., California Inst. of Technology. Asst. Prof., Plant Biology

Ingram, John W., Ph.D., U. of California, Berkeley. Prof. Emeritus, Plant Biology (Bailey Hortorium)

Jagendorf, André T., Ph.D., Yale U. Liberty Hyde Bailey Professor of Plant Physiology Emeritus, Plant Biology

Kemphues, Kenneth J., Ph.D., Indiana U. Prof., Molecular Biology and Genetics

Kessler, André, Ph.D., Max Planck Inst. for Chemical Ecology/Friedrich Schiller U. of Jena (Germany). Asst. Prof., Ecology and Evolutionary Biology/Boyce Thompson Inst. for Plant Research

Kingsbury, John M., Ph.D., Harvard U. Prof. Emeritus, Plant Biology

Kraus, W. Lee, Ph.D., U. of Illinois. Asst. Prof., Molecular Biology and Genetics

Lis, John T., Ph.D., Brandeis U. Prof., Molecular Biology and Genetics

Lovette, Irby J., Ph.D., U. of Pennsylvania. Asst. Prof., Ecology and Evolutionary Biology/Laboratory of Ornithology

Luckow, Melissa A., Ph.D., U. of Texas, Austin. Assoc. Prof., Plant Biology (Bailey Hortorium)

MacDonald, Russell E., Ph.D., U. of Michigan. Prof. Emeritus, Molecular Biology and Genetics

MacIntyre, Ross J., Ph.D., Johns Hopkins U. Prof., Molecular Biology and Genetics

Madsen, Eugene L., Ph.D., Cornell U. Assoc. Prof., Microbiology

Marks, Peter L., Ph.D., Yale U. Prof., Ecology and Evolutionary Biology

McCune, Amy R., Ph.D., Yale U. Prof., Ecology and Evolutionary Biology

Morin, James G., Ph.D., Harvard U. Prof., Ecology and Evolutionary Biology

Mortlock, Robert P., Ph.D., U. of Illinois. Prof. Emeritus, Microbiology

Nasrallah, June B., Ph.D., Cornell U. Prof., Plant Biology

Nasrallah, Mikhail E., Ph.D., Cornell U. Prof., Plant Biology

Naylor, Harry B., Ph.D., Cornell U. Prof. Emeritus, Microbiology

Niklas, Karl J., Ph.D., U. of Illinois. Prof., Plant Biology

Nixon, Kevin C., Ph.D., U. of Texas, Austin. Assoc. Prof., Plant Biology (Bailey Hortorium)

Owens, Thomas G., Ph.D., Cornell U. Assoc. Prof., Plant Biology

Paolillo, Dominick J., Jr., Ph.D., U. of California, Davis. Prof. Emeritus, Plant Biology

Parthasarathy, Mandayam V., Ph.D., Cornell U. Prof. Emeritus, Plant Biology

Peters, Joseph, Ph.D., U. of Maryland. Asst. Prof., Microbiology

Reeve, H. Kern, Ph.D., Cornell U. Prof., Neurobiology and Behavior

Roberts, Jeffrey W., Ph.D., Harvard U. Robert J. Appel Professor of Cellular and Molecular Biology, Molecular Biology and Genetics

Rodriguez, Eloy, Ph.D., U. of Texas, Austin. Prof., Plant Biology (Bailey Hortorium)

Root, Richard B., Ph.D., U. of California, Berkeley. Prof. Emeritus, Ecology and Evolutionary Biology/Entomology

Rose, Jocelyn, Ph.D., U. of California, Davis. Asst. Prof., Plant Biology

Russell, James B., Ph.D., U. of California, Davis. Prof., Microbiology

Scanlon, Michael, Ph.D., Iowa State U. Assoc. Prof., Plant Biology

Seeley, Jr., Harry W., Ph.D., Cornell U. Prof. Emeritus, Microbiology

Shalloway, David I., Ph.D., Massachusetts Inst. of Technology. Greater Philadelphia Prof., Molecular Biology and Genetics

Shapleigh, James P., Ph.D., U. of Georgia. Assoc. Prof., Microbiology

Stinson, Harry T., Ph.D., Indiana U. Prof. Emeritus, Molecular Biology and Genetics

Tye, Bik-Kwoon, Ph.D., Massachusetts Inst. of Technology. Prof., Molecular Biology and Genetics

Uhl, Charles H., Ph.D., Cornell U. Prof. Emeritus, Plant Biology

Uhl, Natalie W., Ph.D., Cornell U. Prof. Emeritus, Plant Biology (Bailey Hortorium)

Van Wijk, Klaas J., Ph.D., Groningen U. (The Netherlands). Assoc. Prof., Plant Biology

Vogt, Volker M., Ph.D., Harvard U. Prof., Molecular Biology and Genetics

Walcott, Charles, Ph.D., Cornell U. Prof., Neurobiology and Behavior

Wayne, Randy O., Ph.D., U. of Massachusetts. Assoc. Prof., Plant Biology

Winans, Stephen C., Ph.D., Massachusetts Inst. of Technology. Prof., Microbiology

Winkler, David W., Ph.D., U. of California, Berkeley. Prof., Ecology and Evolutionary Biology

Wu, Ray, Ph.D., U. of Pennsylvania. Prof., Molecular Biology and Genetics

Zahler, Stanley A., Ph.D., U. of Chicago. Prof. Emeritus, Molecular Biology and Genetics

Zinder, Stephen H., Ph.D., U. of Wisconsin. Prof., Microbiology

#### Other Teaching Personnel

Blankenship, James E., M.S., Cornell U. Sr. Lec., Molecular Biology and Genetics

Calvo, Rita A., Ph.D., Cornell U. Sr. Lec., Molecular Biology and Genetics

Chen, Kuei-chiu, Ph.D., New York U. Lec., Neurobiology and Behavior

Ecklund, P. Richard, Ph.D., Oregon State U. Sr. Lec., Neurobiology and Behavior

Ely, Susan, Ph.D., Tufts U. Lec., Molecular Biology and Genetics

Glase, Jon C., Ph.D., Cornell U. Sr. Lec., Neurobiology and Behavior

Land, Bruce, Ph.D., Cornell U. Sr. Lec., Neurobiology and Behavior\*

Lorr, Nancy, Ph.D., U. of Oregon. Lec., Physiology

McGuire, Betty A., Ph.D., U. of Massachusetts. Sr. Lec., Ecology and Evolutionary Biology

Merkel, Susan, M.S., Cornell U. Sr. Lec., Microbiology

Nivison, Helen T., Ph.D., U. of California, Davis. Lec., Molecular Biology and Genetics

Rehkugler, Carole M., M.S., Cornell U. Sr. Lec., Microbiology

Shulman, Myra J., Ph.D., U. of Washington. Sr. Res. Assoc., Ecology and Evolutionary Biology

Silva, Thomas, Ph.D., Cornell U. Sr. Lec., Plant Biology

Southard, Laurel E., M.S., Tulane U. Lec., Undergraduate Biology

Wrege, Peter H., Ph.D., Cornell U. Sr. Res. Assoc., Ecology and Evolutionary Biology

#### Joint Appointees

Baldwin, Ian T., Adjunct Prof., Max Planck Inst. for Chemical Ecology/Ecology and Evolutionary Biology

Bloom, Stephen E., Prof., Veterinary/Microbiology and Immunology

Bradbury, Jack, Prof., Neurobiology and Behavior/Library of Natural Sounds

Brutnell, Thomas, Prof., Plant Breeding/Plant Biology

Doyle, Jeffrey J., Prof., Plant Biology (Bailey Hortorium)/Plant Biology General

Foote, Robert H., Jacob Gould Schurman Prof. Emeritus, Animal Science/Physiology

Giovannoni, James G., Adjunct Asst. Prof., USDA Science and Education Administration/Plant Biology

Hanson, Maureen, Prof., Molecular Biology and Genetics/Plant Biology

Hrazdina, Geza, Prof., Food Science and Technology/Geneva/Plant Biology Ithaca

Jahn, Margaret M., Assoc. Prof., Plant Breeding/Plant Biology

Jander, Georg, Adjunct Asst. Prof., Boyce Thompson Inst./Plant Biology

Kochian, Leon V., Adjunct Prof., USDA Science and Education Administration/Plant Biology

Korf, Richard P., Prof. Emeritus, Plant Pathology/Plant Biology (Bailey Hortorium)

Kresovich, Stephen, Prof., Plant Breeding/Plant Biology

Liebherr, James K., Assoc. Prof., Entomology/Plant Biology (Bailey Hortorium)

McClure, Polley A., Prof., Information Technologies/Ecology and Evolutionary Biology

McCouch, Susan R., Assoc. Prof., Plant Breeding/Plant Biology

Pimentel, David, Prof. Emeritus, Entomology/Ecology and Evolutionary Biology

Rossman, Michael J., Adjunct Prof., Purdue U./Molecular Biology and Genetics

Stern, David B., Adjunct Prof., Boyce Thompson Institute/Plant Biology

Tanksley, Steven, Prof., Plant Breeding/Liberty Hyde Bailey Prof., Plant Biology

Thaler, Jennifer S., Assoc. Prof., Entomology/Ecology and Evolutionary Biology

Thompson, John F., Adjunct Prof., USDA Science and Education Administration/Plant Biology

Vehrencamp, Sandra, Prof., Neurobiology and Behavior/Library of Natural Sounds

Wang, Haiyang, Adjunct Asst. Prof., Boyce Thompson Inst./Plant Biology

#### College of Arts and Sciences

Adkins-Regan, Elizabeth, Ph.D., U. of Pennsylvania. Prof., Neurobiology and Behavior/Psychology

Aquadro, Charles F., Ph.D., U. of Georgia. Prof., Molecular Biology and Genetics/Ecology and Evolutionary Biology

Bass, Andrew H., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior

Blackler, Antonie W., Ph.D., U. of London (England). Prof., Molecular Biology and Genetics

Booker, Ronald, Ph.D., Princeton U. Assoc. Prof., Neurobiology and Behavior

Bretscher, Anthony P., Ph.D., Leeds U. (England). Prof., Molecular Biology and Genetics

Brown, William J., Ph.D., U. of Texas Health Science Center, Dallas. Prof., Molecular Biology and Genetics

Clark, Andrew G., Ph.D., Stanford U. Prof., Molecular Biology and Genetics/Ecology and Evolutionary Biology

Deitcher, David, Ph.D., Harvard Medical School. Assoc. Prof., Neurobiology and Behavior

Ellner, Stephen P., Ph.D., Cornell U. Prof., Ecology and Evolutionary Biology

Feigenson, Gerald W., Ph.D., California Inst. of Technology. Prof., Molecular Biology and Genetics



Fetcho, Joseph R., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior

Finlay, Barbara, Ph.D., Massachusetts Inst. of Technology. Prof., Neurobiology and Behavior/Psychology

Garcia Garcia, Maria J., Ph.D., U. Autonoma de Madrid Spain. Asst. Prof., Molecular Biology and Genetics

Geber, Monica A., Ph.D., U. of Utah. Assoc. Prof., Ecology and Evolutionary Biology

Gibson, Quentin H., Ph.D./D.Sc., Queen's U. (Northern Ireland). Greater Philadelphia Professor Emeritus in Biological Sciences, Molecular Biology and Genetics

Goodale, Christine L., Ph.D., U. of New Hampshire. Asst. Prof., Ecology and Evolutionary Biology

Greene, Harry W., Ph.D., U. of Tennessee. Prof., Ecology and Evolutionary Biology

Hairston, Nelson G., Jr., Ph.D., U. of Washington. Frank H. T. Rhodes Professor of Environmental Science, Ecology and Evolutionary Biology

Halpern, Bruce P., Ph.D., Brown U. Prof., Neurobiology and Behavior/Psychology

Heppel, Leon A., Ph.D., U. of California, Berkeley. Prof. Emeritus, Molecular Biology and Genetics

Hess, George P., Ph.D., U. of California, Berkeley. Prof., Molecular Biology and Genetics

Hinkle, Peter C., Ph.D., New York U. Prof., Molecular Biology and Genetics

Howland, Howard C., Ph.D., Cornell U. Prof., Neurobiology and Behavior/Biomedical Sciences

Hoy, Ronald R., Ph.D., Stanford U. Merksamer Prof., Neurobiology and Behavior

Huffaker, Tim C., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Molecular Biology and Genetics

Ke, Ailong, Ph.D., Johns Hopkins U. School of Medicine. Asst. Prof., Molecular Biology and Genetics

Kennedy, Kenneth A. R., Ph.D., U. of California, Berkeley. Prof. Emeritus, Ecology and Evolutionary Biology

Lee, Siu Sylvia, Ph.D., Baylor Coll. of Medicine. Asst. Prof., Molecular Biology and Genetics

Leonard, Samuel L., Ph.D., U. of Wisconsin. Prof. Emeritus, Molecular Biology and Genetics

Linster, Christine, Ph.D., Pierre and Marie Curie U. Assoc. Prof., Neurobiology and Behavior

Liu, Jun Kelly, Ph.D., Cornell U. Asst. Prof., Molecular Biology and Genetics

McCobb, David, Ph.D., U. of Iowa. Assoc. Prof., Neurobiology and Behavior

MacDonald, June M. Fessenden, Ph.D., Tufts U. Assoc. Prof. Emeritus, Molecular Biology and Genetics/Program on Science, Technology, and Society

Nicholson, Linda, Ph.D., Florida State U. Asst. Prof., Molecular Biology and Genetics

Power, Alison G., Ph.D., U. of Washington. Prof., Ecology and Evolutionary Biology/Science and Technology Studies

Provine, William B., Ph.D., U. of Chicago. Charles A. Alexander Professor of Biological Sciences, Ecology and Evolutionary Biology/History

Schimenti, John C., Ph.D., U. of Cincinnati. Prof., Molecular Biology and Genetics

Seeley, Thomas D., Ph.D., Harvard U. Prof., Neurobiology and Behavior

Sherman, Paul W., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior

Sparks, Jed P., Ph.D., Washington State U. Asst. Prof., Ecology and Evolutionary Biology

Tumbar, Tudorita, Ph.D., U. of Illinois, Urbana-Champaign. Asst. Prof., Molecular Biology and Genetics

Turgeon, Robert, Ph.D., Carleton U. (Canada). Prof., Plant Biology

Wallace, Bruce, Ph.D., Columbia U. Prof. Emeritus, Molecular Biology and Genetics

Wilson, David B., Ph.D., Stanford U. Prof., Biochemistry, Molecular Biology and Genetics

Wolfner, Mariana F., Ph.D., Stanford U. Prof., Molecular Biology and Genetics

Zamudio, Kelly R., Ph.D., U. of Washington. Assoc. Prof., Ecology and Evolutionary Biology

#### Other Teaching Personnel

Johnson, Bruce R., Ph.D., Boston U. Sr. Lec., Neurobiology and Behavior

#### Joint Appointees

Levin, Simon A., Adjunct Prof., Princeton U./Ecology and Evolutionary Biology

Likens, Gene E., Adjunct Prof., Institute of Ecosystem Studies/Ecology and Evolutionary Biology

#### College of Veterinary Medicine

Alcaraz, Ana, D.V.M., Ph.D., Cornell U. Lec., Biomedical Sciences

Beyenbach, Klaus W., Ph.D., Washington State U. Prof., Biomedical Sciences

Bezuidenhout, Abraham, D.V.Sc., U. of Pretoria (South Africa). Sr. Lec., Biomedical Sciences

Buckles, Elizabeth, D.V.M., Ph.D., U. of Wisconsin. Asst. Prof., Pathology

Catalfamo, James, M.S., Ph.D., Union Coll. Sr. Res. Assoc., Population Medicine and Diagnostic Services

Cohen, Paula, Ph.D., U. of London (England). Asst. Prof., Genetics

Farnum, Cornelia E., D.V.M., Ph.D., U. of Wisconsin, Madison. Prof., Biomedical Sciences

FitzMaurice, Marnie C., V.M.D., Ph.D., U. of Pennsylvania. Instr., Biomedical Sciences

Fortune, Joanne E., Ph.D., Cornell U. Prof., Biomedical Sciences

Gilmour, Robert F., Ph.D., SUNY Upstate Medical Center. Prof., Biomedical Sciences

Gleed, Robin, BVSc, MRCVS, U. of Liverpool (England). Assoc. Prof., Clinical Sciences

Gunn, Teresa M., Ph.D., U. of British Columbia (Canada). Asst. Prof., Biomedical Sciences

Hermanson, John W., M.S., Ph.D., U. of Florida Gainesville. Assoc. Prof., Biomedical Sciences

Haupt, Katherine A., V.M.D., Ph.D., U. of Pennsylvania. Prof., Clinical Sciences

Kotlikoff, Michael I., Ph.D., U. of California, Davis. Prof., Biomedical Sciences

Lin, David, Ph.D., U. of California, Berkeley. Asst. Prof., Biomedical Sciences

Loew, Ellis R., Ph.D., U. of California, Los Angeles. Prof., Biomedical Sciences

Lorr, Nancy, Ph.D., U. of Oregon. Lec., Biomedical Sciences

Ludders, John, D.V.M., Washington State U. Prof., Clinical Sciences

Maza, Paul, D.V.M., U. of St. Kitts (West Indies). Lec., Biomedical Sciences

McDonough, Sean, D.V.M., Ph.D., U. of Pennsylvania. Assoc. Prof., Biomedical Sciences

Meyers-Wallen, Vicki, V.M.D., Ph.D., U. of Pennsylvania. Assoc. Prof., Biomedical Sciences

Minor, Ronald, V.M.D., Ph.D., U. of Pennsylvania. Prof., Biomedical Sciences

Mizer, Linda, D.V.M., Ph.D., Ohio State U. Sr. Lec., Biomedical Sciences

Nikitin, Alexander Yu, M.D., Ph.D., Petrov Research Inst. of Oncology (Russia). Asst. Prof. of Pathology, Biomedical Sciences

Njaa, Bradley, L., D.V.M., MVSc, U. of Saskatchewan. Asst. Prof., Biomedical Sciences

Noden, Drew M., Ph.D., Washington U. (St. Louis). Prof., Biomedical Sciences

O'Brian, Timothy, Ph.D., U. of Illinois. Prof., Biomedical Sciences

Oswald, Robert, Ph.D., Vanderbilt U. Prof., Molecular Medicine

Quaroni, Andrea, Ph.D., U. of Pavia (Italy). Prof., Biomedical Sciences

Rawson, Richard E., D.V.M., Ph.D., U. of Minnesota. Sr. Lec., Biomedical Sciences

Roberson, Mark, Ph.D., U. of Nebraska. Assoc. Prof., Biomedical Sciences

Schimenti, John, Ph.D., U. of Cincinnati. Prof., Biomedical Sciences

Schlafer, Donald H., D.V.M., Ph.D., U. of Georgia. Prof., Biomedical Sciences

Shepard, Laura, D.V.M., Cornell U. Instr., Biomedical Sciences

Suarez, Susan, Ph.D., U. of Virginia. Prof., Biomedical Sciences

Summers, Brian, B.V.Sc., Ph.D., Prof., Biomedical Sciences

Travis, Alexander J., V.M.D., Ph.D., U. of Pennsylvania. Asst. Prof., Biomedical Sciences

Weiss, Robert S., Ph.D., Baylor Coll. of Medicine. Asst. Prof., Biomedical Sciences

Wootton, John F., M.S., Ph.D., Cornell U. Prof., Biomedical Sciences

Xin, Hong-Bo, Ph.D., Beijing Medical U. (People's Republic of China). Asst. Prof., Biomedical Sciences

Yen, Andrew, Ph.D., Cornell U. Prof., Pathology and Director, Graduate Studies in Environmental Toxicology, Biomedical Sciences

#### College of Engineering

##### Joint Appointees

Cisne, John L., Assoc. Prof., Geological Sciences/Biological Sciences

Webb, Watt W., Prof., Applied and Engineering Physics/Biological Sciences

#### Biological Sciences

##### Joint Appointees

Snedeker, Suzanne M., Asst. Prof., Center for the Environment/Biological Sciences

#### Division of Nutritional Sciences

##### Joint Appointees

Arion, William J., Prof., Nutritional Sciences/Molecular Biology and Genetics

Bensadoun, Andre, Prof., Nutritional Sciences/Physiology

Kazarinoff, Michael N., Assoc. Prof., Nutritional Sciences/Molecular Biology and Genetics

Wright, Lemuel D., Prof. Emeritus, Nutritional Sciences/Molecular Biology and Genetics

\*Joint appointment with College of Arts and Sciences

†Joint appointment with College of Veterinary Medicine

‡Joint appointment with College of Agriculture and Life Sciences

§Joint appointment with College of Engineering

## COMPUTING AND INFORMATION SCIENCE

### ADMINISTRATION

Robert Constable, Dean

Juris Hartmanis, Senior Associate Dean

John Guckenheimer, Associate Dean for Advanced Computing

Jennifer Wofford, Assistant Dean for Educational Programs

### INTRODUCTION

Computing and Information Science (CIS) offers courses and programs campuswide in various academic disciplines in which computing is integral. It is home to the Department of Computer Science, the Department of Statistical Science, the major in Information Science, and interdisciplinary programs in computational biology, computational science, and engineering. The faculty members associated with CIS programs hold joint appointments with CIS and another Cornell academic unit.

Computing and Information Science is a rapidly changing area. Please consult the CIS web site, [www.cis.cornell.edu/](http://www.cis.cornell.edu/), for the most current news of programs and courses, or visit the CIS undergraduate office in 303 Upson Hall.

### ACADEMIC PROGRAMS

Computing and Information Science offers the following academic programs through its corresponding colleges. See the departmental listings for details of the programs.

#### Computational Biology

The program of study in computational biology is part of the biological sciences major offered through the College of Agriculture and Life Sciences and the College of Arts and Sciences and is coordinated by the Office of Undergraduate Biology. It provides core training in biology and the supporting physical and information sciences. It is designed for students who want to emphasize basic biological science.

The concentration in computational molecular biology is offered by the Department of Computer Science to students enrolled in the College of Arts and Sciences and the College of Engineering. It provides core training in computer science and biology. It is designed for students who want to emphasize computational science.

The concentration in statistical genomics is offered by the Department of Biological Statistics and Computational Biology to students enrolled in the College of Agriculture and Life Sciences. It provides training in statistics, biology, and computer science. It is designed for students who want to emphasize statistics and bioinformatics.

The concentration in mathematical biology is offered by the Department of Mathematics and is open to students enrolled in the College of Arts and Sciences. It provides training in mathematics, biology, and computer science. It is designed for students who want to emphasize mathematics.

#### Computational Science and Engineering

Computational science and engineering is an emerging CIS program. Numerous courses are taught throughout the university. Topics include numerical methods, modeling and simulation, and real-time computing and control. CIS sponsors several "tool-based" short courses for students who anticipate that their studies will have a strong computational component (CIS 401, 402). A course on data structures for computational science (CIS 409) is also offered.

#### Computer Science

All CIS programs have connections to computer science, the study of computation in all of its forms. The curriculum covers the theory of algorithms and computing and its many applications in science, engineering, and business. Students learn the algorithmic method of thinking and how to bring it to bear on a wide range of problems. They also study the elements of computing and information technology such as system design, problem specification, programming, system analysis and evaluation, and complex modeling. Research areas include programming languages, compilers, computing systems, artificial intelligence, natural language processing, computer graphics, computer vision, databases, networks, bioinformatics, the theory of algorithms, scientific computing, and computational logic.

The Department of Computer Science offers the computer science major to students in the College of Arts and Sciences and the College of Engineering, the computer science minor to students in the College of Engineering, and the Master of Engineering (M.Eng.) degree in computer science to students in the College of Engineering.

#### Information Science

Information science at Cornell is an interdisciplinary program that studies the design and use of information systems in a social context. It integrates the study of three aspects of digital information systems. First, information science studies computing systems that provide people with information content; this study overlaps with parts of computer science, stressing the design, construction, and use of large information systems such as the World Wide Web and other global information resources. The second aspect of information science examines how people engage these information resources and how they can be integrated into everyday life. This area is also called "human-centered systems" because it is concerned with systems that hundreds of millions of people will use in daily life. The

third aspect deals with understanding how information systems are situated in social, economic, and historical contexts. It explores the economic value of information, the legal constraints on systems, their social impact, and the cultural aspects of their construction. These are synergistic topics, and the next generation of scientists, scholars, business leaders, and government workers will need to understand them and how they relate.

Specific topics emphasized in the information science program include information networks; information discovery; knowledge organization; interaction design; interface design and evaluation; collaboration within and across groups, communities, organizations, and society; computational linguistics; computational techniques in the collection, archiving, and analysis of social science data; information privacy; methods of collecting, preserving, and distributing information; information system design; cognition and learning; social informatics; and cultural studies of computation.

The Information Science (IS) major is offered by the College of Agriculture and Life Sciences and the College of Arts and Sciences. Students in the College of Engineering may major in information science, systems, and technology (ISST), which is offered jointly by the Department of Computer Science and the School of Operations Research and Industrial Engineering. For details about the IS and ISST majors, please refer to the respective colleges.

The minor/concentration in information science is available to students in all undergraduate colleges.

#### Applied Statistics

The Department of Statistical Science offers a Master of Professional Studies (MPS) in applied statistics, with an emerging track in bioinformatics, for students pursuing careers in business, industry, and government. The MPS program has three main components: a two-semester core course, ST 501 and 502, covering a wide range of statistical applications, computing, and consulting; an in-depth statistical analysis MPS project supported by the core course; required course work, including a two-semester course sequence in mathematical probability and statistics, and elective course work selected from offerings in the Department of Statistical Science and other departments at Cornell.

### THE INFORMATION SCIENCE CONCENTRATION/MINOR

A concentration/minor in information science is available to students in the Colleges of Agriculture and Life Sciences (CALS); Architecture, Art, and Planning (AAP; available to Architecture and Planning students only); Arts and Sciences; Engineering; Human Ecology; and the Schools of Hotel Administration and Industrial and Labor

Relations (ILR). Because of small differences in regulations between the colleges, the requirements may vary slightly, depending on a student's college and, in a few cases, a student's major. All students interested in pursuing the information science concentration/minor must initiate the process by sending an e-mail message with their name, college, year of study (e.g., second-semester sophomore), expected graduation date, and (intended) major to [minor@infosci.cornell.edu](mailto:minor@infosci.cornell.edu). Students are also referred to [www.infosci.cornell.edu/ugrad/concentrations.html](http://www.infosci.cornell.edu/ugrad/concentrations.html) for the most up-to-date description of the concentration and its requirements.

Information science is an interdisciplinary field covering all aspects of digital information. The program has three main areas: human-centered systems, social systems, and information systems. Human-centered systems studies the relationship between humans and information, drawing from human-computer interaction and cognitive science. Social systems examines information in its economic, legal, political, cultural, and social contexts. Information systems studies the computer science problems of representing, storing, manipulating, and using digital information.

The concentration/minor has been designed to ensure that students have substantial grounding in all three of these areas. To this end, the requirements for the undergraduate concentration/minor are as follows. All courses must be chosen from the course lists below. In addition, a letter grade of C or better is required; S-U courses are not allowed.

Note: Course credits from institutions other than Cornell may not be counted toward the IS minor. Engineering students must use ENGRD 270 or CEE 304. Hotel students must use H ADM 201.

- **Statistics:** one course.
- **Human-centered systems** (human-computer interaction and cognitive science): two courses (for all colleges except Engineering and Hotel); one course (Engineering and Hotel).
- **Social systems** (social, economic, political, cultural, and legal issues): one course.
- **Information systems** (primarily computer science): two courses for all colleges except Hotel. Hotel students need to take one course in this area. Engineering students may not use INFO 130. COM S 211 may not be used by students who are required to take it for their major.
- **Elective:** one additional course from any component area. Hotel students must take three courses in this category, from the following: H ADM 374, 574, and 476 or 575. (Engineering students and all Computer science majors must select a course from human-centered systems or social systems. Communication majors must select a course outside Communication. Students in other majors should check with their advisors to make sure there are no special departmental restrictions or requirements.)

### Statistics

An introductory course that provides a working knowledge of basic probability and statistics and their application to analyzing data occurring in the real world.

Engineering students must take one of the following:

- ENGRD 270 Basic Engineering Probability and Statistics
- CEE 304 Uncertainty Analysis in Engineering

Hotel students must take:

- H ADM 201 Hospitality Quantitative Analysis

All other students can meet this requirement with any one of the following:

- MATH 171 Statistical Theory and Application in the Real World
- H ADM 201 Hospitality Quantitative Analysis
- AEM 210 Introductory Statistics
- PAM 210 Introduction to Statistics
- ENGRD 270 Basic Engineering Probability and Statistics
- BTRY 301 Statistical Methods I
- SOC 301 Evaluating Statistical Evidence
- CEE 304 Uncertainty Analysis in Engineering
- ILRST 312 Applied Regression Methods
- ECON 319 Introduction to Statistics and Probability
- PSYCH 350 Statistics and Research Design

### Human-Centered Systems

- COGST 101 Introduction to Cognitive Science
- PSYCH 205 Perception
- INFO 214 Cognitive Psychology
- INFO 245 Psychology of Social Computing
- PSYCH 280 Introduction to Social Psychology
- PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display
- INFO 345 Human-Computer Interaction Design
- PSYCH 347 Psychology of Visual Communications
- PSYCH 380 Social Cognition
- PSYCH 413 Information Processing: Conscious and Unconscious
- PSYCH 416 Modeling Perception and Cognition
- INFO 440 Advanced Human-Computer Interaction Design
- INFO 445 Seminar in Computer-Mediated Communication
- INFO 450 Language and Technology
- DEA 470 Applied Ergonomic Methods

### Social Systems

- S&TS 250 Technology in Society
- INFO 292 Inventing an Information Society
- ECON 301 Microeconomics\*
- SOC 304 Social Networks and Social Processes

- ECON 313 Intermediate Microeconomic Theory\*
- AEM 322 Technology, Information, and Business Strategy\*
- INFO 349 Media Technologies
- INFO 355 Computers: From the 17th Century to the Dot.com Boom
- INFO 356 Computing Cultures
- ECON 368 Game Theory\*
- INFO 387 The Automatic Lifestyle: Consumer Culture and Technology
- LAW 410 Limits on and Protection of Creative Expression—Copyright Law and Its Close Neighbors
- S&TS 411 Knowledge, Technology, and Property
- ECON 419 Economic Decisions Under Uncertainty
- COMM 428 Communication Law
- INFO 429 Copyright in the Digital Age
- OR&IE 435 Introduction to Game Theory\*
- S&TS 438 Minds, Machines, and Intelligence
- INFO 447 Social and Economic Data
- H ADM 474 Strategic Information Systems\*
- ECON 476/477 Decision Theory I and II
- H ADM 489 The Law of the Internet and E-Commerce
- INFO 515 Culture, Law, and Politics of the Internet

\*Only one of ECON 301 and 313 can be taken for IS credit. Only one of OR&IE 435 and ECON 368 can be taken for IS credit. Only one of AEM 322 and H ADM 474 may be taken for IS credit.

### Information Systems

- INFO 130 Introductory Design and Programming for the Web\*
- INFO 172 Computation, Information, and Intelligence
- COM S 211 Computers and Programming\*
- INFO 230 Intermediate Design and Programming for the Web\*
- CIS 300 Introduction to Computer Game Design
- INFO 330 Data-Driven Web Applications
- LING 424 Computational Linguistics
- INFO 430 Information Retrieval
- INFO 431 Web Information Systems
- COM S 432 Introduction to Database Systems
- COM S 465 Computer Graphics I
- COM S 472 Foundations of Artificial Intelligence
- LING 474 Introduction to Natural Language Processing
- OR&IE 474 Statistical Data Mining
- COM S 478 Machine Learning
- OR&IE 480 Information Technology
- OR&IE 481 Delivering OR Solutions with Information Technology

- OR&IE 483 Application of Operations Research and Game Theory to Information Technology
- COM S 501 Software Engineering
- COM S 513 System Security
- COM S 530 Architecture of Large-Scale Information Systems
- ECE 562 Fundamental Information Theory
- OR&IE 574 Statistical Data Mining
- COM S 578 Empirical Methods in Machine Learning and Data Mining

\*INFO 130 may not be taken for information science credit by Engineering students. Computer science majors may not use INFO 130 or 230. COM S 211 may not be taken for information science credit by majors for which it is a required course, e.g., Computer Science (COM S) and Operations Research and Industrial Engineering (OR&IE).

## COMPUTING AND INFORMATION SCIENCE (CIS) COURSES

### **CIS 121(1121) Introduction to MATLAB (also EAS 121[1121])**

Fall, spring. 2 credits. Corequisite: MATH 111, 191, or equivalent. No programming experience assumed.

Introduction to elementary computer programming concepts using MATLAB. Topics include problem analysis, development of algorithms, selection, iteration, functions, and arrays. Examples and assignments are chosen to build an appreciation for computational science. The goal is for each student to develop a facility with MATLAB that will be useful in other courses whenever there is a need for computer problem solving or visualization.

### **CIS 122(1002) Application of FORTRAN in the Earth and Environmental Sciences (also EAS 150[1500])**

Spring. 2 credits. Prerequisite: CIS/EAS 121 or equivalent.

For description, see EAS 150.

### **CIS 165(1610) Computing in the Arts (also ART 175, COM S 165[1610], ENGR 165[1610], MUSIC 165[1465], PSYCH 165[1650])**

Fall. 3 credits.

For description, see COM S 165.

### **CIS 167(1620) Visual Imaging in the Electronic Age (also ART 170[1700], COM S/ENGR 167[1620])**

Fall. 3 credits. Not offered every year.

For description, see ART 170.

### **CIS 300(3000) Introduction to Computer Game Design**

Fall, spring. 4 credits. Prerequisites: students generally choose one field (art, music, programming, writing), although working in multiple areas is encouraged; artists should have taken ART 251 or have equivalent experience; musicians should have programming experience (COM S 100, COM S/INFO 130 or equivalent) and MUSIC 120; programmers must have completed COM S/ENGRD 211 or CIS 409 and have experience with, or the ability to learn quickly, C++; writers should have programming experience (COM S 100, COM S/INFO 130 or equivalent) and ENGL 280/281 or equivalent experience.

Investigates the theory and practice of developing computer games from a blend of technical, aesthetic, and cultural perspectives. Technical aspects of game architecture include software engineering, artificial intelligence, game physics, computer graphics, and networking. Aesthetic and cultural aspects of design include art and modeling, sound and music, history of games, genre analysis, role of violence, gender issues in games, game balance, and careers in the industry. Programmers, artists, musicians, and writers collaborate to produce an original computer game.

### **CIS 401(4201) Introduction to Applied Scientific Computing with MATLAB**

Fall, usually weeks 2–5. 1 credit.

Prerequisite: COM S 100 or equivalent programming experience. S-U grades only.

Introduction to the use of MATLAB as an aid to scientific research. Introduces the basic syntax and features of MATLAB and develops the background necessary for the more specialized courses. Covers basic MATLAB programming and vectorized operations, data input/output, and simple visualization. Emphasizes applied issues such as managing large data sets, simulation, and visualization but also introduces fundamental ideas in scientific computing such as floating point arithmetic and algorithm efficiency. Although the course uses MATLAB, the ideas and concepts covered are common to many computational environments.

### **CIS 402(4202) Scientific Visualization with MATLAB**

Fall, usually weeks 6–10. 1 credit.

Prerequisite: COM S 100 or equivalent programming experience. Recommended: CIS 401. S-U grades only.

Survey of the advanced visualization features in MATLAB. Covers MATLAB's "handle graphics" paradigm, specialized graphics routines for vectors and fields, and introduces color mapping, lighting, and new features for controlling object transparency. Although the course is meant to introduce students to the capabilities of the MATLAB system, it also emphasizes the basic goal of visualization: producing an image that effectively communicates a scientific result.

### **CIS 405(4205) Effective Use of High-Performance Computing**

Spring, weeks 1–8. 2 credits. Prerequisite: proficiency in C, C++, Fortran, or Fortran 90. S-U grades only.

Introduction to high-performance computing (HPC) for graduate students or advanced undergraduate students who will use HPC as a tool in their research. Various HPC architectural platforms are described, with a focus on computational clusters. Students learn how to identify and exploit the various types of parallelism in algorithms and legacy applications. Understanding how to measure speedup and efficiency and how various bottlenecks affect them is covered. Parallel programming with MPI, OpenMP, and task-farming techniques, such as the use of web services, is covered in detail. The goal of the course is for students to gain practical HPC experience for use in their specific fields of research.

### **[CIS 409(4209) Data Structures and Algorithms for Computational Science (also M&AE 409[4090])]**

Fall. 4 credits. Prerequisite: COM S 211 or equivalent programming experience.

Covers data structures and algorithms with emphasis on those useful for computational science. This course is intended for students outside of the Department of Computer Science whose work involves a significant amount of computing. Topics include basic data structures as well as more advanced areas. Emphasis is placed on the use of abstract data types and on how best to select appropriate data structures.]

### **CIS 490(4999) Independent Reading and Research**

Fall, spring. 1–4 credits.

Independent reading and research for undergraduates.

### **CIS 504(5040) Applied Systems**

**Engineering (also CEE 504[5040], ECE 512[5120], M&AE 591[5910], OR&IE 512[5120], SYSEN 510[5100])**

Fall. 3 credits. Prerequisites: senior or graduate standing in engineering field; concurrent or recent (past two years) enrollment in group-based project with strong system design component approved by course instructor.

For description, see SYSEN 510.

### **CIS 505(5050) Systems Analysis Architecture, Behavior, and Optimization (also CEE 505[5050], ECE 513[5130], M&AE 592[5920], OR&IE 513[5130], SYSEN 520[5200])**

Spring. 3 credits. Prerequisite: Applied Systems Engineering (CEE 504, ECE 512, M&AE 591, OR&IE 512, or SYSEN 510).

For description, see SYSEN 520.

### **[CIS 565(5640) Computer Animation (also ART 273[2703], COM S 565[5640])]**

Fall. 4 credits. Prerequisite: none.

For description, see ART 273.]

### **[CIS 566(5642) Advanced Animation (also ART 372, COM S 566[5642])]**

Spring. 4 credits. Prerequisite: none.

For description, see ART 372.]

### **CIS 572(5722) Heuristic Methods for Optimization (also CEE 509[5090], COM S 572[5722], OR&IE 533[5340])**

Fall. 3 or 4 credits. Prerequisite: COM S/ENGRD 211 or 322, or CEE/ENGRD 241, or graduate standing, or permission of instructor.

For description, see CEE 509.

### **CIS 576(5846) Decision Theory I (also ECON 476/676[4460/6760])**

Fall. 4 credits. Prerequisite: mathematical sophistication.

For description, see ECON 476.

### **CIS 577(5847) Decision Theory II (also ECON 477/677[4770/6770])**

Spring. 4 credits. Prerequisite: mathematical sophistication.

For description, see ECON 477.

### **CIS 629(6229) Computation Methods for Nonlinear Systems (also PHYS 682[7682])**

Fall. 4 credits. Enrollment may be limited. J. Sethna and C. Myers.

For description, see PHYS 682.

### **[CIS 673(6724) Integration of Artificial Intelligence and Operations Research (also COM S 673[6724])]**

Spring. 3 credits.

For description, see COM S 673.]

**CIS 750(7726) Evolutionary Computation and Design Automation (also COM S 750(7726), M&AE 650(6500))**

Fall. 4 credits. Prerequisite: programming experience or permission of instructor. For description, see COM S 750.

**CIS 790(7999) Independent Research**

Fall, spring. Variable credit. Prerequisite: permission of CIS faculty member. Independent research or master of engineering project.

**CIS 797(7970) Topics in CIS/IGERT Seminars**

Fall, spring. 1 credit. S-U grades only. Discusses diverse topics in nonlinear systems. The seminar is oriented to the requirements for the IGERT Program in Nonlinear Systems, a National Science Foundation supported graduate training program. Includes a mixture of student, faculty, and visitor presentations and development of plans for internships and student projects.

## COMPUTER SCIENCE

The Department of Computer Science is affiliated with both the College of Arts and Sciences and the College of Engineering. Students in either college may major in computer science. The department is also part of CIS, and its courses are an integral part of its several educational programs.

**COM S 099(1109) Fundamental Programming Concepts**

Summer. 2 credits. Prerequisite: freshman standing. Credit may not be applied toward engineering degree. S-U grades only.

Designed for students who intend to take COM S 100 but are not adequately prepared for that course. Basic programming concepts and problem analysis are studied. An appropriate high-level programming language is used. Students with previous programming experience and students who do not intend to take COM S 100 should not take this course.

**COM S 100H(1113) Introduction to Computer Programming—Honors**

Spring. 4 credits.

An accelerated, but thorough, introduction to programming (mostly in Java, with a short segment on MATLAB) taught in a small class environment. The primary emphases are problem solving, modular design, and software development, with the focus on learning how to tackle a variety of ill-defined problems in a structured manner. No prior programming experience is required, although a preparedness to enjoy collaborative work and challenges would be a significant asset. Provides adequate preparation for COM S/ENGRD 211.

**COM S 100J(1110) Introduction to Computer Programming**

Fall, spring, summer. 4 credits. Assumes basic high school mathematics (no calculus) but no programming experience. Introduction to computer programming concepts using the Java programming language. Includes a two-week unit on MATLAB. Topics include algorithms, language concepts, object-oriented concepts, procedures and functions, arrays, and strings. Principles of software development, style, and testing are emphasized. Weekly lab sections provide students with guided practice on the

computer, with staff present to help. COM S 100J and 100M are equivalent courses; both should not be taken.

**COM S 100M(1112) Introduction to Computer Programming**

Fall, spring. 4 credits. Corequisite: MATH 111, 191, or equivalent. Assumes student is comfortable with mathematics (at level of one semester of calculus) but has no prior programming experience.

Introduction to computer programming concepts using MATLAB (seven weeks) and Java (seven weeks). Emphasizes techniques of problem analysis and development of algorithms and programs. Topics include iteration, functions, arrays, scientific graphics, and object-oriented concepts. Examples and assignments give the student an appreciation for computational science and engineering. COM S 100M and 100J are equivalent courses, and either one provides adequate preparation for COM S/ENGRD 211.

**COM S 100R(1114) Introduction to Computer Programming—Robotics**

Fall. 4 credits. Limited to 25 students. Prerequisite: programming experience at level of advanced placement computer science.

Fast-paced introduction to computer science using camera-controlled robots, taught in MATLAB. Emphasis is on modular design of programs and on fundamental algorithms. Extensive laboratory experiments with cameras and robots, including Sony Aibo. Example projects include controlling a robot by pointing a light stick and making a robot recognize simple colored objects. Provides adequate preparation for COM S/ENGRD 211.

**COM S 101(1710) Introduction to Cognitive Science (also COGST 101[1010], LING 170[1700], PHIL 191[1910], PSYCH 102[1020])**

Fall, summer. 3 credits. For description, see COGST 101.

**COM S 113(2000) Introduction to C**

Fall, spring, usually weeks 1-4. 1 credit. Prerequisite: COM S 100 or equivalent programming experience. Credit granted for both COM S 113 and 213 only if 113 taken first. S-U grades only.

Brief introduction to the C programming language and standard libraries. Unix accounts are made available for students wishing to use that system for projects, but familiarity with Unix is not required. (Projects may be done using any modern implementation of C.) COM S 213 (C++ Programming) includes much of the material covered in 113. Students planning to take COM S 213 normally do not need to take 113.

**COM S 114(2006) Unix Tools**

Fall, usually weeks 5-8. 1 credit. Prerequisite: COM S 100 or equivalent programming experience. Recommended: knowledge of at least one programming language. S-U grades only.

Introduction to Unix, emphasizing tools for file management, communication, process control, managing the Unix environment, and rudimentary shell scripts. Projects assume no previous knowledge of Unix or expertise in any particular language.

**COM S 130(1300) Introductory Design and Programming for the Web (also INFO 130[1300])**

Fall. 3 credits. Prerequisite: none. No computer background necessary.

The World Wide Web is both a technology and a pervasive and powerful resource in our society and culture. To build functional and effective web sites, students need technical and design skills as well as analytical skills for understanding who is using the web, in what ways they are using it, and for what purposes. In this course, students develop skills in all three of these areas through the use of technologies such as XHTML, Cascading Stylesheets, and PHP. Students study how web sites are deployed and used, usability issues on the web, user-centered design, and methods for visual layout and information architecture. Through the web, this course provides an introduction to the interdisciplinary field of information science. No computer background necessary.

**COM S 165(1610) Computing in the Arts (also ART 175, CIS 165[1610], ENGRI 165[1610], MUSIC 165[1465], PSYCH 165[1650])**

Fall. 3 credits. Recommended: good comfort level with computers and some of the arts.

Over the centuries, artists in a wide variety of media have employed many approaches to the creative process, ranging from the philosophical to the mechanical to the virtual. This course unravels some of the mysteries going on inside software used for art and music. It looks at ways of breaking things apart and sampling and ways of putting things together and resynthesizing, and explores ideas for creation. This course does not teach software packages for creating art and music. The course complements ART 171+ and MUSIC 120+.

**COM S 167(1620) Visual Imaging in the Electronic Age (also ART 170[1700], CIS/ENGRI 167[1620])**

Fall. 3 credits. For description, see ART 170.

**COM S 172(1700) Computation, Information, and Intelligence (also COGST 172, ENGRI 172[1700], INFO 172[1700])**

Fall. 3 credits. Prerequisites: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100. Introduction to computer science using methods and examples from the field of artificial intelligence. Topics include game playing, search techniques, learning theory, compute-intensive methods, data mining, information retrieval, the web, natural language processing, machine translation, and the Turing test. This is not a programming course; rather, "pencil and paper" problem sets are assigned. Some calculus is required.

**COM S 201(2710) Cognitive Science in Context Laboratory (also COGST 201, PSYCH 201[2010])**

Spring. 4 credits. Limited to 24 students. Recommended: concurrent or prior registration in PSYCH 102, COGST/COM S 101, LING 170, or PHIL 191. Knowledge of programming languages not assumed. For description, see COGST 201.

**COM S 211(2110) Computers and Programming (also ENGRD 211[2110])**

Fall, spring, summer. 3 credits. Prerequisite: COM S 100 or equivalent course in Java or C++. Intermediate programming in a high-level language and introduction to computer



science. Topics include program structure and organization, object-oriented programming (classes, objects, types, sub-typing), graphical user interfaces, algorithm analysis (asymptotic complexity, big "O" notation), recursion, data structures (lists, trees, stacks, queues, heaps, search trees, hash tables, graphs), simple graph algorithms. Java is the principal programming language.

### COM S 212(2111) Java Practicum

Fall, spring, 1 credit. Pre- or corequisite:

COM S/ENGRD 211. Letter grades only.

Project course that introduces students to the ways of software engineering using the Java programming language. The course requires the design and implementation of several large programs.

### COM S 214(2008) Advanced UNIX Programming and Tools

Spring, usually weeks 5-8. 1 credit.

Prerequisite: COM S 114 or equivalent. S-U grades only.

Focuses on Unix as a programming environment for people with a basic knowledge of Unix and experience programming in at least one language. Projects cover advanced shell scripts (sh, ksh, csh), Makefiles, programming and debugging tools for C and other languages, and more modern scripting languages such as Perl and Python. Students with little or no experience with Unix should take COM S 114 first.

### COM S 215(2004) Introduction to C#

Fall, spring, usually weeks 5-8. 1 credit.

Prerequisite: COM S/ENGRD 211 or equivalent experience. S-U grades only.

Introduces students to building applications in the .NET environment using the C# language.

### COM S 230(2300) Intermediate Design and Programming for the Web (also INFO 230(2300))

Spring, 3 credits. Prerequisite: COM S 130 or equivalent knowledge.

Web programming requires the cooperation of two machines: the one in front of the viewer (client) and the one delivering the content (server). COM S 130 concentrates almost exclusively on the client side. The main emphasis in COM S 230 is learning about server side processing. Students begin by looking at interactions with databases, learning about querying both on paper and via SQL, and then, through a succession of projects, learn how to apply this understanding to the creation of an interactive data-driven site via the use of an integrated web site development tool such as ColdFusion. Also considered are techniques to enhance security, privacy, and reliability and ways of incorporating other programs. Toward the end of the course, students are shown how these development tools are working. Design issues are emphasized. A major component of the course is the creation of a substantial web site.

### COM S 280(2800) Discrete Structures

Fall, spring, 3 credits. Pre- or corequisite:

COM S 100 or permission of instructor.

Covers the mathematics that underlies most of computer science. Topics include mathematical induction; logical proof; propositional and predicate calculus; combinatorics and discrete mathematics; basic probability theory; basic number theory; sets, functions, and relations; partially ordered sets; and graphs. These topics are discussed in the context of applications to many areas of computer science, including game playing,

the RSA cryptosystem, data mining, load balancing in distributed systems, properties of the Internet and World Wide Web, and web searching.

### COM S 305(3050) Creative Problem-Solving in Computer Science

Spring, 3 credits. Prerequisites: COM S 211 and 280.

Computer science is full of open-ended, vaguely specified problems; this course is about solving them. Examples draw from several sources, including the ACM programming competitions and a collection of "favorites" that interviewers like to pose to potential CS hires. Emphasis is on developing general problem-solving heuristics and teamwork. The course is discussion-based, with students working in groups, presenting solutions to the class, and critiquing the solutions of others. Grading rewards creativity and unusual thinking. Even an unsuccessful attempt to solve a problem can receive full credit if it is interesting, insightful, and clearly presented.

### COM S 312(3110) Data Structures and Functional Programming

Fall, spring, 4 credits. Prerequisite: COM S 211 and 212 or equivalent programming experience. Should not be taken concurrently with COM S 314 or 316.

Advanced programming course that emphasizes functional programming techniques and data structures. Programming topics include recursive and higher-order procedures, models of programming language evaluation and compilation, type systems, and polymorphism. Data structures and algorithms covered include graph algorithms, balanced trees, memory heaps, and garbage collection. Also covers techniques for analyzing program performance and correctness.

### COM S 314(3420) Computer Organization (also ECE 314(3140))

Spring, 4 credits. Prerequisite: COM S 211 or ENGRD 230. Should not be taken concurrently with COM S 312.

Basic computer organization. Topics include performance metrics, data formats, instruction sets, addressing modes, computer arithmetic, datapath design, memory hierarchies including caches and virtual memory, I/O devices, and bus-based I/O systems. Students learn assembly language programming and design a simple pipelined processor.

### COM S 316(3410) Systems Programming

Fall, 4 credits. Prerequisite: COM S 211 or equivalent programming experience. Should not be taken concurrently with COM S 312.

Introduction to systems programming, computer organization, and the hardware/software interface. Topics include representation of information, machine and assembly languages, processor organization, memory management, input/output mechanisms, and basic network programming. Also covered are techniques for analyzing program performance and optimization

### [COM S 321(3510) Numerical Methods in Computational Molecular Biology (also BIOBM 321(3210), ENGRD 321(3510))

Fall, 3 credits. Prerequisites: at least one course in calculus (e.g., MATH 106, 111, or 191) and linear algebra (e.g., MATH 221 or 294 or BTRY 417); COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures;

knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421. Offered odd-numbered years; next offered 2007-2008.

Introduction to numerical computing using MATLAB organized around five applications: the analysis of protein shapes, dynamics, protein folding, score functions, and field equations. Students become adept at plotting, linear equation solving, least squares fitting, and cubic spline interpolation. More advanced problem-solving techniques that involve eigenvalue analysis, the solution of ordinary and partial differential equations, linear programming, and nonlinear minimization are also treated. The goal of the course is to develop a practical computational expertise with MATLAB and to build mathematical intuition for the problems of molecular biology.]

### COM S 322(3220) Introduction to Scientific Computation (also ENGRD 322(3220))

Spring, summer, 3 credits. Prerequisites: COM S 100 and MATH 221 or 294, knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

Introduction to elementary numerical analysis and scientific computation. Topics include interpolation, quadrature, linear and nonlinear equation solving, least-squares fitting, and ordinary differential equations. The MATLAB computing environment is used. Vectorization, efficiency, reliability, and stability are stressed. Includes special lectures on computational statistics.

### [COM S 324(3740) Computational Linguistics (also COGST 424(4240), LING 424(4424))

Fall or spring, 4 credits. Prerequisites: LING 203. Recommended: COM S 114.

Labs involve work in Unix environment.

For description, see LING 424.]

### COM S 330(3300) Data-Driven Web Applications (also INFO 330(3300))

Fall, 3 credits. Prerequisite: COM S/ENGRD 211. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

Introduces students to modern database systems and three-tier application development with a focus on building web-based applications using database systems. Concepts covered include the relational model, relational query languages, data modeling, normalization, database tuning, three-tier architectures, Internet data formats and query languages, server- and client-side technologies, and an introduction to web services. Students build a database-backed web site.

### COM S 381(3810) Introduction to Theory of Computing

Fall, summer, 3 credits. Prerequisite: COM S 280 or permission of instructor. Credit not granted for both COM S 381 and 481; corrective transfers between COM S 381 and 481 (in either direction) encouraged during first few weeks of instruction.

Introduction to the modern theory of computing: automata theory, formal languages, and effective computability.

**[COM S 400(4150) The Science of Programming]**

Fall. 3 credits. Prerequisite: COM S 211. Covers the practical development of correct programs based on the conscious application of principles that are derived from a mathematical notion of program correctness. In addition, related ideas in algorithmic problem solving are explored.]

**COM S 411(4110) Programming Languages and Logics**

Fall. 4 credits. Prerequisite: COM S 312 or permission of instructor. Not offered every year.

Introduction to the theory, design, and implementation of programming languages. Topics include operational semantics, type systems, higher-order function, scope, lambda calculus, laziness, exceptions, side effects, continuations, objects, and modules. Also discussed are logic programming, concurrency, and distributed and persistent programming.

**COM S 412(4120) Introduction to Compilers**

Spring. 3 credits. Prerequisites: COM S 312 or permission of instructor and COM S 314 or 316. Corequisite: COM S 413.

Introduction to the specification and implementation of modern compilers. Topics include lexical scanning, parsing, type checking, code generation and translation, an introduction to optimization, and the implementation of modern programming languages. The course entails a substantial compiler implementation project.

**COM S 413(4121) Practicum in Compilers**

Spring. 2 credits. Corequisite: COM S 412. Compiler implementation project related to COM S 412.

**COM S 414(4410) Operating Systems**

Fall, spring, summer. 3 credits. Prerequisite: COM S 314 or 316. Corequisite: COM S 415 in spring only.

Introduction to the logical design of systems programs, with emphasis on multiprogrammed operating systems. Topics include process synchronization, deadlock, memory management, input-output methods, information sharing, protection and security, and file systems. The impact of network and distributed computing environments on operating systems is also discussed.

**COM S 415(4411) Practicum in Operating Systems**

Fall, spring. 2 credits. Corequisite: COM S 414. Studies the practical aspects of operating systems through the design and implementation of an operating system kernel that supports multiprogramming, virtual memory, and various input-output devices. All the programming for the project is in a high-level language.

**COM S 416(4420) Computer Architecture (also ECE 475[4750])**

Fall. 4 credits. Prerequisites: ENGRD 230 and COM S/ECE 314. For description, see ECE 475.

**COM S 419(4450) Computer Networks**

Spring. 4 credits. Pre- or corequisite: COM S 414 or permission of instructor. Introduction to computer networks with an emphasis on fundamentals. Detailed introduction to networking protocols for reliable data transfer, flow control, congestion control, naming and addressing, routing,

and security. Fundamentals of layered protocols and techniques for protocol design and implementation. Course material is supplemented by network measurement projects, protocol simulations, and a substantial protocol implementation project running over sockets that requires use of C or C++.

**COM S 421(4210) Numerical Analysis**

Fall. 4 credits. Prerequisites: MATH 221 or 294 or equivalent, one additional mathematics course numbered 300 or above, and knowledge of programming. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

Modern algorithms for systems of linear equations, systems of nonlinear equations, numerical optimization, and numerical solution of differential equations. Some discussion of methods suitable for parallel computation. This course requires more mathematical sophistication than COM S 322.

**COM S 426(4520) Introduction to Bioinformatics**

Spring. 4 credits. Prerequisites: COM S/ENGRD 211, COM S 280.

Overview of the goals, tools, and techniques used in bioinformatics, a field that applies ideas from computer science, mathematical modeling, and statistics in order to make sense of the huge datasets that typify modern biology. Topics include a brief introduction to molecular biology, DNA sequencing, sequence alignment and multiple alignment, similarity searches and their statistics, phylogeny, gene regulation and motif finding, gene finding, and genome rearrangements. Much of the course is devoted to an in-depth study of the algorithms behind popular computational tools such as Smith-Waterman, BLAST, CLUSTALW, Genscan, and MEME.

**COM S 428(4510) Introduction to Computational Biophysics**

Fall. 3 credits. Prerequisite: COM S 100, CHEM 211 or equivalent, MATH 221, 293, or 294, PHYS 112 or 213, or permission of instructor. Recommended: BIOBM 330.

Teaches the techniques used to simulate on the computer the structure, dynamics, and function of biological molecules. Computer models of water/proteins/membranes using mechanical force fields are considered. Optimization methods (conjugate gradient and Newton Raphson minimization) are explained in the context of structure optimization. Stochastic sampling (Metropolis algorithm) is used to estimate entropy and partition functions. Enhanced sampling approaches such as multi-tempering to estimate free energies are discussed. Continuum approximation to dielectric and the numerical solution of the Poisson Boltzmann equation are explored.

**COM S 430(4300) Information Retrieval (also INFO 430[4300])**

Fall. 3 credits. Prerequisite: COM S 211 or equivalent.

Studies the methods used to search for and discover information in large-scale systems. The emphasis is on information retrieval applied to textual materials, but there is some discussion of other formats. The course includes techniques for searching, browsing, and filtering information and the use of classification systems and thesauruses. The techniques are illustrated with examples from web searching and digital libraries.

**COM S 431(4302) Web Information Systems (also INFO 431[4302])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

Examines the architecture of web information systems such as distributed digital libraries and electronic publishing systems. Many of the topics presented are the subject of current research and development at Cornell, other universities, and in standards organizations such as the World Wide Web Consortium. Course content mixes exploration of current tools for building web information systems such as XML, XSLT, and RDF with broader concepts such as techniques for knowledge representation and description, object models for content representation, and legal and economic impacts of web information. A theme that runs throughout the course is the relationship between traditional information environments, exemplified by libraries, and the distributed information environment of the web.

**COM S 432(4320) Introduction to Database Systems**

Fall. 3 credits. Prerequisites: COM S 312 (or COM S 211, 212, and permission of instructor).

Introduction to modern database systems. Concepts covered include storage structures, access methods, query languages, query processing and optimization, transaction management, recovery, database design, XML, and XQuery. The course focuses on the design and internals of modern database systems.

**COM S 433(4321) Practicum in Database Systems**

Fall. 2 credits. Prerequisite: COM S 432 or coregistration in COM S 432. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

Students build part of a real database system in C++.

**COM S 465(4620) Computer Graphics I (also ARCH 374[3704])**

Fall. 4 credits. Prerequisite: COM S/ENGRD 211. May not be taken after COM S 417.

Introduction to the principles of computer graphics in two and three dimensions. Topics include digital images, filtering and anti-aliasing, 2-D and 3-D affine geometry, ray tracing, perspective and 3-D viewing, the graphics pipeline, curves and surfaces, and human visual perception. Homework assignments require programming.

**COM S 467(4630) Computer Graphics II**

Spring. 3 credits. Prerequisite: COM S 465. Covers the principles of computer graphics including advanced topics such as the modern graphics hardware pipeline, transformations, materials and shading models, advanced texturing, shadow algorithms, hierarchical acceleration structures, global illumination, animation, and 3D surface modeling.

**COM S 468(4631) Computer Graphics Practicum**

Spring. 2 credits. Prerequisite: COM S 465. Corequisite: COM S 467.

Provides COM S 467 students with hands-on experience in computer graphics programming on modern graphics hardware with a final 3D game project. Programming assignments cover 3D transformations, modeling, shading, rendering, animation, and user interfaces. The

course uses Java, OpenGL, and Cg for code development.

#### **COM S 472(4700) Foundations of Artificial Intelligence**

Fall. 3 credits. Prerequisites: COM S/ENGRD 211 and COM S 280 (or equivalent).

Challenging introduction to the major subareas and current research directions in artificial intelligence. Topics include knowledge representation, heuristic search, problem solving, natural-language processing, game-playing, logic and deduction, planning, and machine learning.

#### **COM S 473(4701) Practicum in Artificial Intelligence**

Fall. 2 credits. Corequisite: COM S 472.

Project portion of COM S 472. Topics include knowledge representation systems, search procedures, game-playing, automated reasoning, concept learning, reinforcement learning, neural nets, genetic algorithms, planning, and truth maintenance.

#### **COM S 474(4740) Introduction to Natural Language Processing (also COGST 474, LING 474[4474])**

Fall or spring. 4 credits. Prerequisite: COM S 211.

Computationally oriented introduction to natural language processing, the goal of which is to enable computers to use human languages as input, output, or both. Possible topics include parsing, grammar induction, information retrieval, and machine translation.

#### **COM S 475(4702) Artificial Intelligence: Uncertainty and Multi-Agent Systems**

Spring. 4 credits. Prerequisites: COM S/ENGRD 211 and COM S 280 or equivalent.

A key issue in the design of intelligent system is how to deal with uncertain or incomplete information, as obtained, for example, through (noisy) sensory input. The first half of this course focuses on how to represent and reason with uncertain information. The second half covers the study and design of multi-agent systems. Topics include Bayesian networks, dynamic Bayesian networks, belief propagation, Markov random fields, exact and approximate probabilistic inference methods, Markov Chain Monte Carlo methods, connections to statistical physics and information science, adversarial reasoning and planning in multi-agent systems, and game theoretic notions underlying multi-agent systems. This course complements COM S 472, but is given as a self-contained unit.

#### **COM S 478(4780) Machine Learning**

Spring. 4 credits. Prerequisites: COM S 280, 312, and basic knowledge of linear algebra and probability theory.

Machine learning is concerned with the question of how to make computers learn from experience. The ability to learn is not only central to most aspects of intelligent behavior, but machine learning techniques have become key components of many software systems. For example, machine learning techniques are used to create spam filters, to analyze customer purchase data, and to explore new domains of science. This course introduces the fundamental set of techniques and algorithms that constitute machine learning as of today, including classification methods like decision trees and support vector machines, parametric Bayesian learning and hidden Markov models, as well as unsupervised learning and reinforcement learning. The course discusses algorithms and

methods and provides an introduction to the theory of machine learning.

#### **COM S 480(4870) Introduction to Cryptology (also MATH 335[3350])**

Fall, spring. 3 credits. Prerequisites:

COM S 100 and MATH 222 or 294.

Students who take this course may not also receive credit for MATH 336.

For description, see MATH 335.

#### **COM S 482(4820) Introduction to Analysis of Algorithms**

Spring, summer. 4 credits. Prerequisites: COM S 280 and 312.

Develops techniques used in the design and analysis of algorithms, with an emphasis on problems arising in computing applications. Example applications are drawn from systems and networks, artificial intelligence, computer vision, data mining, and computational biology. This course covers four major algorithm design techniques (greedy algorithms, divide-and-conquer, dynamic programming, and network flow), computational complexity focusing on NP-completeness, and algorithmic techniques for intractable problems (including identification of structured special cases, approximation algorithms, and local search heuristics).

#### **[COM S 483(4812) Quantum Computation (also PHYS 481/681[4481/7681])]**

Spring. 2 credits. Prerequisite: familiarity with theory of vector spaces over complex numbers. Not offered every year; next offered 2007–2008.

For description, see PHYS 481.]

#### **COM S 485(4850) Mathematical Foundations for the Information Age**

Spring. 4 credits. Prerequisites: COM S 381 or 481.

Covers the mathematical foundations underlying modeling and searching of the WWW and other complex networks, discovering trends, data mining, and making recommendations based on user behavior. Topics include random graphs, tail bounds, branching processes, spectral analysis, clustering, learning mixtures of distributions, extracting information from large, high dimensional, and noisy data, VC dimension, latent semantic indexing, and collaborative filtering.

#### **COM S 486(4860) Applied Logic (also MATH 486[4860])**

Fall or spring. 4 credits. Prerequisites: MATH 222 or 294, COM S 280 or equivalent (e.g., MATH 332, 432, 434, 481), and some additional course in mathematics or theoretical computer science.

Propositional and predicate logic, compactness and completeness by tableaux, natural deduction, and resolution. Equational logic. Herbrand Universes and unification. Rewrite rules and equational logic, Knuth-Bendix method, and the congruence-closure algorithm and lambda-calculus reduction strategies. Topics in Prolog, LISP, ML, or Nuprl. Applications to expert systems and program verification.

#### **COM S 490(4999) Independent Reading and Research**

Fall, spring. 1–4 credits.

Independent reading and research for undergraduates.

#### **COM S 501(5150) Software Engineering**

Spring. 4 credits. Prerequisite: COM S 211 or equivalent experience programming in Java or C++.

Introduction to the practical problems of specifying, designing, and building large, reliable software systems. Students work in teams on projects for real clients. This work includes a feasibility study, requirements analysis, object-oriented design, implementation, testing, and delivery to the client. Additional topics covered in lectures include professionalism, project management, and the legal framework for software development.

#### **COM S 513(5430) System Security**

Fall. 4 credits. Prerequisites: COM S 414 or 419 and familiarity with JAVA, C, or C# programming languages.

Discusses security and survivability for computers and communications networks. Includes discussions of policy issues (e.g., the national debates on cryptography policy) as well as the discussions of the technical alternatives for implementing the properties that comprise "trustworthiness" in a computing system. Covers mechanisms for authorization and authentication as well as cryptographic protocols.

#### **COM S 514(5410) Intermediate Computer Systems**

Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

Focuses on practical issues in designing and implementing distributed software. Topics vary depending on instructor. Recent offerings have covered object-oriented software development methodologies and tools, distributed computing, fault-tolerant systems, and network operating systems or databases. Students undertake a substantial software project. Many students obtain additional project credit by co-registering in COM S 490, 515, or 790.

#### **[COM S 516(5420) Parallel Computer Architecture (also ECE 572[5720])]**

Spring. 4 credits. Prerequisite: ECE 475.

For description, see ECE 572.]

#### **COM S 530(5300) The Architecture of Large-Scale Information Systems (also INFO 530[5300])**

Spring. 4 credits. Prerequisite: COM S/ INFO 330 or COM S 432.

Deals with the architecture of large-scale information systems, with special emphasis on Internet-based systems. Topics include three-tier architectures, edge caches, distributed transaction management, web services, workflows, performance scalability, and high-availability architectures. The course includes a substantial project in the context of three-tier architectures, involving web servers, application servers, and database systems. Students study and use technologies such as Web Services, .Net, J2EE, ASPs, Servlets, XML, and SOAP.

#### **[COM S 565(5640) Computer Animation (also ART 273[2703], CIS 565[5640])]**

Fall. 4 credits. Prerequisite: none.

For description, see ART 273.]

#### **[CIS 566(5642) Advanced Animation (also ART 372[3702], COM S 566[5642])]**

Spring. 4 credits. Prerequisites: none.

For description, see ART 372.]

**COM S 572(5722) Heuristic Methods for Optimization (also CEE 509[5090], CIS 572[5722], OR&IE 533[5340])**

Fall. 3 or 4 credits. Prerequisites: COM S/ENGRD 211 or 322 or CEE/ENGRD 241, or graduate standing, or permission of instructor.

For description, see CEE 509.

**COM S 578(5780) Empirical Methods in Machine Learning and Data Mining**

Fall. 4 credits. Prerequisites: COM S 280 and 312 or equivalent.

This implementation-oriented course presents a broad introduction to current algorithms and approaches in machine learning, knowledge discovery, and data mining and their application to real-world learning and decision-making tasks. The course also covers experimental methods for comparing learning algorithms, for understanding and explaining their differences, and for exploring the conditions under which each is most appropriate.

**COM S 611(6110) Advanced Programming Languages**

Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.

Study of programming paradigms: functional, imperative, concurrent, and logic programming. Models of programming languages, including the lambda calculus. Type systems, polymorphism, modules, and other object-oriented constructs. Program transformations, programming logic, and applications to programming methodology.

**COM S 612(6120) Compiler Design for High-Performance Architectures**

Spring. 4 credits. Prerequisites: COM S 314 and 412 or permission of instructor.

Compiler design for pipelined and parallel architectures. Program analysis: data and control dependencies, dataflow analysis, efficient solution of dataflow equations, dependence tests, solution of Diophantine equations. Architecture and code generation for instruction-level parallel (ILP) processors: pipelined, VLIW and superscalar architectures, code reorganization and software pipelining. Architecture and code generation for multi-processors: shared- and distributed-memory architectures, latency tolerance and avoidance, loop transformations to enhance parallelism and locality of reference.

**COM S 614(6410) Advanced Systems**

Fall or spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

Advanced course in systems, emphasizing contemporary research in distributed systems. Topics may include communication protocols, consistency in distributed systems, fault-tolerance, knowledge and knowledge-based protocols, performance, scheduling, concurrency control, and authentication and security issues.

**COM S 615(6460) Peer-to-Peer Systems**

Spring. 4 credits. Recommended: COM S 614.

Peer-to-peer (P2P) is a new paradigm for distributed computing. P2P systems lack centralized servers and rely on self-organization and peer-to-peer resource sharing to accomplish their tasks. This course examines the peer-to-peer paradigm and peer-to-peer systems, and it discusses existing and new applications. Students are expected to perform an in-depth study of an existing approach or to develop new peer-to-peer

systems and applications as part of the course project.

**COM S 619(6450) Advanced Computer Networks**

Fall. 4 credits. Prerequisite: COM S 419 or permission of instructor.

Examines advanced computer network topics such as overlay and P2P networking, reliable multicast, mobility, voice over IP, header compression, security, and extreme networking environments (fast, slow, big, long). The emphasis is on both research and the latest standards. A project with research content is required.

**COM S 621(6210) Matrix Computations**

Fall. 4 credits. Prerequisites: MATH 411 and 431 or permission of instructor.

Stable and efficient algorithms for linear equations, least squares, and eigenvalue problems. Direct and iterative methods are considered. The MATLAB system is used extensively.

**COM S 622(6220) Numerical Optimization and Nonlinear Algebraic Equations**

Spring. 4 credits. Prerequisite: COM S 621. Offered odd-numbered years.

Modern algorithms for the numerical solution of multidimensional optimization problems and simultaneous nonlinear algebraic equations. Emphasis is on efficient, stable, and reliable numerical techniques with strong global convergence properties: quasi-Newton methods, modified Newton algorithms, and trust-region procedures. Special topics may include large-scale optimization, quadratic programming, and numerical approximation.

**[COM S 624(6240) Numerical Solution of Differential Equations**

Spring. 4 credits. Prerequisites: exposure to numerical analysis (e.g., COM S 421 or 621) and differential equations, and knowledge of MATLAB. Offered even-numbered years; next offered 2007-2008.

Finite difference methods for the solution of ordinary and partial differential equations. A fast-moving course that begins with a three-week survey of numerical methods for ODEs, then moves on to Fourier analysis and methods for PDEs, especially parabolic and hyperbolic equations. Other topics include numerical stability, finite element methods, Hamiltonian problems, and computational issues such as mesh generation and sparse matrix computation for PDEs.]

**COM S 626(6510) Computational Molecular Biology**

Spring. 4 credits. Prerequisites: familiarity with linear programming, numerical solutions of ordinary differential equations, and nonlinear optimization methods.

Problems and algorithms in computational molecular biology. Topics include sequences (alignment, scoring functions, complexity of searches and alignment, secondary structure prediction, families, and function), the protein folding problem (lattice models, lattice searches, the HP model, chemical potentials, statistical potentials, funnels, complexity and model verification, global optimization, homology, threading), and the dynamics of complex biosystems (the Molecular Dynamics method, long-range forces, statistics of flexible systems, reduced models).

**COM S 628(6522) Biological Sequence Analysis**

Fall. 4 credits. Prerequisite: none.

Typically concentrates on one topic in biological sequence analysis, providing an in-depth analysis of the algorithmic and statistical challenges in that area. The selected topics vary from year to year.

**COM S 630(6300) Human Language Technology (also INFO 630[6300])**

Spring. 4 credits. Prerequisites: basic knowledge of linear algebra and probability theory; basic programming skills.

Information retrieval has evolved from the problem of locating books in a library to a multitude of tasks ubiquitous in business, science, and personal life. Modern information systems automatically compose newspapers, extract facts from the web, and analyze usage patterns. This course covers the necessary techniques for representing, organizing, and accessing digital information that is in textual or semistructured form. Topics combine information retrieval, natural language processing, and machine learning, with links to work in databases and data mining.

**COM S 632(6320) Database Management Systems**

Spring. 4 credits. Prerequisite: COM S 432 or graduate standing.

Covers a variety of advanced issues ranging from transaction management to query processing to data mining. Involves extensive paper reading and discussion. Development of a term project with research content is required.

**COM S 633(6322) Advanced Database Systems**

Spring. 4 credits. Prerequisite: COM S 632 or permission of instructor.

Covers advanced topics in database systems and data mining. The exact set of topics changes with each offering of the course.

**[COM S 664(6670) Machine Vision**

Fall. 4 credits. Prerequisites: undergraduate-level understanding of algorithms and MATH 221 or equivalent.

Introduction to computer vision, with an emphasis on discrete optimization algorithms and on applications in medical imaging. Topics include edge detection, image segmentation, stereopsis, motion and optical flow, active contours, and the Hausdorff distance. Students are required to implement several of the algorithms covered in the course and complete a final project.]

**COM S 665(6620) Advanced Interactive Graphics**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, probability and statistics, vector calculus, and programming.

Covers advanced topics in realistic rendering with a focus on interactive techniques. Topics include light transport and global illumination. Monte-Carlo rendering, rendering using the modern graphics pipeline, rendering with complex scenes, shadow algorithms, perception for rendering, and image-based rendering.

**[COM S 667(6630) Physically Based Rendering**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, programming, and vector calculus.



Advanced course in realistic image synthesis, focusing on the computation of physically accurate images. Topics include radiometry; light transport and global illumination; rendering with participating media; advanced models for material properties; and physical measurement of light sources, images, and materials.]

**COM S 671(6762) Introduction to Automated Reasoning**

Fall or spring. 4 credits. Prerequisite: COM S 611 and graduate standing or permission of instructor. Not offered every year.

Topics in modern logic needed to understand and use automated reasoning systems such as HOL, Nuprl, and PVS. Special emphasis is on type theory and logic and on tactic-oriented theorem proving.

**COM S 672(6700) Advanced Artificial Intelligence**

Spring. 4 credits. Prerequisites: COM S 472 or permission of instructor.

Artificial intelligence (AI) provides many computational challenges. This course covers a variety of areas in AI, including knowledge representation, automated reasoning, learning, game-playing, and planning, with an emphasis on computational issues. Specific topics include stochastic reasoning and search procedures, properties of problem encodings, issues of syntax and semantics in knowledge representation, constraint satisfaction methods and search procedures, and critically constrained problems and their relation to phase-transition phenomena. In addition, connections between artificial intelligence and other fields, such as statistical physics, operations research, and cognitive science are explored.

**[COM S 673(6724) Integration of Artificial Intelligence and Operations Research (also CIS 673(6724))]**

Spring. 3 credits.

Covers topics on the integration of artificial intelligence (AI) and operations research (OR) techniques for solving combinatorial problems as they appear in AI and OR applications. Application domains include AI planning, scheduling, combinatorial auctions, market mechanisms, and combinatorial designs.]

**COM S 674(6740) Natural Language Processing**

Spring. 3 credits. Prerequisites: COM S 472 or permission of instructor. COM S 474 is not a prerequisite.

Presents a graduate-level introduction to natural language processing, the primary concern of which is the study of human language use from a computational perspective. Covers syntactic analysis, semantic interpretation, and discourse processing, examining both symbolic and statistical approaches. Possible topics include information extraction, natural language generation, memory models, ambiguity resolution, finite-state methods, mildly context-sensitive formalisms, deductive approaches to interpretation, machine translation, and machine learning of natural language.

**[COM S 676(6764) Reasoning about Knowledge]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.

Knowledge plays a crucial role in distributed systems, game theory, and artificial

intelligence. Material examines formalizing reasoning about knowledge and the extent to which knowledge is applicable to those areas. Issues include common knowledge, knowledge-based programs, applying knowledge to analyzing distributed systems, attainable states of knowledge, modeling resource-bounded reasoning, and connections to game theory.]

**[COM S 677(6766) Reasoning about Uncertainty]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.

Examines formalizing reasoning about and representing uncertainty, using formal logical approaches as a basis. Topics: logics of probability, combining knowledge and probability, probability and adversaries, conditional logics of normality, Bayesian networks, qualitative approaches to uncertainty, going from statistical information to degrees of belief, and decision theory.]

**COM S 678(6780) Advanced Topics in Machine Learning**

Spring. 4 credits. Prerequisites: COM S 478 or equivalent, or COM S 578 or equivalent, or permission of instructor. Not offered every year.

Extends and complements COM S 478 and 578, giving in-depth coverage of new and advanced methods in machine learning. In particular, we connect to open research questions in machine learning, giving starting points for future work. The content of the course reflects an equal balance between learning theory and practical machine learning, making an emphasis on approaches with practical relevance. Topics include support vector machines, clustering, Bayes nets, boosting, model selection, learning orderings, and inductive transfer.

**COM S 681(6820) Analysis of Algorithms**

Fall. 4 credits. Prerequisite: COM S 482 or graduate standing.

Methodology for developing efficient algorithms, primarily for graph theoretic problems. Understanding of the inherent complexity of natural problems via polynomial-time algorithms, randomized algorithms, NP-completeness, and randomized reducibilities. Also covers topics such as parallel algorithms and efficient data structures.

**[COM S 682(6810) Theory of Computing]**

Spring. 4 credits. Prerequisite: (COM S 381 or 481) and (COM S 482 or 681) or permission of instructor. Not offered every year; next offered 2007–2008.

Advanced treatment of theory of computation, computational-complexity theory, and other topics in computing theory.]

**COM S 683(6822) Advanced Design and Analysis of Algorithms**

Spring. 4 credits. Prerequisite: COM S 681 or permission of instructor.

An advanced study of current topics in the design of discrete algorithms. Topics may include randomization, approximation algorithms, online algorithms, learning theory, spectral methods, and techniques from the theory of metric spaces. The course will emphasize algorithmic problems in a range of areas including networks, electronic markets, and large datasets.

**[COM S 684(6840) Algorithmic Game Theory]**

Fall or spring. 4 credits. Prerequisite: background in algorithms and graphs at level of COM S 482. No prior knowledge of game theory or economics assumed.

Algorithmic game theory combines algorithmic thinking with game-theoretic or, more generally, economic concepts. This course focuses on problems arising from, and motivated by, the Internet and other decentralized computer networks. The most defining characteristic of the Internet is that it was not designed by a single central entity, but emerged from the complex interaction of many economic agents, such as network operators, service providers, designers, and users, in varying degrees of collaboration and competition. The course focuses on some of the many questions at the interface between algorithms and game theory that arise from this point of view. Topics include Nash equilibrium and general equilibrium, the price of anarchy, market equilibrium, social choice theory, mechanism design, and multicast pricing.]

**[COM S 685(6850) The Structure of Information Networks (also INFO 685(6850))]**

Fall or spring. 4 credits. Prerequisite: COM S 482.

Information networks such as the World Wide Web are characterized by the interplay between heterogeneous content and a complex underlying link structure. This course covers recent research on algorithms for analyzing such networks and models that abstract their basic properties. Topics include combinatorial and probabilistic techniques for link analysis, centralized and decentralized search algorithms, generative models for networks, and connections with work in the areas of social networks and citation analysis.]

**COM S 686(6860) Logics of Programs**

Spring. 4 credits. Prerequisites: COM S 481, 682, and MATH 481 or MATH/COM S 486.

**COM S 709(7090) Computer Science Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in computer science. S-U grades only.

Weekly meeting for the discussion and study of important topics in the field.

**COM S 711(7191) Seminar in Advanced Programming Languages**

Fall, spring. 3 credits.

**COM S 713(7491) Seminar in Systems and Methodology**

Fall, spring. 4 credits. Prerequisites: graduate course employing formal reasoning (e.g., COM S 611, 613, 671), logic course, or permission of instructor. Not offered every year.

Discussion of contemporary issues in the design and analysis of computing systems. Emphasis is on the proper use of rigor, models, and formalism.

**COM S 714(7410) Topics in Systems**

Fall or spring. 3 credits. Prerequisite: permission of instructor.

**COM S 715(7192) Seminar in Programming Refinement Logics**

Fall, spring. 4 credits. Prerequisite: permission of instructor.

Topics in programming logics, possibly including type theory, constructive logic, decision procedures, heuristic methods,



extraction of code from proofs, and the design of proof-development and problem-solving systems.

**COM S 717(7430) Topics in Parallel Architectures**

Fall, 4 credits. Prerequisite: COM S 612 or permission of instructor. Not offered every year.

Covers topics in parallel computers. Material includes: architectures of parallel computers, parallelizing compilers, operating systems for parallel computers, and languages (functional and logic-programming languages) designed for parallel computation.

**COM S 718(7690) Computer Graphics Seminar**

Fall, spring, 3 credits.

**COM S 719(7190) Seminar in Programming Languages**

Fall, spring, 4 credits. Prerequisite: COM S 611 or permission of instructor. S-U grades only.

**COM S 721(7210) Topics in Numerical Analysis**

Fall, spring, 4 credits. Prerequisite: COM S 621 or 622 or permission of instructor. Not offered every year.

Topics are chosen at instructor's discretion.

**COM S 726(7590) Problems and Perspectives in Computational Molecular Biology**

Fall, spring, 1 credit. Open to all from life sciences, computational sciences, and physical sciences. S-U grades only.

Weekly seminar series discussing timely topics in computational molecular biology. Addresses methodological approaches to sequence and structure analysis, function prediction, study of evolutionary relationships, and analysis of large biological systems. Statistical and deterministic computational approaches are covered, and specific and detailed biological examples are discussed. In each topic, one or two representative papers are selected that made significant advances in this field. The lectures are given by faculty and students. We try to bridge these disciplines by pairing students and faculty from complementary backgrounds.

**COM S 732(7320) Topics in Database Systems**

Fall, spring, 4 credits. S-U grades only.

**COM S 733(7390) Database Seminar**

Spring, 1 credit. Prerequisite: COM S 633 or permission of instructor. S-U grades only.

**COM S 750(7726) Evolutionary Computation and Design Automation (also CIS 750[7726], M&AE 650[6500])**

Fall, 4 credits. Prerequisite: programming experience or permission of instructor.

Seminar course in evolutionary algorithms and their application to optimization and open-ended computational design. Genetic algorithms, genetic programming, co-evolution, arms races and cooperation, developmental representations, learning, and symbiosis are covered. Topics include artificial life, evolutionary robotics, and applications in a variety of domains in science and engineering. Suitable for students interested in computational techniques for addressing open-ended design problems and in computational models of evolutionary discovery.

**COM S 754(7490) Systems Research Seminar**

Fall, spring, 1 credit. S-U grades only.

**COM S 764(7670) Visual Object Recognition**

Spring, 3 credits.

This course covers recent advances in object recognition in computer vision, set in the context of classical methods. The readings are primarily recently published research results. The course format is a mixture of lectures, student presentations, and discussion. The final project consists of both an implementation and a paper. While the course has no formal prerequisites, a degree of mathematical and algorithmic sophistication is required. Familiarity with computer vision or machine learning techniques would be helpful.

**COM S 772(7790) Seminar in Artificial Intelligence**

Fall, spring, 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 775(7794) Seminar in Natural Language Understanding**

Fall, spring, 2 credits.

Informal weekly seminar in which current topics in natural language understanding and computational linguistics are discussed.

**COM S 785(7850) Seminar on Information Networks**

Fall, 4 credits. Prerequisites: COM S 485 or 685 or permission of instructor.

Covers current research on algorithms and models for analyzing large-scale networks, with connections to work in information systems and the social sciences. The course is based on the presentation and discussion of recent research papers.

**COM S 786(7860) Introduction to Kleene Algebra**

Spring, 4 credits. Prerequisite: COM S 481. Recommended: COM S 482 or 681, COM S 682, elementary logic (MATH 481 or 681), algebra (MATH 432).

Kleene algebra is an algebraic system that axiomatically captures the properties of a natural class of structures arising in logic and computer science. It has appeared in various guises in relational algebra, semantics and logics of programs, automata and formal language theory, and the design and analysis of algorithms. This course reviews the history of the development of Kleene algebra and Kleene algebra with tests (Kleene/Boolean algebra); studies models, compare axiomatizations, and derive completeness, expressiveness, and complexity results; and discusses various applications in program schematology, program verification, compiler optimization, and programming language semantics and logic.

**COM S 789(7890) Seminar in Theory of Algorithms and Computing**

Fall, spring, 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 790(7999) Independent Research**

Fall, spring. Prerequisite: permission of a computer science advisor.

Independent research or master of engineering project.

**COM S 990(9999) Thesis Research**

Fall, spring. Prerequisite: permission of a computer science advisor. S-U grades only. Doctoral research.

## INFORMATION SCIENCE (INFO)

**INFO 130(1300) Introductory Design and Programming for the Web (also COM S 130[1300])**

Fall, 3 credits.

For description, see COM S 130.

**INFO 172(1700) Computation, Information, and Intelligence (also COGST 172, COM S 172[1700], ENGR 172[1700])**

Fall, 3 credits. Prerequisites: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100.

For description, see COM S 172.

**INFO 204(2040) Networks (also ECON 204[2040], SOC 204[2120])**

Spring, 4 credits.

For description, see ECON 204.

**INFO 214(2140) Cognitive Psychology (also COGST/PSYCH 214[2140])**

Fall, 3 credits. Limited to 175 students.

Prerequisite: sophomore standing.

Graduate students, see INFO/PSYCH 614, or COGST 501.

For description, see PSYCH 214.

**INFO 230(2300) Intermediate Design and Programming for the Web (also COM S 230[2300])**

Spring, 3 credits. Prerequisite: COM S/INFO 130 or equivalent knowledge.

For description, see COM S 230.

**INFO 245(2450) Psychology of Social Computing (also COMM 245[2450])**

Fall, 3 credits.

For description, see COMM 245.

**INFO 292(2921) Inventing an Information Society (also AM ST 292[2980], ECE/ENGR 298[2980], HIST 292[2920], S&TS 292[2921])**

Spring, 3 credits; may not be taken for credit after ECE/ENGR 198.

For description, see ENGR 298.

**INFO 295(2950) Mathematical Methods for Information Science**

Fall, 4 credits. Corequisite: MATH 231 or equivalent.

Teaches basic mathematical methods for information science. Topics include graph theory, discrete probability, Bayesian methods, finite automata, Markov models, and hidden Markov models. Uses examples and applications from various areas of information science such as the structure of the web, genomics, natural language processing, and signal processing.

**INFO 330(3300) Data-Driven Web Applications (also COM S 330[3300])**

Fall, 3 credits. Prerequisite: COM S/ENGR 211.

For description, see COM S 330.

**INFO 345(3450) Human-Computer Interaction Design (also COMM 345[3450])**

Spring, 3 credits.

For description, see COMM 345.

**INFO 349(3491) Media Technologies (also COMM 349[3490], S&TS 349[3491])**

Spring, 3 credits.

For description, see S&TS 349.

**INFO 355(3551) Computers: From the 17th Century to the Dot.com Boom (also S&TS 355[3551])**

Fall. 4 credits.

For description, see S&amp;TS 355.

**[INFO 356(3561) Computing Cultures (also S&TS 356[3561])]**

Spring. 4 credits. Prerequisites: none. Not offered 2006–2007; next offered 2007–2008.

For description, see S&amp;TS 356.]

**INFO 372(3720) Explorations in Artificial Intelligence**

Spring. 3 credits. Prerequisites: MATH 111 or equivalent, an information science approved statistics course, and COM S 211 or permission of instructor.

How do computers solve tasks as diverse as playing chess or backgammon, control autonomous space missions such as NASA's Deep Space One, plan the route for a driverless car as in the Darpa Grand Challenge race, perform content-based selection of music programs, or solve Sudoku, the latest puzzle craze? This course introduces students to a range of computational modeling approaches and solution strategies using examples from AI and Information Science. We cover different formalisms such as logical representations, constraint-based languages, mathematical programming, and multi-agent approaches (including adversarial games). Emphasis is on modeling, not on algorithms, but efficiency issues (complexity) are highlighted as part of the modeling approaches. Students also learn about the tradeoffs in modeling choices.

**[INFO 387(3871) The Automatic Lifestyle: Consumer Culture and Technology (also S&TS 387[3871])]**

Spring. 4 credits. Not offered 2006–2007; next offered 2007–2008.

For description, see S&amp;TS 387.]

**[INFO 429(4290) Copyright in the Digital Age (also COMM 429[4290])]**

Fall. 3 credits. Not offered 2006–2007; next offered 2007–2008.

For description, see COMM 429.]

**INFO 430(4300) Information Retrieval (also COM S 430[4300])**

Fall. 3 credits. Prerequisite: COM S/ENGRD 211 or equivalent.

For description, see COM S 430.

**INFO 431(4302) Web Information Systems (also COM S 431[4302])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

For description, see COM S 431.

**INFO 435(4350) Seminar on Applications of Information Science (also INFO 635[6390])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent, and experience using information systems. Undergraduates and master's students should register for INFO 435; Ph.D. students should register for INFO 635.

This course brings together the interdisciplinary themes of information science—technological, sociological, legal, economic, and political—through a series of case studies of applications and areas of current research. The case studies are explored through reading and discussion of recent articles on aspects of information

science, both social and technical. Several of the case studies center on current work at Cornell, e.g., arXiv, the Legal Information Institute, the NSDL, etc. Others build on the Information Science seminar series.

**INFO 440(4400) Advanced Human-Computer Interaction Design (also COMM 440[4400])**

Fall. 3 credits. Prerequisites: COMM/INFO 245.

For description, see COMM 440.

**INFO 445(4450) Seminar in Computer-Mediated Communication (also COMM 445[4450])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

For description, see COMM 445.

**INFO 447(4470) Social and Economic Data (also ILRLE 447[4470])**

Spring. 4 credits. Prerequisites: one semester of calculus, IS statistics requirement, and one upper-level social science course, or permission of instructor.

Social and economic data drive decisions in public and private organizations, and quality decisions require quality data. This course focuses on data quality—conceptual fit, sampling and nonsampling error, timeliness, geographic detail, and dissemination—as well as legal and ethical issues in the data manufacturing process. Major emphasis is placed on public use microdata files of the U.S. Census Bureau and their role in the allocation of federal funds. These files include the Census of Population and Housing, Current Population Survey, American Housing Survey, Consumer Expenditure Survey, and American Community Survey. The course is appropriate for upper-level undergraduate, professional master's and doctoral students who will be users of data products, from the public and private sectors; and/or producers of data products for their organizations, working with existing data products from public and proprietary sources, as well as administrative or survey data collected by their organization.

**INFO 450(4500) Language and Technology (also COMM 450[4500])**

Spring. 3 credits. Prerequisite: COMM 240 or 245 or permission of instructor

For description, see COMM 450.

**INFO 490(4900) Independent Reading and Research**

Fall, spring. 1–4 credits.

Independent reading and research for undergraduates.

**INFO 491(4910) Teaching in Information Science, Systems, and Technology**

Fall, spring. Variable credit.

Involves working as a T.A. in a course in the information science, systems, and technology major.

**INFO 515(5150) Culture, Law, and Politics of the Internet**

Fall. 4 credits.

Explores the culture, law, and politics of the Internet. Highlighted issues include: net neutrality, free speech, Internet governance, domain naming, intellectual property, DMCA compliance, privacy and security, and the development of institutional as well as national policy for the Internet.

**INFO 530(5300) The Architecture of Large-Scale Information Systems (also COM S 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or COM S 432.

For description, see COM S 530.

**INFO 614(6140) Cognitive Psychology (also COGST 614[6140], PSYCH 614[6140])**

Fall. 5 credits.

For description, see PSYCH 614.

**INFO 630(6300) Human Language Technology (also COM S 630[6300])**

Spring. 4 credits. Prerequisites: basic knowledge of linear algebra and probability theory; basic programming skills.

For description, see COM S 630.

**INFO 634(6341) Information Technology in Sociocultural Context (also S&TS 634[6341])**

Spring. 4 credits. Prerequisite: permission of instructor.

For description, see S&amp;TS 634.

**INFO 635(6390) Seminar on Applications of Information Science (also INFO 435[4390])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent, and experience using information systems. Undergraduates and master's students should register for INFO 435; Ph.D. students should register for INFO 635.

For description, see INFO 435.

**INFO 640(6400) Human-Computer Interaction Design (also COMM 640[6400])**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 640.

**INFO 645(6450) Seminar in Computer-Mediated Communication (also COMM 645[6450])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 645.

**INFO 648(6648) Speech Synthesis by Rule (also LING 648[6648])**

Spring. 4 credits. Prerequisite: LING 401, 419, or permission of instructor.

For description, see LING 648.

**INFO 650(6500) Language and Technology (also COMM 650[6500])**

Spring. 3 credits.

For description, see COMM 650.

**INFO 651(6002) Critical Technical Practices**

Fall or spring. 4 credits. Prerequisites: graduate-level training in human-computer interaction, science and technology studies, visual studies, communication, or equivalent, or permission of instructor.

This course studies media research practices that incorporate cultural criticism into technology design. Topics include tangible media, ubiquitous computing, and critical design. Content draws on computer science, human-computer interaction, interactive art, cultural studies, and interaction design.

**[INFO 685(6850) The Structure of Information Networks (also COM S 685(6850))]**

Fall or spring. 4 credits. Prerequisite: COM S 482.

For description, see COM S 685.]

**INFO 709(7090) IS Colloquium**

Fall, spring. 1 credit.

For staff, visitors, and graduate students interested in information science

**INFO 747(7400) Social and Economic Data (GR-RDC) (also ILRLE 740(7400))**

Spring. 4 credits. Prerequisite: Ph.D. and research master's students.

Teaches all the basics required to acquire and transform raw information into social and economic data. Covers legal, statistical, computing, and social science aspects of the data "production" process are covered. Major emphasis is placed on U.S. Census data that are accessible from the Census Bureau's Research Data Center network. This version of the course has been specially prepared for graduate students who are planning to use RDC-based data or are seriously considering it. RDC-based data products covered include the new Longitudinal Employer-Household Dynamics (LEHD) micro data; the Longitudinal Business Database (LBD); and its predecessor the Longitudinal Research Database (LRD); internal versions of the Survey of Income and Program Participation (SIPP), Current Population Survey (CPS), American Community Survey (ACS), American Housing Survey (AHS), the 1990 and 2000 Decennial Census of Population and Housing; the Employer Business Register (BR and SSEL); the Censuses and Annual Surveys of Manufactures, Mining, Services, Retail Trade, Wholesale Trade, Construction, Transportation, Communications, and Utilities; Business Expenditures Survey; Characteristics of Business Owners; and others. Students are introduced to the new NSF-sponsored Virtual Research Data Center. Core topics include: basic statistical principles of populations and sampling frames; acquiring data via samples, censuses, administrative records, and transaction logging; law, economics and statistics of data privacy and confidentiality protection; data linking and integration techniques (probabilistic record linking; multivariate statistical matching); data imputation techniques; and analytic methods for complex linked data sets.

**INFO 790(7900) Independent Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Independent research for M.Eng. students and pre-A exam Ph.D. students.

**INFO 990(9900) Thesis Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Thesis research for post-A exam Ph.D. students.

**FACULTY ROSTER**

Computing and Information Science (CIS)  
Abowd, John, Information Science Program;  
School of Industrial and Labor Relations

Apanasovich, Tatiyana, Dept. of Statistical Science; School of Operations Research and Industrial Engineering  
Arms, William, Dept. of Computer Science; Information Science Program  
Bailey, Graeme, Dept. of Computer Science; Computing in the Arts Program  
Bala, Kavita, Dept. of Computer Science; Program of Computer Graphics  
Berger, Toby, Dept. of Statistical Science; School of Electrical and Computer Engineering  
Birman, Kenneth, Dept. of Computer Science  
Blume, Lawrence, Information Science Program; Dept. of Economics  
Bunge, John, Dept. of Statistical Science; School of Industrial and Labor Relations  
Burtscher, Martin, Computer Science Field; School of Electrical and Computer Engineering  
Bustamante, Carlos, Computational Biology Program; Dept. of Biological Statistics and Computational Biology  
Cardie, Claire, Dept. of Computer Science; Information Science Program  
Caruana, Rich, Dept. of Computer Science  
Clark, Andrew, Computational Biology Program; Dept. of Molecular Biology and Genetics  
Constable, Robert, Dept. of Computer Science  
DiCiccio, Thomas, Dept. of Statistical Science; School of Industrial and Labor Relations  
Durrett, Richard, Dept. of Statistical Science; Dept. of Mathematics  
Dynkin, Eugene, Dept. of Statistical Science; Dept. of Mathematics  
Easley, David, Information Science Program; Dept. of Economics  
Edelman, Shimon, Information Science Program; Dept. of Psychology  
Elber, Ron, Dept. of Computer Science; Computational Biology Program  
Ellner, Stephen, Computational Biology Program; Dept. of Ecology and Evolutionary Biology  
Ernst, Kevin, Computing in the Arts Program; Dept. of Music  
Fan, K-Y Daisy, Dept. of Computer Science  
Fine, Terrence, Dept. of Statistical Science; School of Electrical and Computer Engineering  
Francis, Paul, Dept. of Computer Science  
Friedman, Eric, Computer Science Field; Information Science Program; School of Operations Research and Industrial Engineering  
Gay, Geri, Information Science Program; Dept. of Communication  
Gehrke, Johannes, Dept. of Computer Science  
Gillespie, Tarleton, Information Science Program; Dept. of Communication  
Ginsparg, Paul, Information Science Program; Dept. of Physics  
Gomes, Carla, Dept. of Computer Science; Dept. of Applied Economics and Management  
Greenberg, Donald, Dept. of Computer Science; Program of Computer Graphics; Johnson Graduate School of Management; Dept. of Architecture  
Gries, David, Dept. of Computer Science; College of Engineering  
Guckenheimer, John, Computational Biology Program; Computational Science and Engineering Program; Dept. of Mathematics  
Guo, Xin, Dept. of Statistical Science; School of Operations Research and Industrial Engineering

Haas, Zygmunt, Computer Science Field; School of Electrical and Computer Engineering  
Halpern, Joseph, Dept. of Computer Science; Information Science Program  
Hancock, Jeff, Information Science Program; Dept. of Communication  
Hartmanis, Juris, Dept. of Computer Science  
Hemami, Sheila, Computer Science Field; School of Electrical and Computer Engineering  
Hong, Yongmiao, Dept. of Statistical Science; Dept. of Economics  
Hopcroft, John, Dept. of Computer Science  
Huttenlocher, Daniel, Dept. of Computer Science; Information Science Program; Johnson Graduate School of Management  
Hwang, J. T. Gene, Dept. of Statistical Science; Dept. of Mathematics  
Ingraffea, Anthony, Computational Science and Engineering Program; Dept. of Civil and Environmental Engineering  
Joachims, Thorsten, Dept. of Computer Science; Information Science Program  
Kedem, Klara, Dept. of Computer Science; Computational Biology Program  
Keich, Uri, Dept. of Computer Science; Computational Biology Program  
Kesten, Harry, Dept. of Statistical Science; Dept. of Mathematics  
Kiefer, Nicholas, Dept. of Statistical Science; Dept. of Mathematics  
Kleinberg, Jon, Dept. of Computer Science; Computational Biology Program; Information Science Program  
Kleinberg, Robert, Dept. of Computer Science  
Kozen, Dexter, Dept. of Computer Science  
Lawler, Gregory, Dept. of Statistical Science; Dept. of Mathematics  
Lee, Lillian, Dept. of Computer Science; Information Science Program  
Lifka, David, Computational Science and Engineering Program  
Linster, Christiane, Computational Biology Program; Dept. of Neurobiology and Behavior  
Lipson, Hod, Computing and Information Science Program; School of Mechanical and Aerospace Engineering  
Macy, Michael, Information Science Program; Dept. of Sociology  
Manohar, Rajit, Computer Science Field; School of Electrical and Computer Engineering  
Marschner, Steve, Dept. of Computer Science; Program of Computer Graphics  
Martinez, Jose, Computer Science Field; School of Electrical and Computer Engineering  
McKee, Sally, Computer Science Field; School of Electrical and Computer Engineering  
Merman, N. David, Dept. of Physics  
Myers, Andrew, Dept. of Computer Science  
Nerode, Anil, Computer Science Field; Dept. of Mathematics  
Nussbaum, Michael, Dept. of Statistical Science; Dept. of Mathematics  
Pershing, Andrew, Computational Science and Engineering Program; Dept. of Earth and Atmospheric Sciences  
Pinch, Trevor, Information Science Program; Dept. of Science and Technology Studies  
Pope, Stephen, School of Mechanical and Aerospace Engineering; School of Operations Research and Industrial Engineering  
Prentice, Rachel, Information Science Program; Dept. of Science and Technology Studies  
Protter, Philip, Dept. of Statistical Science; School of Operations Research and Industrial Engineering

Resnick, Sidney, Dept. of Statistical Science;  
School of Operations Research and  
Industrial Engineering

Rooth, Mats, Information Science Program;  
Dept. of Linguistics

Rugina, Radu, Dept. of Computer Science

Ruppert, David, Dept. of Statistical Science;  
School of Operations Research and  
Industrial Engineering

Samorodnitsky, Gennady, Dept. of Statistical  
Science; School of Operations Research and  
Industrial Engineering

Schneider, Fred, Dept. of Computer Science

Schwager, Steven, Dept. of Statistical  
Science; Dept. of Biological Statistics and  
Computational Biology

Schwartz, David, Dept. of Computer Science

Selman, Bart, Dept. of Computer Science

Sengers, Phoebe, Information Science  
Program; Dept. of Science and Technology  
Studies

Shalloway, David, Computational Biology  
Program; Dept. of Molecular Biology and  
Genetics

Shmoys, David, Dept. of Computer Science;  
School of Operations Research and  
Industrial Engineering

Shoemaker, Christine, School of Civil and  
Environmental Engineering

Siepel, Adam, Computational Biology  
Program; Dept. of Biological Statistics and  
Computational Biology

Sirer, Emin Gun, Dept. of Computer Science

Spector, Buzz, Dept. of Art

Spivey, Michael, Information Science Program;  
Dept. of Psychology

Strawderman, Robert, Dept. of Statistical  
Science; Dept. of Biological Statistics and  
Computational Biology

Tardos, Eva, Dept. of Computer Science;  
Information Science Program

Teitelbaum, Tim, Dept. of Computer Science

Thurston, William, Computing and Information  
Science Program; Dept. of Mathematics

Torrance, Kenneth, Program of Computer  
Graphics; School of Mechanical and  
Aerospace Engineering

Turnbull, Bruce, Dept. of Statistical Science;  
School of Operations Research and  
Industrial Engineering

Van Loan, Charles, Dept. of Computer Science;  
Computational Science and Engineering  
Program

Vavasis, Stephen, Dept. of Computer Science;  
Computational Science and Engineering  
Program

Velleman, Paul, Dept. of Statistical Science;  
School of Industrial and Labor Relations

Vidyashankar, Anand, Dept. of Statistical  
Science; School of Industrial and Labor  
Relations

Vogelsang, Timothy, Dept. of Statistical  
Science; Dept. of Economics

Walther, Joe, Information Science Program;  
Dept. of Communication

Wells, Martin, Dept. of Statistical Science;  
Computational Biology Program

Wicker, Stephen, Computer Science Field;  
School of Electrical and Computer  
Engineering

Williamson, David, Information Science  
Program; School of Operations Research  
and Industrial Engineering

Yuan, Connie, Information Science Program;  
Dept. of Communication

Zabih, Ramin, Dept. of Computer Science

## SCHOOL OF CONTINUING EDUCATION AND SUMMER SESSIONS

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Our programs are presented in a wide variety of formats and time frames and are offered on and off campus and via distance learning.

Join us to prepare for your future, enhance your studies, improve your job skills, or simply have fun learning something new!

For information about the following programs, write B20 Day Hall, Ithaca, NY 14853-2801; call 255-4987; e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu); or fax 255-9697; unless indicated otherwise below. You may also visit us on the web at [www.sce.cornell.edu](http://www.sce.cornell.edu).

### SCHOOL ADMINISTRATION

Glenn C. Altschuler, dean

Charles W. Jermy, Jr., associate dean, and director, Cornell University Summer Session

Diane E. Sheridan, director, finance and administration

Diane M. Duthie, assistant director, finance and administration

### School Program Directors and Managers

Mary E. Adie, director, Special Programs and Executive Education

Stuart M. Blumin, director, Cornell in Washington Program

Abby H. Eller, director, Summer College Programs for High School Students

Ralph Janis, director, Cornell's Adult University and CyberTower

### School Support Services

Graham Dobson, manager, information technologies

Ann L. Morse, manager, media services

Cathy M. Pace, registrar, and coordinator, continuing education information service

### CORNELL'S ADULT UNIVERSITY

Cornell's Adult University (CAU) offers weeklong noncredit courses on campus for adults and families during the summer. During the fall, winter, and spring, it offers weekend seminars, weeklong domestic programs, and international study tours. Developed and led by distinguished members of the Cornell faculty, all programs are inspired by the belief that learning never ends and that one of the roles of a great university is to provide a bridge between traditional formal education and informal, noncredit study. For information, write Cornell's Adult University, 626 Thurston Avenue, Ithaca, NY 14850-2490;

call 255-6260; e-mail [cauinfo@cornell.edu](mailto:cauinfo@cornell.edu); fax 254-4482; or visit [www.cau.cornell.edu](http://www.cau.cornell.edu).

### CONTINUING EDUCATION INFORMATION SERVICE

This service provides free information, counseling, and referral to adults who have been out of school for several years and want to resume their education. It also provides information about short courses, workshops, professional updates, and executive programs offered by the university to people inside and outside Cornell. For information, write to Continuing Education, B20 Day Hall, Ithaca, NY 14853-2801; call 255-4987; e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu); or fax 255-9697.

### CORNELL IN WASHINGTON PROGRAM

Cornell in Washington offers undergraduates the opportunity to combine the strengths of Cornell with all of the best parts of living and learning in Washington, D.C. Students take courses in the fall, spring, or summer for credit, work as externs, and complete substantial research projects, all the while enjoying the rich opportunities available in the nation's capital. For information, write to Cornell in Washington, M101 McGraw Hall, Ithaca, NY 14853-4601; call 255-4090; e-mail [cwash@cornell.edu](mailto:cwash@cornell.edu); or visit [www.ciw.cornell.edu](http://www.ciw.cornell.edu).

### DISTANCE LEARNING

Need a flexible schedule? Have a full-time job? Planning to travel during winter break or during the summer? Don't let any of these stop you from taking a class, earning credits, or learning something new. Wherever you are, whatever your schedule, Cornell distance learning courses are just a keyboard away.

Distance learning courses may include a web-based component, videotapes, and/or CD-ROMs. Students interact with the instructor and other students by phone or e-mail. Most assignments and examinations are completed within a scheduled time frame, just as in on-campus courses, but students have the option of getting a head start on readings and lectures. For information, visit [www.sce.cornell.edu/dl/](http://www.sce.cornell.edu/dl/).

For faculty members interested in developing credit or noncredit distance learning courses, the school offers a broad range of services, including determining technological needs, resolving copyright issues, creating a marketing plan, and fulfilling administrative duties related to the course. Services are tailored to individual needs and ongoing support is available. Visit [www.sce.cornell.edu/dl/](http://www.sce.cornell.edu/dl/) to see what's possible.

### CyberTower: Cornell at No Cost

Cornell's online CyberTower program is a great way to meet Cornell faculty and explore fascinating topics ranging from mastodons and wine appreciation to today's headline news, all at no cost.

CyberTower features three online program series, with new offerings added every month:

- **Study Rooms** contain video-streamed lectures, links to specially selected web sites, reading lists, and discussion boards with Cornell faculty and fellow CyberTower users.
- **Forums** are informal video-streamed conversations with leading faculty members. Discussion boards enable you to trade comments and questions with each month's featured guest.
- **Views and Reviews** are brief, unabashedly opinionated commentaries by faculty members on books, films, articles, and topics in the news. The newest addition to this series is "SunSpots! Op-Eds from the writers of the *Cornell Daily Sun*."

To explore CyberTower, simply log on to [cybertower.cornell.edu](http://cybertower.cornell.edu) and follow the registration instructions. It's all free and is a great way to see what Cornell has to offer.

### EXECUTIVE AND PROFESSIONAL PROGRAMS

The school presents short, high-level professional updates, both on and off campus, in study tours and in locations worldwide via distance learning. These courses are taught by Cornell faculty and senior research staff in many fields. Programs also can be designed to respond to the specific needs and interests of corporations, professional societies, and other groups. For information, call 255-7259; e-mail [cupsp@cornell.edu](mailto:cupsp@cornell.edu); fax 255-8942; or visit [www.sce.cornell.edu/exec/](http://www.sce.cornell.edu/exec/).

### EXTRAMURAL STUDY

Cornell students whose studies have been interrupted may find it useful to take classes on a part-time basis. The school is also dedicated to offering part-time study to staff, faculty, "townies," and anyone else interested in taking courses at the university, improving their job skills, continuing their education, or simply having fun learning something new.

Thanks to the school's Extramural Study program, anyone may (with few exceptions) enroll in any course in the university during the fall and spring semesters if space is available. Part-time study at Cornell is a great opportunity to take fascinating courses and study with world-renowned faculty members. If you'd like to take advantage of Cornell's extensive course offerings but don't need college credit, you may register through the



Visitor's Program and receive a 90 percent discount on tuition.

For information, write to Extramural Study, B20 Day Hall, Ithaca, NY 14853-2801; call 255-4987; e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu); fax 255-9697; or visit [www.sce.cornell.edu/exmu/](http://www.sce.cornell.edu/exmu/).

## SPECIAL PROGRAMS

If you want to immerse yourself in a particular subject, consider enrolling in a special program. Programs are offered on and off campus, may include an internship, and may be combined with other courses. For information, call 255-7259; e-mail [culp@cornell.edu](mailto:culp@cornell.edu); fax 255-8942; or visit [www.sce.cornell.edu/sp/](http://www.sce.cornell.edu/sp/).

### On-Campus Special Programs Roster

AEM Certificate in Business Management

African Languages: Swahili

Architecture

Asian Studies Programs: Chinese, Japanese, Nepali, Sinhala, Tibetan

Biological Sciences Undergraduate Research Program

CCMR Institute for Chemistry Teachers (CICT)

CNS Institute for Physics Teachers

Cornell Institute for Biology Teachers

Education

Engineering Cooperative Education Program

English for International Students and Scholars

Freshman Summer Start

Industrial and Labor Relations: Strategic Corporate Research

Intensive Arabic Program

Landscape Architecture: Site Grading

Leadership Program for Veterinary Students

Nanobiotechnology Institute for Teachers

Prefreshman Summer Program

Satellite Remote Sensing Applications in Biological Oceanography

School of Hotel Administration Executive Education Programs

Teaching Writing

Telluride Association Summer Program

### Off-Campus Special Programs Roster

Architecture

Art Studio and Creative Writing Workshop in Rome, Italy

Capital Urbanism: Paris, Berlin, Vienna

Dance in Rome, Italy

Geologic Field Mapping in Argentina

Greece: Into the Labyrinths—Amazing Myths Meet in Crete

Human Ecology: Urban Semester Program—The Culture of Medicine/Community and Public Service in North Brooklyn

Urban Cities in Brazil

Marine Science: Shoals Marine Laboratory, Maine

Prelaw Program in New York City

Summer in Washington

Urbanism, Landscape, and Architecture in Latin America: Mexico, Venezuela, Brazil

### Campus to Careers

The job market's tough. The economy's tight. You've been thinking it's time to get serious about your future . . .

The School of Continuing Education and Summer Sessions invites you to join us for one of our highly regarded programs linking classrooms and careers. No matter what your major is, you can:

- Expand your career opportunities
- Strengthen your résumé and skills
- Develop professional contacts
- Take focused, intensive classes
- Learn from distinguished professors, alumni, practitioners, and executives
- Study in Washington, D.C., New York City, or on the Cornell campus in Ithaca
- Enrich your personal, academic, and professional life

For more information, visit [www.sce.cornell.edu/sp/](http://www.sce.cornell.edu/sp/).

### Campus-to-Careers Programs Roster

AEM Certificate in Business Management

Practicing Medicine/Providing Health Care

Prelaw Program in New York City

Summer in Washington

## SUMMER COLLEGE PROGRAMS FOR HIGH SCHOOL STUDENTS

Cornell's award-winning programs for high school students offer one-, three-, four-, and six-week programs for talented sophomores, juniors, and seniors from around the world.

Participants live on our beautiful campus, take college classes with leading Cornell faculty, earn an average of 6 credits, and explore careers and academic majors.

The program is a wonderful opportunity for high school students to experience college life and make some great friends. At the end of the program, students often say it's been the best summer of their life.

For information, call 255-6203; e-mail [summer\\_college@cornell.edu](mailto:summer_college@cornell.edu); fax 255-6665; or visit [www.summercollege.cornell.edu](http://www.summercollege.cornell.edu).

## WINTER SESSION

Cornell undergraduate and graduate students, as well as employees and area residents, can earn up to 4 credits between the fall and spring semesters by enrolling in the winter session. This quiet time on campus allows students to enjoy generally smaller classes and to concentrate on intensive study. Winter-session students may enroll in scheduled courses or design individualized study with a faculty member. For information, write to Winter Session, B20 Day Hall, Ithaca, NY 14853-2801; call 255-4987; e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu).

[cornell.edu](http://cornell.edu); fax 255-9697; or visit [www.sce.cornell.edu/ws/](http://www.sce.cornell.edu/ws/). If a course also is offered through distance learning, the course title will be followed by **DL**.

### Winter Session Course Roster

AEM 240 Marketing **DL**

AM ST 202 Popular Culture in the United States, 1945 to Present **DL**

ART 372 Special Topics in Art Studio: Digital Publication **DL**

ART H 350 History of Photography

AS&RC 131-132 Swahili (off campus)

BIOEE 264 Tropical Field Ornithology (off campus)

BIOEE 265 Tropical Field Ecology and Behavior (off campus)

COM L 256 Introduction to the Qu'ran

COMM 120 Contemporary Mass Communication **DL**

COMM 263 Organizational Writing

COMM 272 Principles of Public Relations and Advertising **DL**

CRP 395/689 Special Topics: Sustainable Panama (off campus)

CRP 495 Special Topics: Introduction to Peace Science

ECON 101 Introductory Microeconomics **DL**

ECON 102 Introductory Macroeconomics

ECON 307 Introduction to Peace Science

ENGL 280 Creative Writing

ENGL 288 Expository Writing

GOVT 161 Introduction to Political Philosophy **DL**

GOVT 314 Prisons **DL**

JWST 256 Introduction to the Qu'ran

NES 256 Introduction to the Qu'ran

OR&IE 350 Financial and Managerial Accounting

PSYCH 470 Undergraduate Research in Psychology

RELST 256 Introduction to the Qu'ran

Practicing Medicine/Providing Health Care (off campus)

## CORNELL UNIVERSITY SUMMER SESSION

Summer at Cornell is an excellent time to get a world-class education while enjoying all of the pleasures of summer in the Finger Lakes.

Summer Session features open admissions and outstanding instructors, nearly all of whom are regular Cornell faculty members. Courses are offered on and off campus and via distance learning.

During our three-, six-, or eight-week sessions you can actually get to know your professors and are sure to be surrounded by intriguing people of all ages from all over the world. And, all with time left over for travel or a summer job.

Summer Session offers the practical benefits of fulfilling requirements, accelerating your degree, gaining personal and professional growth, or easing your fall/spring course load. It's also the perfect time to take advantage of the area's stunningly beautiful gorges, waterfalls, lakes, and parks. Hike, swim, sail, picnic, or enjoy a sunset concert on the Arts Quad.

However you look at it, spending a summer at Cornell is a great way to enjoy the best of the university and the best of summer!

For information, call 255-4987; e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu); or visit our web site at [www.summer.cornell.edu](http://www.summer.cornell.edu).

### Summer Session Course Roster

The Cornell University Summer Session offers a wide variety of courses. The list that follows includes those courses that are usually offered every summer. The list is not exhaustive; many new courses or courses offered only occasionally are not listed. For complete information, contact the Summer Session office. Courses are posted on the web ([www.summer.cornell.edu](http://www.summer.cornell.edu)) in the fall as the roster is developed. If a course also is offered through distance learning, the course title will be followed by **DL**.

### Africana Studies

- AS&RC 131-132 Swahili
- AS&RC 205 African Cultures and Civilizations
- AS&RC 310 Introduction to African Art
- AS&RC 422 African Literature
- AS&RC 505 Teaching about Africa

### American Studies

- AM ST 104 Introduction to American History
- AM ST 124 Democracy and Its Discontents: Political Traditions in the United States
- AM ST 202 Popular Culture in the United States, 1945 to Present **DL**
- AM ST 301 America's Changing Faces

### Animal Science

- AN SC 112 Sustainable Animal Husbandry

### Anthropology

- ANTHR 100 Ancient Peoples and Places
- ANTHR 101 Human Evolution: Genes, Behavior, and the Fossil Record
- ANTHR 389 Culture and Emotion: Love and Death in Cross-Cultural Perspective

### Applied Economics and Management

- AEM 220 Introduction to Business Management
- AEM 221 Financial Accounting
- AEM 224 Principles of Finance
- AEM 240 Marketing **DL**
- AEM 320 Business Law I
- AEM 323 Managerial Accounting

- AEM 495 Undergraduate Special Topics in Applied Economics and Management

### Archaeology

- ARKEO 100 Ancient Peoples and Places
- Other field study opportunities are usually available through this department.

### Architecture

- ARCH 110 Introduction to Architecture: Design Studio
  - ARCH 130 An Introduction to Architecture: Lectures
- Consult the Department of Architecture office for a complete list of summer design offerings including foreign study opportunities.

### Art

- ART 121 Introductory Painting
- ART 141 Introductory Sculpture
- ART 151-152 Drawing I and II
- ART 159 Life and Still-Life Drawing
- ART 161 Photography I
- ART 168 Black-and-White Photography
- ART 169 Color Photography
- ART 171-172 Electronic Imaging in Art
- ART 221 Painting II
- ART 241 Sculpture II
- ART 261 Photography II
- ART 263 Color Photography
- ART 361 Photography III
- ART 372 Special Topics in Art Studio

### Asian American Studies

- AAS 207 The Legal Construction of Asian Americans in the Workplace

### Asian Studies

- ASIAN 225 Literature, Politics, and Genocide in Cambodia **DL**

### Astronomy

- ASTRO 105 An Introduction to the Universe
- ASTRO 106 Essential Ideas in Relativity and Cosmology
- ASTRO 107 An Introduction to the Universe

### Biological and Environmental Engineering

- BEE 299 Sustainable Development **DL**

### Biological Sciences

- Ecology and Evolutionary Biology**
- BIOEE 207 Evolution
- BIOEE 261 Ecology and the Environment
- BIOEE 278 Evolutionary Biology
- BIOEE 363 Field Methods in Ornithological Research
- BIOEE 467 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

### Microbiology

- BIOMI 172 Bioscientific Terminology
- BIOMI 290-291 General Microbiology
- Molecular Biology and Genetics**
- BIOGD 281 Genetics
- BIOBM 333 Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology
- BIOBM 432 Survey of Cell Biology
- BIOBM 440 Laboratory in Biochemistry and Molecular Biology
- Neurobiology and Behavior**
- BIO G 107-108 General Biology
- BIONB 221 Neurobiology and Behavior I: Introduction to Behavior

### Biology and Society

- B&SOC 447 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

### Biometry and Statistics

- BTRY 301 Biological Statistics I
- BTRY 601 Statistical Methods I

### Chemistry and Chemical Biology

- CHEM 206 Introduction to General Chemistry
- CHEM 207-208 General Chemistry
- CHEM 251 Introduction to Experimental Organic Chemistry
- CHEM 257 Introduction to Organic and Biological Chemistry
- CHEM 357-358 Organic Chemistry for the Life Sciences

### City and Regional Planning

- CRP 328/528 Overview: Quantitative Methods in Policy Planning
- CRP 381/581 Principles of Spatial Design and Aesthetics
- CRP 508 Introduction to Geographic Information Systems (GIS) **DL**

### Classics

#### Classical Civilization

- CLASS 172 Anatomy of Bioscientific Terminology
- CLASS 236 Greek Mythology
- CLASS 263 The Comic Theater
- CLASS 267 History of Rome I

#### Greek

- CLASS 103 Intensive Greek

#### Latin

- CLASS 107 Intensive Latin

### Cognitive Studies

- COGST 101 Introduction to Cognitive Science

## Communication

- COMM 116 Communication in Social Relationships  
 COMM 120 Contemporary Mass Communication **DL**  
 COMM 201 Oral Communication  
 COMM 203 Argumentation and Debate  
 COMM 245 Psychology of Social Computing  
 COMM 260 Science Writing for Public Information  
 COMM 263 Organizational Writing  
 COMM 272 Principles of Public Relations and Advertising **DL**  
 COMM 424 Communication in the Developing Nations

## Comparative Literature

- COM L 204 Global Fictions  
 COM L 223 The Comic Theater  
 COM L 236 Greek Mythology

## Computer Science

- COM S 099 Fundamental Programming Concepts  
 COM S 100 Introduction to Computer Programming  
 COM S 101 Introduction to Cognitive Science  
 COM S 211 Computers and Programming  
 COM S 322 Introduction to Scientific Computation

## Earth and Atmospheric Sciences

- EAS 108 Earth in the News  
 EAS 154 The Sea: An Introduction to Oceanography, Lectures

## Economics

- ECON 101 Introductory Microeconomics **DL**  
 ECON 102 Introductory Macroeconomics  
 ECON 313 Intermediate Microeconomic Theory (calculus)  
 ECON 314 Intermediate Macroeconomic Theory (calculus)  
 ECON 362 International Monetary Theory and Policy  
 ECON 434 Financial Economics, Derivatives, and Risk Management

## Education

- EDUC 471 The Roots of Modern American Schooling: Public Education in the United States, 1890–1960

## Engineering

### Distribution Courses

- ENGRD 211 Computers and Programming  
 ENGRD 221 Thermodynamics  
 ENGRD 270 Basic Engineering Probability and Statistics  
 ENGRD 322 Introduction to Scientific Computation

The Engineering Cooperative Education Program offers a number of other engineering courses. Contact that office for more information.

## English

- ENGL 131 FWS: Reading and Writing About . . . ?  
 ENGL 132 FWS: The Personal Essay  
 ENGL 280 Creative Writing  
 ENGL 288–289 Expository Writing  
 ENGL 364 Studies in United States Literature after 1950  
 ENGL 365 Studies in United States Fiction after 1900

## English as a Second Language

- ENGLF 101–102 English as a Second Language  
 ENGLF 211 English as a Second Language

## English for Later Bilinguals

- ENGLB 115 English for Later Bilinguals

## Government

- GOVT 111 Introduction to American Government and Politics  
 GOVT 131 Introduction to Comparative Government and Politics  
 GOVT 161 Introduction to Political Philosophy **DL**  
 GOVT 181 Introduction to International Relations  
 GOVT 330 Politics of the Global North  
 GOVT 393 Introduction to Peace Studies  
 GOVT 314 Prisons **DL**

## History

- HIST 124 Democracy and Its Discontents: Political Traditions in the United States  
 HIST 151–152 Introduction to Western Civilization  
 HIST 154 Introduction to American History  
 HIST 267 History of Rome I  
 HIST 287 Evolution  
 HIST 415 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

## History of Art

- ART H 202 Survey of European Art: Renaissance to Modern  
 ART H 261 Introduction to Art History: Modern Art  
 ART H 350 History of Photography  
 ART H 378 Introduction to African Art

## Human Development

- HD 115 Human Development  
 HD 116 Human Development: Section  
 HD 216 Human Development: Adolescence and Youth  
 HD 233 Children and the Law

## Industrial and Labor Relations

### Collective Bargaining, Labor Law, and Labor History

- ILRCB 100 Introduction to United States Labor History

- ILRCB 207 The Legal Construction of Asian Americans in the Workplace

- ILRCB 611 Managing and Resolving Conflict

## Human Resource Studies

- ILRHR 266 Essential Desktop Applications

## International and Comparative Labor

- ILRIC 333/533 Politics of the Global North

## Organizational Behavior

- ILROB 170 Introduction to Micro Organizational Behavior and Analysis

- ILROB 423 Leadership in Organizations

## Social Statistics

- ILRST 212 Statistical Reasoning  
 ILRST 312 Applied Regression Methods  
 ILRST 510–511 Statistical Methods for the Social Sciences I and II

## Information Science

- INFO 245 Psychology of Social Computing

## Linguistics

- LING 111–112 American Sign Language I and II  
 LING 170 Introduction to Cognitive Science

## Management

### Management Elective Courses

- NBA 666 Negotiations

## Marine Science

Consult related department listings for summer offerings in marine science.

## Mathematics

- MATH 103 Mathematical Explorations  
 MATH 109 Precalculus Mathematics  
 MATH 111–112 Calculus  
 MATH 135 The Art of Secret Writing  
 MATH 171 Statistical Theory and Application in the Real World  
 MATH 191–192 Calculus for Engineers  
 MATH 293–294 Engineering Mathematics  
 MATH 336 Applicable Algebra

## Mechanical and Aerospace Engineering

- MA&E 221 Thermodynamics

## Music

- MUSIC 105 Introduction to Music Theory

## Natural Resources

- NTRES 102 Science Fiction and the Environment  
 NTRES 314 Conservation of Birds  
 NTRES 315 Conservation of Birds Laboratory

## Philosophy

- PHIL 101 Introduction to Philosophy  
 PHIL 145 Contemporary Moral Issues  
 PHIL 191 Introduction to Cognitive Science  
 PHIL 231 Introduction to Deductive Logic  
 PHIL 262 Philosophy of Mind

## Physical Education

Consult the Physical Education office for a complete list of summer offerings for credit and recreation.

## Physics

- PHYS 101-102-103 General Physics  
 PHYS 112 Physics I: Mechanics  
 PHYS 213 Physics II: Heat/Electromagnetism  
 PHYS 214 Physics III: Optics, Waves, and Particles

## Policy Analysis and Management

- PAM 463 Community Indicators: Measuring Quality of Life

## Psychology

- PSYCH 101 Introduction to Psychology: The Frontiers of Psychological Inquiry  
 PSYCH 102 Introduction to Cognitive Science  
 PSYCH 128 Introduction to Psychology: Personality and Social Behavior  
 PSYCH 199 Sports Psychology  
 PSYCH 223 Introduction to Biopsychology  
 PSYCH 280 Introduction to Social Psychology  
 PSYCH 350 Statistics and Research Design

## Romance Studies

### French Language

- FRROM 209 Intermediate Composition and Conversation I

### Spanish Language

- SPANR 121 Elementary Spanish  
 SPANR 123 Continuing Spanish

## Science and Technology Studies

- S&TS 287 Evolution  
 S&TS 447 Seminar in the History of Biology: Evolution, Ethics, and Meaning In Life

## Sociology

- SOC 101 Introduction to Sociology  
 SOC 212 Hate Crimes and Bias-Motivated Violence  
 SOC 304 Introduction to Social Networks and Social Theory

## Textiles and Apparel

- TXA 332 Designers as Entrepreneurs DL

## Theatre, Film, and Dance

### Film Studies

- FILM 325 Animation History and Practice

### Dance

- DANCE 210 Beginning Dance Composition

### Theatre

- THETR 223 The Comic Theater

### Visual Studies

- VISST 211 Beginning Dance Composition

## Theoretical and Applied Mechanics

- T&AM 293-294 Engineering Mathematics

## Writing

- WRIT 134 An Introduction to Writing in the University

## INDEPENDENT STUDY

Have a special interest you'd like to pursue?  
 Want to do research and get credit for it?  
 Need a particular course to graduate on time?  
 Consider independent study.

Independent study encompasses courses of your own design, special topics courses, undergraduate research, or any regular course from the fall and spring semesters not being offered. If you can find a professor willing to supervise your study, all you need to do is pick up the application for independent study (available on the web at [www.summer.cornell.edu](http://www.summer.cornell.edu) or from the Summer Session office) and register in B20 Day Hall at least two weeks prior to beginning the independent study course. Also, please let the Summer Session office know if there are courses you would like to see offered next summer (call 255-4987 or e-mail [cusce@cornell.edu](mailto:cusce@cornell.edu)).

## COLLEGE OF ENGINEERING

### ADMINISTRATION

W. Kent Fuchs, dean

David Gries, associate dean for undergraduate programs

Michael Spencer, associate dean for research, graduate studies, and professional education

Zellman Warhaft, associate dean for diversity

Deborah Cox, assistant dean for strategic planning, assessment, and new initiatives

Betsy East, assistant dean for student services

Cathy Long, assistant dean for administration

vacant, assistant dean for alumni affairs and development

### FACILITIES AND SPECIAL PROGRAMS

Most of the academic units of the College of Engineering are on the Joseph N. Pew, Jr. Engineering Quadrangle. The School of Applied and Engineering Physics is located in Clark Hall on the College of Arts and Sciences campus, and the Department of Biological and Environmental Engineering is in Riley-Robb Hall on the campus of the New York State College of Agriculture and Life Sciences.

Special university and college facilities augment the laboratories operated by the various engineering schools and departments, and special centers and programs contribute to opportunities for study and research.

Cornell programs and centers of interest in engineering include the following:

*Center for Applied Mathematics.* This cross-disciplinary center administers a graduate program.

*Center for Nanoscale Systems in Information Technologies.* The mission of this National Science Foundation Nanoscience and Technology Center is to explore new methods for creating nanoscale devices for use in information technologies. The facilities for this center are distributed between Clark Hall and the Engineering Quadrangle, and especially in Duffield Hall.

*Center for Radiophysics and Space Research.* This interdisciplinary unit facilitates research in astronomy and the space sciences.

*Center for Theory and Simulation in Science and Engineering.* A supercomputer facility used for advanced research in engineering and the physical and biological sciences.

*Cornell High Energy Synchrotron Source (CHESS).* A high-energy synchrotron radiation laboratory operated in conjunction with the university's high-energy storage ring. Current research programs at CHESS are in areas of structural biology, chemistry, materials science, and physics.

*Cornell Nanoscale Science and Technology Facility* (part of the National Science Foundation-funded National Nanofabrication Users Network). This center provides

equipment and services for research in the science, engineering, and technology of nanometer-scale structures for electronic, chemical, physical, and biological applications.

*Cornell Waste Management Institute.* This research, teaching, and extension program within the Center for Environmental Research addresses the environmental, technical, and economic issues associated with solid waste; one facility sponsored by the institute is the Combustion Simulation Laboratory in the Sibley School of Mechanical and Aerospace Engineering.

*Institute for the Study of the Continents.* This interdisciplinary organization promotes research on the structure, composition, and evolution of the continents.

*W. M. Keck Foundation in Nanobiotechnology.* Facilities of this program include tools for nanoscale diagnostics of biomaterials.

*Laboratory of Plasma Studies.* A center for research in plasma physics.

*Cornell Center for Materials Research.* An interdisciplinary center, with substantial support from the National Science Foundation, that performs state-of-the-art materials research and provides sophisticated scientific measurement and characterization equipment.

*National Astronomy and Ionosphere Center.* The world's largest radio-radar telescope facility, operated by Cornell in Arecibo, Puerto Rico.

*Multidisciplinary Center for Earthquake Engineering Research.* A facility established by the National Science Foundation and a group of universities to study response and design of structures in earthquake environments.

*Nanobiotechnology Center.* The mission of this National Science Foundation Science and Technology Center is to develop nanoscale technologies and science applied to the life sciences. The facilities of this center are distributed between Clark Hall, Kimball Hall, and the Biotechnology Center.

*National Institutes of Health/National Science Foundation Developmental Resource in Biophysical Imaging and Optoelectronics.* This resource develops novel measurement and optical instrumentation for solving biophysical problems.

*Network for Earthquake Engineering Simulation (NEES).* A system of nationwide experimental facilities linked by high-performance Internet for laboratory and computational simulation of structures under earthquake loads.

*Power Systems Engineering Research Center.* A National Science Foundation cooperative center between university and industry in which research is centered on power systems and infrastructure networks.

*Program of Computer Graphics.* This interdisciplinary research center operates one of the most advanced computer-graphics laboratories in the United States.

*Program on Science, Technology, and Society.* This cross-disciplinary unit sponsors courses and promotes research on the interaction of science, technology, and society.

The programs listed above are sponsored by College of Engineering units, and several are industry affiliated.

### DEGREE PROGRAMS

Cornell programs in engineering and applied science lead to the degrees of bachelor of science (B.S.), master of engineering (with field designation) (M.Eng.), master of science (M.S.), and doctor of philosophy (Ph.D.).

General academic information concerning the B.S. degree is given below under "Undergraduate Study." The student pursues the degree in one of 13 majors. The majors are described under "Engineering Majors."

Many students stay a fifth year in the College of Engineering to pursue a professional degree, the master of engineering (M.Eng.) degree. Joint enrollment in the B.S. and M.Eng. degrees is possible for students in their last semester who lack only 1 to 8 credits for the B.S.

M.Eng. degrees are awarded in most of the major areas. In addition, the following M.Eng. degrees are awarded: aerospace engineering, biomedical engineering, electrical engineering, engineering mechanics, nuclear engineering, operations research and industrial engineering, and systems engineering. For full details on M.Eng. degrees, see "Master of Engineering Degree Programs."

Programs leading to the M.S. and Ph.D. degrees are administered by the Graduate School. They are described in the *Announcement of the Graduate School* and the special announcement *Graduate Study in Engineering and Applied Science*.

### UNDERGRADUATE STUDY

Students in the College of Engineering spend most of their first two years of undergraduate studies in the Common Curriculum, which is administered by the College Curriculum Governing Board (CCGB) through the associate dean for undergraduate programs and Engineering Advising. At the end of their third semester, they affiliate with one of these majors:

- biological engineering (BE)†
- chemical engineering (ChemE)
- civil engineering (CE)
- computer science (CS)
- electrical and computer engineering (ECE)
- engineering physics (EP)
- environmental engineering (EnvE)
- geological sciences (GeoS)



independent major (IM)

information science, systems, and technology (ISST)—with options in information science and management science

materials science and engineering (MS&E)

mechanical engineering (ME)

operations research and engineering (ORE)

Criteria for affiliation with the majors are described under "Affiliation with a Major." The majors are described under "Undergraduate Engineering Majors."

Most of the majors have a corresponding minor, in which the student can pursue a secondary interest. In addition, there are minors in applied mathematics, biomedical engineering, civil infrastructure, engineering management, engineering statistics, industrial systems and information technology, and information science. There is one option, in bioengineering. See the main section, "Engineering Minors and Options."

\*The majors biological engineering, chemical engineering, civil engineering, electrical and computer engineering, materials science and engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

†To major in biological engineering, students normally enroll in the College of Agriculture and Life Sciences for the first three years and jointly in that college and the College of Engineering for the final year. However, students initially enrolled in the College of Engineering may affiliate with the biological engineering major and complete the degree solely within Engineering.

There is no undergraduate major in nuclear science and engineering. Students who intend to enter graduate programs in this area are encouraged to begin specialization at the undergraduate level. This may be done by choice of electives within the major (e.g., engineering physics, materials science and engineering, civil engineering, chemical engineering, and the independent major). Contact a faculty member in the graduate field of nuclear science and engineering who is most directly concerned with the curriculum, including K. B. Cady, D. A. Hammer, R. W. Kay, and V. O. Kostroun.

## Graduation Requirements

To receive the bachelor of science degree, students must meet the requirements of the common curriculum (outlined below) as set forth by the College of Engineering, including the requirements of their chosen major, as established by the school or department that administers the major. (Further explanation of the revised common curriculum and major flow charts are provided in the 2006-2007 edition of the *Engineering Undergraduate Handbook*.)

Course Category	Credits
1. Mathematics (major-specific)	15-16
2. Physics (major-specific)	8-12
3. Chemistry (major-specific)	4-8
4. First-year writing seminar	6
5. Technical writing*	3
6. Computer programming	4
7. Introduction to engineering (ENGRI)	3

8. Two engineering distributions (ENGRD) 6-8
9. Liberal studies distribution (6 courses min.)  $\geq 18$
10. Advisor-approved electives 6
11. Major program
  - a. Major-required courses  $\geq 30$
  - b. Major-approved electives 9
  - c. Courses outside the major 9
12. Two semesters of physical education in the freshman year and demonstration of proficiency in swimming (university requirement)

From 123 to 133 credits are required for graduation, depending on the major (see "Engineering Majors").

\*Technical writing courses may simultaneously fulfill another requirement.

## Mathematics

The normal program in mathematics includes MATH 191, 192, 293 or 294 (depending on the major), and a major-specific math course. At least C- must be attained in these courses; if not, the course must be repeated immediately before the next course in the sequence is taken. Failure to achieve at least C- the second time will generally result in withdrawal from the College of Engineering. Courses that are taken a second time to meet this or any requirement do not yield additional credit toward a degree.

## Physics

The normal program in physics includes PHYS 112, 213, and 214 or the corresponding honors courses (PHYS 116, 217, and 218). Engineering students must attain at least C- in each math prerequisite of a physics course before taking the physics course (e.g., C- in MATH 191 before taking PHYS 112 and C- in MATH 192 before taking PHYS 213). Students in the majors ChemE, CE, CS, GeoS (geoscience and SES options), ISST, and ORE may substitute CHEM 208 for PHYS 214. BE and EnvE students may substitute CHEM 257 or 357 for PHYS 214.

## Chemistry

CHEM 211 or 207 is required.

CHEM 211 is designed for students who do not intend further study in chemistry. Typically, CHEM 211 is taken during the freshman year, but students who wish to complete the physics program (PHYS 112, 213, and 214) first may postpone CHEM 211 until the sophomore year.

Students intending to affiliate with the following majors usually take CHEM 211: engineering physics; computer science; electrical and computer engineering; information science, systems, and technology; materials science and engineering; mechanical engineering; and operations research and engineering. Students considering chemical engineering must take CHEM 207 in the fall of their freshman year and CHEM 208 in the spring semester. Students considering the science-of-earth-systems option in geological sciences or a health-related career such as medicine should take the CHEM 207-208 sequence.

## First-Year Writing Seminars

Each semester of their freshman year, students choose a first-year writing seminar from among more than 100 courses offered by over 30 different departments in the humanities, social sciences, and expressive arts. These courses offer the student practice in writing English prose. They also assure beginning students the benefits of a small class.

## Technical Writing

Students can fulfill the upper-level technical-writing requirement using one of the six alternatives below. See [www.engineering.cornell.edu/ECP/](http://www.engineering.cornell.edu/ECP/) for more information.

1. ENGRC 350 or 355, taught by the Engineering Communications Program
2. The Writing-Intensive Co-op—an opportunity to combine work and academics. Some co-op students do a significant amount of writing on the job; under certain circumstances, this writing will satisfy the technical-writing requirement.
3. An officially designated Writing-Intensive (W-I) engineering course:
  - ENGRD/A&EP 264
  - CHEME 432
  - MS&E 403 and 404 (both)
  - MS&E 405 and 406 (both)
  - M&AE 427
  - BEE 450 with co-registration in BEE 493
  - BEE 473 with co-registration in BEE 493
  - BEE 489
4. ENGRC 302, a 1-credit attachment to an engineering course that is not one of the officially designated W-I courses (see #3 above). An instructor may wish to extend the writing done in their course for a given semester so that it will fulfill the technical-writing requirement. With the approval of the CCGB's Subcommittee on Technical Writing, the instructor may have students co-register in ENGRC 302, which may be taken more than once with different courses by permission of the engineering instructor.
5. COMM 260, 263, or 352, taught by the Department of Communication (in the College of Agriculture and Life Sciences).
6. Petition. Occasionally, a student will be doing a significant amount and variety of technical writing elsewhere in the College of Engineering. It may be appropriate to petition the CCGB's Subcommittee on Technical Writing for permission to use this forthcoming writing (not past writing) to meet the technical-writing requirement.

## Computer Programming

COM S 100 Introduction to Computer Programming is normally taken in the freshman year to fulfill the computer programming requirement.

Before taking COM S 100, some students take COM S 099, Fundamental Programming Concepts, offered in the fall and summer. This 2-credit S-U course is meant for students with virtually no programming experience; students with previous programming experience may not enroll in it. Basic programming concepts

and problem analysis are studied. COM S 099 may not be used as credit toward graduation.

### Introduction-to-Engineering Course

An introduction-to-engineering course (designated ENGR1) must be taken during the freshman year. This course introduces students to the engineering process and provides a substantive experience in an open-ended problem-solving context. See the Introduction-to-Engineering course listing for current course offerings.

### Engineering Distribution

Two engineering distribution (ENGRD) courses (6–8 credits) must be selected from two different categories listed below. A student may use any one of the possible substitutions described.

#### 1. Scientific computing

ENGRD 211 Computers and Programming  
ENGRD 241 Engineering Computation  
ENGRD 321 Numerical Methods in Computational Molecular Biology  
ENGRD 322 Introduction to Scientific Computation

#### 2. Materials science

ENGRD 261 Introduction to Mechanical Properties of Materials: From Nanodevices to Superstructures  
ENGRD 262 Electronic Materials for the Information Age

#### 3. Mechanics

ENGRD 202 Mechanics of Solids  
ENGRD 203 Dynamics

Majors in Engineering Physics may substitute A&EP 333 for ENGRD 203.

#### 4. Probability and statistics

ENGRD 270 Basic Engineering Probability and Statistics

Majors in Electrical and Computer Engineering may substitute ECE 310 for ENGRD 270. Majors in Engineering Physics may substitute ECE 310 or MATH 471 for ENGRD 270. Majors in Civil Engineering, Biological Engineering, and Environmental Engineering may substitute CEE 304 for ENGRD 270.

#### 5. Electrical sciences

ENGRD 210 Introduction to Circuits for Electrical and Computer Engineers  
ENGRD 230 Introduction to Digital Logic Design  
ENGRD 264 Computer-Instrumentation Design

#### 6. Thermodynamics and energy balances

ENGRD 219 Mass and Energy Balances  
ENGRD 221 Thermodynamics

#### 7. Earth and life sciences

ENGRD 201 Introduction to the Physics and Chemistry of the Earth  
ENGRD 251 Engineering for a Sustainable Society  
ENGRD 260 Principles of Biological Engineering

#### 8. Biology and chemistry

ENGRD 252/A&EP 252 The Physics of Life  
BIO G 101 and 103 Biological Sciences, Lec and Lab  
BIO G 105 Introductory Biology  
BIO G 107 General Biology (summer only)  
CHEM 389 Physical Chemistry I

Some majors require a specific engineering distribution course as a prerequisite for the upper-class course sequence. These requirements are as follows:

Biological Engineering: ENGRD 202

Chemical Engineering: ENGRD 219

Civil Engineering: ENGRD 202

Computer Science: ENGRD 211 (co-enrollment in COM S 212 highly recommended)

Electrical and Computer Engineering: ENGRD 230

Environmental Engineering: ENGRD 202

Geological Sciences: ENGRD 201

Information Science, Systems, and Technology: ENGRD 270

Materials Science and Engineering: ENGRD 261 or ENGRD 262

Mechanical Engineering: ENGRD 202

Operations Research and Engineering: ENGRD 270

Some majors require additional distribution courses after the student affiliates.

### Liberal Studies Distribution

The following liberal studies distribution requirements begin with the class entering in 2003. Students who entered before that may choose to use the new requirements.

Global and diverse societies require that engineers have an awareness of historical patterns, an appreciation for different cultures, professional ethics, the ability to work in multifaceted groups, and superior communications skills. Cornell has a rich curriculum in the humanities, arts, and social sciences, enabling every engineering student to obtain a true liberal education. At least six courses (totaling at least 18 credits) are required, and they should be chosen with as much care and foresight as courses from technical areas.

- The six courses must be chosen from at least three of the following six groups.
- At least two of the six courses must be at the 200 level or higher.

Besides courses classified as liberal studies distribution in Arts and Sciences, Engineering classifies appropriate courses in other colleges as meeting the various categories. To view these courses, visit [www.engineering.cornell.edu/student-services/academic-advising/index.cfm](http://www.engineering.cornell.edu/student-services/academic-advising/index.cfm), which contains a complete listing of acceptable courses in each group. A list of courses is also available in Engineering Advising, 167 Olin Hall.

#### Group 1. Cultural Analysis (CA)

Courses in this area study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion),

expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community), and power and politics (states, colonialism, inequality).

#### Group 2. Historical Analysis (HA)

Courses in this group interpret continuities and changes—political, social, economic, diplomatic, religious, intellectual, artistic, and scientific—through time. The focus may be on groups of people, dominant or subaltern, a specific country or region, an event, a process, or a time period.

#### Group 3. Literature and the Arts (LA)

Offerings in this area explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge, and creative imagination.

#### Group 4. Knowledge, Cognition, and Moral Reasoning (KCM)

Offerings in this area investigate the bases of human knowledge in its broadest sense, ranging from cognitive faculties shared by humans and animals such as perception, to abstract reasoning, to the ability to form and justify moral judgments. Courses investigating the sources, structure, and limits of cognition may use the methodologies of science, cognitive psychology, linguistics, or philosophy. Courses focusing on moral reasoning explore ways of reflecting on ethical questions that concern the nature of justice, the good life, or human values in general.

#### Group 5. Social and Behavioral Analysis (SBA)

Courses in this area examine human life in its social context through the use of social-scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g., in friendship, love, conflict) to larger social organizations (e.g., the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g., discrimination, inequality, prejudice, stigmas, conflict resolution).

#### Group 6. Foreign Languages (not literature courses)

Courses in this area teach language skills, inclusive of reading, writing, listening, and spoken non-English languages, at beginning to advanced levels.

### Electives

- **Advisor-approved electives:** 6 credits required (approved by the academic advisor). Because these courses should help develop and broaden the skills of

the engineer, advisors generally accept the following as approved electives:

1. One introduction-to-engineering course (ENGRI)
  2. Engineering distribution courses
  3. Courses stressing written or oral communication
  4. Upper-level engineering courses
  5. Advanced courses in mathematics
  6. Rigorous courses in the biological and physical sciences
  7. Courses in business, economics, or language (when they serve the student's educational and academic objectives)
  8. Courses that expand the major or another part of the curriculum.
  9. Up to 6 credits of advisor-approved electives may come from ROTC courses at the 300 level or higher.
- **Major-approved electives:** 9 credits (approved by the major and faculty advisors in the major). Refer to the major curricula for descriptions of courses in this category.
  - **Outside-the-major electives:** 9 credits of courses outside the major to ensure breadth of engineering studies

### Social Issues of Technology

It is important for engineers to realize the social and ethical implications of their work. Consequently, in selecting their liberal studies distribution courses and approved electives, students are urged to consider courses listed in the "Science and Technology Studies" undergraduate area of concentration (see "Interdisciplinary Centers and Programs"). These courses may provide students with important perspectives on their studies and their future careers.

### Engineering Advising

Entering first-year students are assigned a faculty advisor (who may or may not be in their intended major), who remains their advisor until affiliation with a major (normally during the fourth semester). The students are also under the administration of Engineering Advising in Olin Hall, which implements the academic policies of the College Curriculum Governing Board. Engineering Advising serves as the primary resource center for undergraduate students in the college, offering general advising and counseling. Other student services offices located in Olin Hall are Engineering Learning Initiatives and Diversity Programs in Engineering (DPE), which are primary resources for counseling, support, tutoring, and networking opportunities.

### First-Year Requirements

During the first year, engineering students are expected to complete (or receive credit for) the following core requirements:

- MATH 191 and 192
- Two of: CHEM 211, 207, 208, PHYS 112, 213, 214\* (or the Honors equivalent)
- COM S 100
- Two first-year writing seminars

- One introduction to engineering (ENGRI) course
- Two physical education courses

\*Students with an interest in pre-med (or other health-related careers), chemical engineering, or the science-of-earth-systems option in geological sciences should enroll in the CHEM 207-208 sequence during their first year.

### Affiliation with a Major

Students must apply for affiliation with a major during the first semester of their sophomore year, although earlier affiliation may be granted at the discretion of the major. This is done by visiting the undergraduate major office and completing the application for major affiliation form. To affiliate, students must (1) make good progress toward completing required courses in the common curriculum, (2) have a GPA  $\geq 2.0$ , and (3) have satisfied the major's course and grade requirements as specified below:

(Majors may impose alternative affiliation requirements for students applying for affiliation later than the first semester of the sophomore year.)

<i>Major</i>	<i>Courses and Minimum Grade Requirements</i>
Biological Engineering	At most one grade below C- in math and science courses and COM S 100 or its equivalent.
Chemical Engineering	At most one grade below C- in chemistry, math, physics, and chemical engineering courses. GPA $\geq 2.2$ in math, science, and engineering courses.
Civil Engineering	GPA $\geq 2.0$ in all engineering and science courses. At least C- in ENGRD 202 (or ENGRD 251, for students who do not take ENGRD 202 before affiliation).
Computer Science	At least C in all completed COM S and math courses. GPA $\geq 2.5$ in COM S 211, 212, and 280. GPA $\geq 2.5$ in MATH 192 and COM S 280. Visit the CS undergraduate office web site for alternative affiliation criteria.
Electrical and Computer Engineering	At least C+ in MATH 293, PHYS 213, and one of ECE/ENGRD 210, ECE 220, and ENGRD 230 (all taken for 4 credits). GPA $\geq 2.5$ in (if completed): MATH 192, 293, 294, PHYS 213, ENGRD 211, 230, ECE/ENGRD 210, ECE 220.
Engineering Physics	At least B- in all required math and physics courses.
Environmental Engineering	GPA $\geq 2.0$ in all engineering and science courses. At least C- in ENGRD 251.
Geological Science	Good academic standing in the College of Engineering.

Independent Major GPA  $\geq 2.0$ .

**Information Science Systems, and Technology** At least C in two of MATH 294, COM S 211, and OR&IE/ENGRD 270. Courses must be taken for a letter grade. GPA  $\geq 2.3$  in completed engineering math, engineering distribution, and ISST major courses, which must be taken at Cornell. For a repeated course, the most recent grade will be used.

**Materials Science and Engineering** At least C- in required physics and chemistry and math courses. At least C in ENGRD 261 or ENGRD 262.

**Mechanical Engineering** At least C- in ENGRD 202, ENGRD 221\*, and all required mathematics, science, and computer science courses. GPA  $\geq 2.5$  in MATH 293, PHYS 213, ENGRD 202, and ENGRD 221 (if ENGRD 221 was taken). For students entering prior to fall 2005, see affiliation requirements at [www.mae.cornell.edu](http://www.mae.cornell.edu).

**Operations Research and Engineering** At least a C- in ENGRD 270. GPA  $\geq 2.0$  in math, science, and engineering courses (both overall and in the semester immediately before affiliation). GPA  $\geq 2.0$  in ENGRD 270 and all required college math courses at the 200 level or above that have been taken thus far.

Students must be affiliated or conditionally affiliated with a major by the end of their fourth semester or they will be withdrawn from the College of Engineering, unless allowed to participate in a terminal semester.

## SPECIAL PROGRAMS

### Dual-Degree Program

The dual-degree program, intended for superior students, allows both a bachelor of science and either a bachelor of arts (B.A.) or bachelor of fine arts (B.F.A.) degree to be earned in about five years. Students registered in the College of Engineering, the College of Arts and Sciences, or the College of Architecture, Art, and Planning may apply and, after acceptance of their application, begin the dual-degree program in their second or third year. For information, contact the appropriate coordinators of dual-degree programs at 55 Goldwin Smith Hall (for Arts and Sciences), B-1 West Sibley Hall (for Architecture, Art, and Planning), and Engineering Advising, 167 Olin Hall.

## Double Major in Engineering

The double-major option, which makes it possible to develop expertise in two allied engineering majors, generally requires at least one semester beyond the usual four years. Students affiliate with one major following normal procedures and then petition to enter a second major before the end of their junior year. All requirements of both majors must be satisfied. Further information is available from Engineering Advising, 167 Olin Hall, and the individual major offices.

## Independent Major

Students whose educational objectives cannot be met by one of the regular majors may affiliate with the independent major. Often, the desired curriculum is in an interdisciplinary area.

This major consists of a primary area ( $\geq 32$  credits), which may be any subject areas offered by the schools or departments of the college, and an educationally related secondary area ( $\geq 16$  credits), which may be in a second engineering subject area or in a logically connected nonengineering area. The combination must form an engineering education in scope and substance and should include engineering design and synthesis as well as engineering sciences. See the discussion of this major in "Undergraduate Engineering Majors."

## Engineering Minors and Options

Most of the majors have a corresponding minor, requiring six courses (18 credits), in which the student can pursue a secondary interest. Besides those minors, there are minors in applied mathematics, biomedical engineering, civil infrastructure, engineering management, engineering statistics, industrial systems and information technology, and information science. There is also the bioengineering option, which requires only four courses (12 credits) plus a seminar. See "Engineering Minors and Options."

## Department of Biomedical Engineering

270 Olin Hall

The charge of the Department of Biomedical Engineering (BME) is to bridge engineering, biology, and medicine. Students are educated to understand the human body as an integrated system through quantitative engineering analysis and to use that understanding to design better therapeutic strategies, devices, and diagnostics to improve human health. Biomedical engineers also contribute to biological discovery. The 43 faculty in the biomedical engineering graduate field represent 12 departments and six colleges (including Weill Medical College). The BME field offers research opportunities in biomedical mechanics; biomaterials; drug delivery, design, production, and metabolism; biomedical instrumentation and diagnostics; and system computational biology.

The Department of BME administers the undergraduate minor in biomedical engineering, the biomedical engineering graduate field, the M.S./Ph.D. degree programs, and the M.Eng. (BME) degree.

## Engineering Communications Program

424 Hollister Hall, 255-8558,  
www.engineering.cornell.edu/ECP

The Engineering Communications Program (ECP), created in 1987 at the urging of the College of Engineering faculty and employers of Cornell engineers, provides instruction in technical writing, oral presentation, and the use of graphics in both. The ECP is a recipient of the Engineering Dean's Prize in Excellence and Innovation in Teaching.

ECP courses give students experience with the difficult task of explaining technical information to audiences that have various levels of technical expertise. Students improve their writing style, become more comfortable with and effective at oral presentation, use standard forms and formats for presenting technical information, perform library and Internet research on engineering topics, and study real engineering situations in which ethics may have been breached.

Enrollment in ECP courses is typically 20 students per section; like writing seminars elsewhere at Cornell, those taught by the ECP are discussion classes. Students' work receives abundant written comments, and conferences are frequent.

ECP members are available to consult with the faculty teaching writing-intensive technical courses and anyone else interested in including writing in their courses. They oversee the communications component of the Writing-Intensive Co-op and occasionally give talks to alumni and student groups.

## Diversity Programs in Engineering

146 Olin Hall, 255-6403

The Diversity Programs in Engineering (DPE) office operates programs at the undergraduate, graduate, and faculty levels to facilitate the outreach, recruitment, retention, and overall success of underrepresented minorities, women, and other underrepresented groups in Engineering. DPE serves as a resource center for academic support, career placement, graduate school preparation, and overall student success.

The office participates in a university-wide pre-freshman summer program for admitted students, coordinates two summer program initiatives for high school students, CURIE (www.engineering.cornell.edu/curie) and CATALYST (www.engineering.cornell.edu/catalyst), and it also provides specialized instruction, in collaboration with Engineering Advising and Engineering Learning Initiatives, each semester in subjects such as math, computer science, and English composition.

The DPE office sponsors networking events in April and throughout the academic year that allow company representatives from all over the United States to meet students from diverse populations. Summer internships and permanent jobs frequently result from these events.

In addition, the DPE office coordinates various trips, recreational activities, seminars, lectures, and workshops on a wide range of topics that are relevant to academic and extracurricular life in the university setting.

## Engineering Learning Initiatives

167 Olin Hall, 255-9622, www.engineering.cornell.edu/learninginitiatives

The office of Engineering Learning Initiatives offers programs designed to enhance the undergraduate academic experience through peer education, cooperative learning, research opportunities, and leadership development.

*Academic Excellence Workshops* (AEWs) offered through Engineering Learning Initiatives are taken in conjunction with core engineering courses in math, computer science, and chemistry. The 1-credit AEWs are weekly two-hour cooperative learning sessions. Designed to enhance student understanding, they feature peer-facilitated group work on problems at or above the level of course material.

*Undergraduate Research Grants* offered through Engineering Learning Initiatives provide opportunities for students to obtain hands-on research experience with a faculty mentor. Students and faculty may apply for funding to cover student stipend and expense costs for the fall, spring, and summer terms.

*Tutors-on-Call*, through Engineering Learning Initiatives, offers one-on-one peer tutoring free of charge for engineering students in many first- and second-year core courses, including math, chemistry, physics, computer science, and distribution courses.

*LeaderShape*, offered through Engineering Learning Initiatives, provides opportunities for our students to engage in the dynamic process of personal discovery and leadership development at a week-long retreat held in May of each year.

## Engineering Cooperative Education and Career Services

201 Carpenter Hall, 255-5006, www.engineering.cornell.edu/careerservices

This office assists engineering students (freshmen through Ph.D.) on issues related to career development and the job search through individual advising and group seminars. It also administers the Engineering Cooperative Education Program. Each year, more than 200 national employers typically visit the office to recruit technical students and graduates; additional job opportunities are posted electronically through CornellTrak. Both undergraduate and graduate students can use these resources to pursue permanent, summer, or co-op employment; however, students seeking co-op opportunities must meet specific requirements.

The Engineering Cooperative Education Program (Co-op) provides an opportunity for students to gain practical experience in industry and other engineering-related enterprises before they graduate. By supplementing course work with carefully monitored, paid jobs, co-op students are able to explore their own interests and acquire a better understanding of engineering as a profession—and still graduate in four years.

To be eligible, a student must have been enrolled in the College of Engineering for four semesters. Students majoring in computer science or biological engineering, but not registered in the College of Engineering, are also eligible. In most cases a GPA  $\geq 2.7$  is required. Applicants interview with participating employers in February of the

sophomore year. Those who receive offers and join the program usually complete their fifth-semester course work on campus during the summer after sophomore year and begin the first co-op work term normally the following fall. They return to Cornell to complete the sixth semester with their classmates, and then return to work the following summer with the same employer (but not necessarily in the same department or location) to complete a second work term. Students then spend the senior year back on campus, graduating on schedule with their class. Students who are ahead in their course curriculum may prefer to complete one eight-month spring/summer or summer/fall co-op work term during the junior year.

### International Programs

An international perspective, sensitivity to other cultures, and the ability to read and speak a second language are increasingly important for today's engineers. The College of Engineering encourages students to study or work abroad during their undergraduate years. Currently, the College has agreements with Ecole Centrale Paris, France, and the Hong Kong University of Science and Technology and is also working with IIT Kanpur, India, and the National University of Singapore. Visit [www.engineering.cornell.edu/studyabroad](http://www.engineering.cornell.edu/studyabroad) and Engineering Advising, 167 Olin Hall, for the latest information. The college is also working to facilitate study in Cantabria, Spain; Dresden, Germany; and Guadalajara, Mexico. For information on an international co-op work experience, visit the Engineering Cooperative Education and Career Services office, 201 Carpenter Hall.

Students who plan to study abroad apply through Cornell Abroad; see the Cornell Abroad program description in the introductory section of *Courses of Study*.

### Cooperative Program with the Johnson Graduate School of Management

Undergraduates may be interested in a cooperative program at Cornell that leads to both master of engineering and master of business administration (M.B.A.) degrees. See "Master of Engineering Degrees" for details.

### Lester Knight Scholarship Program

The Lester Knight Scholarship Program is designed to assist and encourage Cornell Engineering students and alumni interested in combining their engineering education with a business degree. See "Master of Engineering Degrees" for details.

## ACADEMIC PROCEDURES AND POLICIES

### Advanced Placement Credit

The College of Engineering awards a significant amount of advanced placement (AP) credit to entering first-year students who demonstrate proficiency in the subject areas of introductory courses. Students can earn AP credit by receiving qualifying scores on any of the following:

1. Advanced placement examinations given and scored by the College Entrance Examination Board (CEEB);

2. General Certificate of Education (GCE) Advanced ("A") Level Examinations;
3. International Baccalaureate (IB) Higher Level Examinations; or
4. Cornell's departmental placement examinations, given during orientation week before the beginning of fall-semester classes.

Advanced placement credit is intended to permit students to develop more challenging and stimulating programs of study. Students who receive AP credit for an introductory course may use it in three different ways. They may:

1. enroll in a more advanced course in the same subject right away.
2. substitute an elective course from a different area.
3. enroll in fewer courses, using the AP credit to fulfill basic requirements.

### Acceptable Subjects and Scores for CEEB or Cornell Departmental AP Exams

The most common subjects for which AP credit is awarded in the College of Engineering, and the scores needed on qualifying tests, are listed below. AP credit is awarded only for courses that meet engineering curriculum requirements.

**Mathematics:** MATH 191, 192 are required.

**First-semester math (MATH 191).** AP credit may be earned by:

- a score of 4 or 5 on the CEEB BC exam, or
- a passing score on the Cornell departmental exam for first-semester math.

**First-year math (through MATH 192).** AP credit may be earned by:

- a passing score on the Cornell departmental exam for first-year math.

**Physics:** PHYS 112 and 213 are required.

**PHYS 112.** AP credit may be earned by:

- a score of 4 or 5 on the mechanics portion of the CEEB C exam, or
- a score of 5 on the CEEB B exam with successful completion of a high school-level calculus course, or
- a passing score on the Cornell departmental exam for PHYS 112.

**Note:** MATH 293 is a prerequisite for PHYS 214.

**PHYS 213.** Students receiving a 5 on the Electricity and Magnetism portion of the AP C exam may choose to accept AP credit for PHYS 213.

**PHYS 116, 217, and 218 (honors sequence).** This sequence is designed for students with strong experience in physics and calculus, e.g., a 5 on one or both Physics C AP tests and the equivalent of at least one semester of university calculus. Students interested in PHYS 217 or 218 are strongly advised to start with PHYS 116. Even for a student with a 5 on both Physics C AP tests, 116 will not be boring. Students may not simultaneously receive credit for PHYS 116 and AP credit for PHYS 112, or credit for PHYS 217 and AP credit for PHYS 213. For advice or

more information, contact the departmental representative at 255-6016.

**Chemistry:** CHEM 207 or 211 is required.

**CHEM 207 or 211.** AP credits may be earned by:

- a score of 5 on the CEEB AP exam, or
- a passing score on the Cornell departmental exam for chemistry.

**Note:** Students who obtain AP credit for CHEM 207 and who are considering a major in chemical engineering or materials science and engineering should consider enrolling in CHEM 215. Those who are offered AP credit for CHEM 207 and then elect to take CHEM 215 will also receive academic credit for CHEM 207. Students may want to discuss this option with their faculty advisor.

**Computing:** COM S 100 is required. AP credit may be earned by:

- a score of 5 on the CEEB A or a score of 4 or 5 on the AB exam, or
- a passing score on the Cornell departmental exam for COM S 100.

**Biology:** Biology is not required as part of the core curriculum, although it is a popular elective, especially for students who intend to pursue health-related careers. AP credit may be earned as follows:

- 8 credits will be offered to students who receive a 5 on the CEEB AP exam;
- 4 credits will be offered to students who receive a 4 on the CEEB AP.

Those who want to study more biology should contact the Office of Undergraduate Biology, 200 Stimson Hall, to discuss proper placement.

**First-year writing seminar:** Two first-year writing seminars are required.

- AP credit for one first-year writing seminar may be earned by a score of 5 on either of the CEEB AP English exams.

Students who earn a score of 4 on the AP English Literature and Composition exam or the AP English Language and Composition exam will be offered 3 credits, which may be applied toward the Literature and Arts (LA) category of the Liberal Studies distribution requirement.

**Liberal studies distribution:** Six courses beyond two first-year writing seminars are required. Students may earn AP credit toward the liberal studies distribution by taking College Entrance Examination Board (CEEB) AP tests. AP credit earned in the liberal studies distribution cannot be used to fulfill the "upper-level" liberal studies requirements.

**Modern languages:** Students may earn AP credit for competence in a foreign language by taking the College Entrance Examination Board (CEEB) AP test or by taking the Cornell Advanced Standing Examination (CASE). Those who score 4 or 5 on the CEEB AP test are entitled to 3 credits in most languages. To qualify for the CASE exam, the student must score at least 65 on a college placement test (taken either in high school or at Cornell during Orientation Week). A passing score on the CASE entitles the student to 3 credits. Modern language AP credits may be used to satisfy part of the foreign language category of the liberal studies distribution or may meet an



approved elective requirement, contingent on discussions with the faculty advisor.

### Advanced Placement and Credit for International Credentials

Students who have successfully completed either a General Certificate of Education (GCE) Advanced ("A") Level Examination or an International Baccalaureate (IB) Higher Level Examination may be eligible for advanced placement credit in the College of Engineering as follows:

#### General Certificate of Education Advanced Level Examination (GCE "A")

Hong Kong Advanced Level examinations and the joint examination for the Higher School Certificate and Advanced Level Certificate of Education in Malaysia and Singapore—principal passes only—are considered equivalent in standard to GCE "A" Levels.

Subject	Marks	Credit
Biology	A or B	8 credits
Chemistry	A	8 credits (CHEM 207 and 208)
	B	4 credits (CHEM 207 or CHEM 211)
Mathematics	A, B, or C	4 credits (MATH 191)
Physics	A or B	4 credits for PHYS 112; 4 additional credits for PHYS 213 are granted to a combination of grades of A or B and a minimum of 4 Advanced Placement (or advanced standing) credits in mathematics.

#### International Baccalaureate (IB) Higher Level Examination

Subject	Marks	Credit
Biology	7	8 credits
	6	6 credits
Chemistry	6 or 7	4 credits (CHEM 207 or 211)
Computer Science	6 or 7	4 credits (COM S 100)
Physics	6 or 7	4 credits (PHYS 112)

Mathematics: No credit is given for the IB exam; students are encouraged to take the Engineering Mathematics Advanced Standing exam during orientation.

Note: Advanced placement credit based on GCE or IB results may also be awarded for courses that satisfy the liberal studies requirement in the College of Engineering. In such cases, the College of Engineering follows the AP guidelines found earlier in this publication under "General Information."

### General Policies for Advanced Placement

The general policies in the College of Engineering governing awards of AP credit are as follows:

1. AP credit will not be offered in any subject area without a documented examination.
2. All AP examinations are normally taken and scored before fall-semester classes

begin. Students who take CEEB AP tests in high school should have an official report of their scores sent directly to Cornell as soon as possible. Students who have completed either GCE "A" Level or IB Higher Level Examinations must present the original or a certified copy of their examination certificate to Engineering Advising, 167 Olin Hall. Those who wish to take departmental examinations should do so during Orientation Week; permission to take these tests after the start of fall-semester classes must be requested in a written petition to the college's Committee on Academic Standards, Petitions, and Credit (ASPAC).

A more detailed description of the college's policies concerning advanced placement credit and its use in developing undergraduate programs may be found in the pamphlet *Advanced Placement and Transfer Credit for First-Year Engineering Students*, which may be obtained from Engineering Advising, 167 Olin Hall.

### General Policies for Transfer Credit

Undergraduate students who have completed courses at recognized and accredited colleges may, under certain conditions, have credits for such courses transferred to Cornell. Such courses must represent academic work in excess of that required for the secondary school diploma and must be documented as such in writing by the secondary institution. Courses deemed acceptable for transfer credit must be equivalent in scope and rigor to courses at Cornell. Transfer credit will not be awarded for courses taken during a semester in which the student is enrolled at Cornell.

- To apply for transfer credit, submit a transfer credit form (one form for each request), accompanied by a course description. (Forms are available from Engineering Advising or the Registrar's office and should be submitted before enrollment in the course to be transferred.) An official transcript from the offering institution (bearing the institutional seal and Registrar's signature) must be sent to the Engineering Registrar's office before official transfer credit will be awarded.
- Applications for transfer credit to satisfy requirements in math, science, engineering courses, or first-year writing seminars require approval from the department offering an equivalent course at Cornell. The department may require course materials, textbooks used, etc., in addition to the course description before approving the course.
- Departmental approval is not required for transfer credit that satisfies liberal studies distribution requirements. The course will be reviewed for approval by a representative of the Committee on Academic Standards, Petitions, and Credit (ASPAC) in Engineering Advising.
- Cornell does not award credit for courses in which a student has earned a grade less than C; schools and departments may stipulate a higher minimum grade.
- College courses completed under the auspices of cooperative college and high school programs will be considered for advanced placement credit only

if students demonstrate academic proficiency by taking the appropriate AP or Cornell departmental placement examination (CASE), as described in the "Advanced Credit" section.

- Following matriculation, students may apply up to 18 credits of transfer and/or Cornell extramural credit toward B.S. degree requirements.
- At most 72 total transfer credits (taken both before and after matriculation) may be used to meet graduation requirements.
- Summer session courses taken at Cornell are not considered transfer credit.

A more detailed description of the college's regulations governing transfer credit may be found in the pamphlet *Advanced Placement and Transfer Credit for First-Year Engineering Students* as well as the *Engineering Undergraduate Handbook*, both available from Engineering Advising, 167 Olin Hall.

### Transfer Credit for Transfer Students

Transfer students may transfer up to 36 credits for each year spent in full-time study at another institution, provided that the courses are acceptable for meeting graduation requirements. Transfer credit awards are determined by the majors/departments.

### Academic Standing

Full-time students are expected to remain in good academic standing. The criteria for good standing change somewhat as a student progresses through the four years of the engineering curriculum. At all times, the student must be making adequate progress toward a degree, but what this actually means depends on the major.

Requirements for first-year engineering students to be in good standing at the end of the first semester are as follows. Failure to meet these standards will result in a review by the Committee on Academic Standards, Petitions, and Credit (ASPAC), and the actions of warning, stern warning, required leave of absence, or withdrawal from the College of Engineering may be taken.

1. At least 12 credits passed, including *at least* two courses from math, science, and/or engineering (phys. ed. courses and courses below the 100 level do not count)
2. At least C– in the math course
3. Semester GPA  $\geq 2.0$
4. No F, U, or INC grades

Requirements for unaffiliated second-semester first-year and sophomore students to be in good standing are as follows. Failure to meet these requirements will result in a review by the Committee on Academic Standards, Petitions, and Credit (ASPAC); a warning, stern warning, required leave of absence, or withdrawal from the College of Engineering may be taken.

1. At least 12 credits passed in courses that meet B.S. degree requirements, *normally* at least two math, science, or engineering courses (phys. ed. courses and courses below the 100 level do not count)
2. At least C– in a math course, if one was taken
3. Semester GPA  $\geq 2.0$
4. No F, U, or INC grades

## Academic Progress

The total number of credits required for graduation range from 123 to 133, depending on the major. Therefore, an average semester credit load ranges from 15 to 17 credits.

Because math is pivotal to the study and practice of engineering, students must earn at least C- in their four required math courses. If at least C- is not attained, the course must be repeated immediately. Failure to achieve at least C- the second time will generally result in withdrawal from the College of Engineering. Physics and advanced math courses often have math prerequisites, and having to repeat the prerequisite course may delay progress in the physics and math curricula. Students are expected to continue the core engineering math courses each semester until completed.

## Dean's List

Dean's List citations are presented each semester to engineering students who have exemplary academic records. The Dean of the college determines the criteria for this honor. For 2006-2007, the requirement is a semester GPA  $\geq 3.4$  (without rounding); no failing, unsatisfactory, missing, or incomplete grades (even in physical education); and at least 12 letter-grade credits (not S-U). Students may earn Dean's List status retroactively if they meet these criteria after making up incomplete grades. Students who earn Dean's List status receive certificates from the engineering registrar's office, and the honor is noted on the transcript.

## Graduating with Distinction and Honors

### Graduating with Distinction

Meritorious students graduating with a B.S. degree from the College of Engineering may also be designated *cum laude*, *magna cum laude*, or *summa cum laude*.

- Cum laude will be awarded to engineering students with a GPA  $\geq 3.5$ . Cum laude will also be awarded to engineering students who received a semester GPA  $\geq 3.5$  in each of the last four semesters at Cornell; in each of these semesters, at least 12 letter-graded credits must be taken with no failing, unsatisfactory, missing, or incomplete grades. If the student is an engineering co-op student, then the engineering co-op summer term will count as one of the last four. Students who were approved for prorated tuition in their final semester will be awarded cum laude if they received a semester GPA  $\geq 3.5$  in their last semester and meet the conditions above in the prior four semesters.
- Magna cum laude will be awarded to engineering students with a GPA  $\geq 3.75$  (based on all credits taken at Cornell).
- Summa cum laude will be awarded to engineering students with a GPA  $\geq 4.0$  (based on all credits taken at Cornell).

Note: All GPA calculations are minimums and are not rounded.

### Major Honors Program

To be eligible for major honors, a student must enter a major with and maintain a cumulative GPA  $\geq 3.5$ . If the major has an

approved honors program and both the GPA and program requirements are fulfilled, the faculty of the major may recommend that a student graduate with the additional diploma and transcript notation of "With Honors." For more information, see "Engineering Majors."

## S-U Grades

Many courses may be taken either for a letter grade or for an S-U (satisfactory or unsatisfactory) grade designation. Under the S-U option, students earning the letter grade equivalent of at least C- in a course will receive a grade of S; those earning less than C- receive U. A course in which a U grade is received does not count toward graduation requirements.

Engineering students may choose to receive an S-U grade option under the following conditions:

- The course in question must be offered with an S-U option.
- The student must previously have completed at least one full semester of study at Cornell.
- The proposed S-U course must count as either a liberal studies distribution or an advisor-approved elective in the engineering curriculum.
- Students may enroll S-U in only one course each semester in which the choice between letter grade and S-U is an option. (Additional courses offered "S-U grades only" may be taken in the same semester as the elected S-U course.)

The choice of grading option for any course is made initially during the pre-enrollment period. Grading options may be changed online. For permission-only courses submit a properly completed add/drop form to the engineering registrar by the end of the third week of classes. After this deadline, the grading option may not be changed, nor will a student be permitted to add a course in which he or she was previously enrolled (in the current semester) under a different grade option.

## Residence Requirements

Candidates for an undergraduate degree in engineering must spend at least four semesters or an equivalent period of instruction as full-time students at Cornell, including at least three semesters affiliated with an engineering major.

Students on a voluntary leave of absence may register for courses extramurally only with the approval of their major (or the college, for unaffiliated students). No more than 18 credits earned through extramural study or acquired as transfer credit (or a combination thereof) after matriculation may be used to satisfy the requirements for the B.S. degree in engineering. Students may not complete their last semester extramurally.

Degree candidates may spend periods of time studying away from the Cornell campus with appropriate authorization. Information on programs sponsored by other universities and on procedures for direct enrollment in foreign universities is available at the Cornell Abroad office, 474 Uris Hall. Programs should be planned in consultation with the staff of Engineering Advising, who can provide

information on credit-evaluation policies and assist in the petitioning process.

## Transferring within Cornell

It is not uncommon for students to change their academic or career goals after matriculation in one college and decide that their needs would be better met in another college at Cornell. While transfer between colleges is not guaranteed, efforts are made to assist students in this situation.

The Internal Transfer Division office is responsible for assisting students with the transfer process. Students who wish to transfer out of the College of Engineering to another college at Cornell should consult initially with Engineering Advising.

Students who wish to transfer into the College of Engineering can apply at Engineering Advising—application forms are available in 167 Olin Hall. It is preferred that students apply in the semester in which they are completing affiliation criteria for the desired major. Students who would enter the college as a second-semester sophomore or later must be accepted by a major as part of the admission process. Students who would enter as a second-semester freshman or first-semester sophomore may be accepted into the college without the requirement of major affiliation but must be sponsored by a major.

Students who wish to transfer into engineering should take courses in math, chemistry, computer science, physics, and engineering that conform to the requirements of the Common Curriculum. Students should discuss their eligibility with an advisor in Engineering Advising, 167 Olin Hall.

## Leave of Absence

A leave of absence may be voluntary, medical, or required. A description of each follows:

**Voluntary leave:** Students sometimes find it necessary to suspend their studies. To do this, they must petition for a leave of absence for a specified period of time and receive written approval.

Affiliated students request leave through their majors. Unaffiliated students request leave through Engineering Advising; the first step is an interview to establish conditions for the leave and subsequent return. Those who take a leave before affiliating with a major and while not in good standing may be given a "conditional leave." This requires them to meet specific conditions, established at the time the leave is granted, before they will be reinstated.

A leave of absence generally is not granted for more than two years. A leave of absence granted during a semester goes into effect on the day it is requested and lasts for a *minimum of six months*. If a leave is requested after the 12th week of a semester, the courses in which the student was registered at the time of the request are treated as having been dropped (i.e., a "W" will appear on the transcript for each course). Students who owe money to the university are ineligible for a leave of absence. If courses taken during a leave are to satisfy Cornell degree requirements, they must be approved *in advance* through a formal transfer petition. (See previous section, "Transfer Credit," for details.)

Students who intend to take a leave of absence should check with the Office of Financial Aid and Student Employment to discuss financial implications; this is especially true for those who have taken out educational loans. Medical insurance eligibility may also be affected.

To return after a leave of absence, the conditions established when the leave was granted must be satisfied, and the college must be notified in writing at least six weeks before the beginning of the semester in which the student plans to return.

**Medical leave:** Medical leaves are granted by the college only upon recommendation by a physician or therapist from Gannett Health Center. Such leaves are granted for at least six months and up to two years with the understanding that the student may return at the beginning of any semester after the medical condition in question has been corrected. Students must satisfy the Gannett Health Center that the condition has been corrected before they may return. The student's academic standing will also be subject to review both at the time the leave is granted and upon the student's return.

**Required leave:** A required leave of absence is imposed in cases in which the academic progress of a student is so poor that continuing into the next semester does not appear prudent. An example of this might be failure in key engineering courses in a semester. Unless the student is ahead in the curriculum, returning later to repeat the semester makes better academic sense than continuing without the necessary background. In many cases, the leave is dictated by courses that are offered only in the fall or spring semester. Leaves are given when the probability of success is increased substantially by deferring the student's return by one semester (or, in unusual circumstances, one year).

### Rejoining the College

Students wishing to rejoin the college who have not yet affiliated with a major should request permission to rejoin in a letter to Engineering Advising; affiliated students should contact their major office. This must be done at least six weeks before the beginning of the semester in which the student wishes to return. The letter should describe the student's activities while away from Cornell, detail any academic work completed during this time, and specify the courses the student intends to take upon return.

### Withdrawal from the College

A withdrawal from the College of Engineering may be voluntary or required. Following is a description of each:

**Voluntary withdrawal:** Students who voluntarily withdraw from the college sever all connection with the college. Unaffiliated students who wish to withdraw should do so through Engineering Advising. Affiliated students should contact their major office. If a withdrawal is requested during the semester, courses in which the student is enrolled must be dropped in accordance with applicable regulations.

A student who fails to register in the first three weeks of the semester, without benefit of a leave of absence or permission for study in absentia, will be deemed to have withdrawn.

Students who withdraw from the College of Engineering are eligible to apply for admission to one of the other six colleges at Cornell. The intrauniversity transfer process should be followed.

A student who has withdrawn and subsequently wishes to return must make a formal application for readmission. This is rarely granted. It is subject to a review of the student's academic background and depends on available space in the college and in the student's major.

**Required withdrawal:** Students are required to withdraw from the college only when their overall record indicates that they are either incapable of completing the program or not sufficiently motivated to do so. This action withdraws them only from the College of Engineering and does not, in and of itself, adversely affect their ability to transfer and complete a degree in one of the other colleges in the university.

## ENGINEERING MAJORS

This section describes the majors in the College of Engineering; the programs in which an undergraduate can study to obtain a B.S. degree.

A basic requirement of any major is a GPA  $\geq 2.0$ . Most majors have a higher GPA requirement and may have other requirements.

### Honors Program within Majors

Many of the engineering majors supplement the major with an honors program.

#### Eligibility

The B.S. degree with honors is granted to engineering students who, *in addition* to having completed the requirements for a B.S. degree in a major, satisfactorily complete the honors program in the major and are recommended for the degree by the honors committee of that major. An honors program student must enter with and maintain a cumulative GPA  $\geq 3.5$ . If the GPA drops below 3.5, the student is dropped from the honors program.

Courses taken to satisfy the honors requirement may not be used to satisfy B.S. degree requirements. At least 9 extra credit hours are required, and a student must be in the program for at least two semesters before graduation.

No research, independent study, or teaching for which the student is paid may be counted toward the honors program.

#### Procedures

An applicant to the honors program in a major must have an honors advisor, a faculty member from that major who will supervise the honors program and direct the research or project. The honors advisor need not be the student's advisor in the major.

The application for the honors program should be a letter from the student that describes the proposed honors program in detail and includes the explicit approval of the honors advisor.

Students must complete a written application no later than the beginning of the first

semester of their senior year, but they are encouraged to make arrangements with the honors advisor during the second semester of their junior year. Each major may place further constraints on timing.

### Major-Specific Information

Each major defines the content of the honors program and may also place other requirements on the program, in terms of timing, content, and procedures. Information is given within the description of the individual majors.

## BIOLOGICAL ENGINEERING

Offered by the Department of Biological and Environmental Engineering

Contact: 207 Riley-Robb Hall, 255-2173, [www.bee.cornell.edu](http://www.bee.cornell.edu)

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Biological and environmental engineering (BEE) addresses three great challenges facing humanity today: ensuring an adequate and safe food supply in an era of expanding world population; protecting and remediating the world's natural resources, including water, soil, air, biodiversity, and energy; and developing engineering systems that monitor, replace, or intervene in the mechanisms of living organisms. The biological engineering (BE) major has a unique focus on biological systems, including the environment, which is realized through a combination of fundamental engineering sciences, biology, engineering applications and design courses, and liberal studies.

An option in environmental engineering is discussed further below.

Students interested in the BE major should have a strong aptitude for the sciences and math and an interest in the complex social issues that surround technology.

Students take courses in math, statistics, computing, physics, chemistry, basic and advanced biology, fundamental engineering sciences (mechanics, thermodynamics, fluid mechanics, and transport processes), and engineering applications. Students select upper-level engineering courses in subjects that include bioprocessing, soil and water management, biotechnology applications, bioinstrumentation, engineering aspects of animal physiology, environmental systems analysis, and waste treatment and disposal. Students may further strengthen their programs by completing a minor or a second engineering major. Students planning for medical school also take additional lab-based courses in chemistry, biology, and biochemistry. Throughout the curriculum, emphasis is placed on communications and teamwork skills, and all students complete a capstone design project.

Career opportunities cover the spectrum of self-employment, private industry, public agencies, educational institutions, and graduate and professional programs in engineering and science, as well as professional fields like medicine, business, and law. In recent years, graduates have developed careers in environmental consulting, biotechnology, the pharmaceutical

industry, biomedical engineering, management consulting, and international development.

The living world is all around us and within us. The biological revolution continues, and it has given rise to a growing demand for engineers and technical people who have studied biology and the environment, who have strong math and science skills, who can communicate effectively, and who are sensitive to the needs of people and interested in the challenges facing society. The Biological Engineering major is designed to educate the next generation of engineers to meet these challenges.

The academic requirements\* for students majoring in Biological Engineering are outlined below.

<i>Basic Subjects</i>	<i>Credits</i>
MATH 191, 192, 293, 294**	
Calculus for Engineers and Engineering Mathematics	16
PHYS 112, 213	8
General Chemistry (207 or 211 or 215)*	4
Organic Chemistry (257 or 357)*	3
BEE 151 Introduction to Computer Programming or COM S 100M	4
Biological Sciences*	15
Introductory (BIO G 101-104 recommended)	8
Biochemistry or Microbiology	3-4
Biological science course(s) at or above 200 level	3
<i>Major-required courses</i>	46
BEE 200 The BEE Experience or ENGRG 150 (counted as an approved elective)	1
ENGRD 202 Mechanics of Solids	4
BEE 260 or 251, BIO/ENV Engineering Analysis	3
BEE 360 or CEE 351, BIO/ENV Engineering	3
BEE 350 Biological and Environmental Transport Processes	3
BEE 222 or ENGRD 221 Thermodynamics	3
Engineering Statistics and Probability (ENGRD 270 or CEE 304)	3-4
Fluid Mechanics (BEE 331 or CEE 331)	4
Major approved Engineering Electives: (must include minimum of 9 credits of BEE courses, one course must be a BEE Capstone course and one course must be an approved lab experience course)***	
Concentration courses (three courses, minimum of 9 credits, chosen from one of the following BE concentrations): Biomedical Engineering, Bioprocess Engineering, or Bio-Environmental Engineering***	
Engineering electives (Engineering courses at 200 level or above to bring the total of required plus engineering electives to 46 credits)	
Liberal studies (two first-year writing seminars and six liberal studies electives)	24
Advisor-approved electives	6
Total (minimum)	126

\*Basic accredited curriculum. Engineering minors may be accommodated by course selection in the major plus additional electives as outlined in the engineering undergraduate handbook. Information on preprofessional study for medicine, dentistry, and veterinary medicine is available at [www.career.cornell.edu](http://www.career.cornell.edu).

\*\* All students must have a competency in calculus equivalent to MATH 111 before they attempt MATH 191.

\*\*\* See department for a list of approved courses.

### Biological Engineering Honors Program

The B.S. degree with honors is granted to biological engineering majors who graduate with distinction from the College of Engineering and satisfy the Honors requirements given at the beginning of the section "Engineering Majors."

The Honors program requires completion of 9 credits beyond the B.S. degree requirements drawn from the following, with at least 6 credits in the first category:

1. A significant research experience or honors project under the supervision of a BEE faculty member using BEE 495 BE Honors Research. A written senior honors thesis must be submitted as part of this component.
2. A significant teaching experience under the direct supervision of a faculty member or as part of a regularly recognized course in the department under BEE 498 Undergraduate Teaching.
3. Advanced or graduate courses. These additional courses must be technical in nature, i.e., in engineering, math, biology, chemistry, and physics at the 400+ and graduate level.

### Option in Environmental Engineering

By completing the following courses, BE majors may earn the Environmental Engineering option within the framework of the BE curriculum.

Chemistry: CHEM 211/257 or 207/208  
Organic Chemistry: CHEM 257 or CEE 451  
Microbiology: CEE 451 or BIOMI 290  
Fluid Mechanics: BEE 331 or CEE 331  
Engineering Probability and Statistics: CEE 304  
Environmental Quality Engineering: CEE 351  
Environmental Engineering Lab: BEE 427, BEE 473\*, or CEE 453  
Environmental Engineering Design Analysis: BEE 473 or 475 Watershed Engineering or Environmental Systems Analysis

\* If BEE 473 is used for lab, students will need to complete BEE 475 for design analysis.

## CHEMICAL ENGINEERING

Offered by the School of Chemical and Biomolecular Engineering

Contact: 120 Olin Hall, 255-8656.  
[www.cheme.cornell.edu](http://www.cheme.cornell.edu)

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

The undergraduate major in chemical engineering comprises a coordinated sequence of courses beginning in the sophomore year and extending through the fourth year. Students who plan to enter the major take CHEM 208 during the freshman year. The program for the last three years is as follows:

<i>Semester 3</i>	<i>Credits</i>
MATH 293 Engineering Mathematics	4
PHYS 213 Physics II, Heat/Electromagnetism	4
CHEM 389 Physical Chemistry I (engineering distribution)	4
ENGRD 219 Mass and Energy Balances (engineering distribution)	3
Liberal Studies Distribution	3
<i>Semester 4</i>	
MATH 294 Engineering Mathematics	4
CHEME 323 Fluid Mechanics	3
CHEM 390 Honors Physical Chemistry II (major)	
CHEM 290 Introductory Physical Chemistry Laboratory (major)	6
Biology elective*	3
Liberal Studies Distribution 3	
<i>Semester 5</i>	
CHEM 357 Organic Chemistry for the Life Sciences	3
CHEM 251 Introduction to Experimental Organic Chemistry	2
CHEME 313 Chemical Engineering Thermodynamics	3
CHEME 324 Heat and Mass Transfer	3
Liberal Studies Distribution	3
<i>Semester 6</i>	
Advanced science elective**	3
CHEME 301 Nonresident Lectures	1
CHEME 332 Analysis of Separation Processes	3
CHEME 372 Introduction to Process Dynamics and Control	2
CHEME 390 Reaction Kinetics and Reactor Design	3
Liberal Studies Distribution	3
<i>Semester 7</i>	
CHEM 432 Chemical Engineering Laboratory	4
Electives***	9
Liberal Studies Distribution	3
<i>Semester 8</i>	
CHEME 462 Chemical Process Design	4
Liberal Studies Distribution	3
Electives***	3
Approved elective	3

\*Every student must complete one of the five following options for the biology elective: (1) CHEME 288 Biomolecular Engineering: Fundamentals and Applications. (2) advanced placement: a score of 5 on the CEEB AP exam or a score of 7 on the IB Higher Level exam. (3) 4 credits of a pre-med biology sequence: BIO G 101 Biological Sciences, Lec (fall, 2 credits) and BIO G 103 Biological Sciences, Lab (fall, 2 credits), BIO G 102 Biological Sciences, Lec (spring, 2 credits) and BIO G 104 Biological Sciences, Lab (spring, 2 credits), BIO G 105 Introductory Biology (fall, 4 credits), BIO G 106 Introductory Biology (spring, 4 credits), BIO G 107 General Biology (summer, first half of eight-week session, 4 credits) or BIO G 108 General Biology (summer, second half of eight-week session, 4 credits). (4) 3 credits of microbiology: BIOMI 290 General Microbiology (fall, spring, or summer six-week session, 3 credits). (5) 4 credits of biochemistry: BIOBM 330 Principles of Biochemistry, Individual Instruction (fall or spring, 4 credits) or BIOBM 333 Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology (summer six-week session, 4 credits). (6) 5 credits of biochemistry: BIOBM 331 Principles of Biochemistry: Proteins and Metabolism (fall, 3 credits) and BIOBM 332 Principles of Biochemistry: Molecular Biology (spring, 2 credits).

\*\*Advanced science electives include BIOMI 290 General Microbiology Lectures; BIOBM 330, 331, 332, and 333 Principles of Biochemistry; BME 301 (CHEME 401) Molecular Principles of Biomedical Engineering; BME 302 (CHEME 402) Cellular Principles of Biomedical Engineering; CEE 451 Microbiology for Environmental Engineering; CEE 654 Aquatic Chemistry; CHEME 470 Process Control Strategies; CHEME 480 Chemical Processing of Electronic Materials; CHEME 481 (BME 481) Biomedical Engineering; CHEME 484 Microchemical and Microfluidic Systems; CHEME 520 Chemical, Polymer, Biomedical, and Electronic Materials Processing; CHEME 543 Bioprocess Engineering; CHEME 631 (BME 631) Engineering Principles for Drug Delivery; CHEME 640 Polymeric Materials; CHEME 661 Air Pollution Control; FD SC 417 Food Chemistry I; M&AE 423 Intermediate Fluid Dynamics; MS&E 206 Atomic and Molecular Structure of Matter; MS&E 305 Electronic, Magnetic, and Dielectric Properties of Materials; MS&E 521 Properties of Solid Polymers; MS&E 524 Materials Chemistry of Synthetic Polymeric Materials; MS&E 531 Introduction to Ceramics; MS&E 541 (ECE 536) Nanofabrication for M.Eng.; T&AM 310 Advanced Engineering Analysis I; T&AM 311 Advanced Engineering Analysis II; any A&EP course numbered 333 or above; any CHEM course numbered 301 or above; any PHYS course numbered 300 or above.

\*\*\*The electives in semesters 7 and 8 comprise 6 credits of major-approved electives and 6 credits of advanced CHEME electives. Advanced CHEME electives include any CHEME course at the 400+ level except CHEME 490, 499, 520, and 572.

## CIVIL ENGINEERING

Offered by the School of Civil and Environmental Engineering

Contact: 221 Hollister Hall, 255-3412, www.cee.cornell.edu

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

While it is not necessary to do so, students may concentrate in environmental engineering, environmental fluid mechanics and hydrology, geotechnical engineering, structural engineering, transportation, or water resource systems.

### Admission Requirements

Students planning to affiliate with this major must complete ENGRD 202 Mechanics of Solids and PHYS 112 (or, for students following the Environmental Concentration, ENGRD 251) with at least a C-. It is strongly recommended that ENGRD 202 be taken as an engineering distribution during the first semester of the sophomore year.

### Engineering Distribution Courses

Majors are required to take ENGRD 202 Mechanics of Solids as an engineering distribution course. For the second engineering distribution course, one of the following is recommended:

ENGRD 261 Introduction to Mechanical Properties of Materials for students interested in structural engineering and geotechnical engineering.

ENGRD 221 Thermodynamics for students interested in fluid mechanics and hydraulics/hydrology.

ENGRD 211 Computers and Programming for students interested in transportation.

ENGRD 241 Engineering Computation\* for all students interested in environmental engineering.

ENGRD 251 Engineering for a Sustainable Society for students interested in Environmental Engineering.

### Major Program

Students may substitute CHEM 208 or CHEM 257 for PHYS 214. The following nine courses are required in addition to those required for the Common Curriculum. (Students interested in the Environmental Concentration should follow the course requirements for the Environmental Engineering Major and should refer to the CEE Undergraduate Handbook for requirements specific to CE majors. CE majors should take CEE 341.)

Core Courses	Credits
ENGRD 203 Dynamics* or CEE 478 Structural Dynamics	3
ENGRD 241 Engineering Computation*	3
CEE 304 Uncertainty Analysis in Engineering†	4
CEE 323 Engineering Economics and Management	3
CEE 331 Fluid Mechanics	4
CEE 341 Introduction to Geotechnical Engineering and Analysis	4
CEE 351 Environmental Quality Engineering**	3

CEE 361 Introduction to Transportation Engineering\*\* 3  
CEE 371 Structural Modeling and Behavior 4

Additional requirements include a set of two major-approved electives and three design electives from a list of approved courses that is available in the school office. In addition, students must complete one technical communications course from among the courses designated ENGRC or approved communications courses. If the technical communications course also fulfills another requirement (liberal studies major-approved elective, etc.), then an additional advisor-approved elective must be taken.

\*ENGRD 203 and ENGRD 241 can be used to satisfy a major requirement. If a student elects to use one of these courses as a second distribution course, the student must take an additional major-approved elective to fulfill the core course requirements.

†ENGRD 270 may be accepted (by petition) as a substitute for CEE 304 in the major, but only if ENGRD 270 is taken before affiliation, or in some special cases where co-op or study abroad programs necessitate such a substitution.

\*\*Students may substitute CEE 372 or CEE 471 for either CEE 351 or 361, if they also complete either CEE 473 or 474. However, CEE 372 or CEE 471 then counts as a core course only and not as a CEE design course or major-approved elective. Students may also substitute CEE 461 for CEE 351 if they also take CEE 463, 464, and 465. However, then CEE 461 counts as a core course only and not as a CEE design course or major-approved elective.

### Civil Engineering Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

The 9 credits beyond the B.S. degree requirements shall be drawn from the following components (with no fewer than 2 credits in any selected component):

1. A significant research experience or honors project under the direct supervision of a CEE faculty member using CEE 400 Senior Honors Thesis (1–6 credits per semester). A significant written report or senior honors thesis must be submitted as part of this component. Letter grades only.
2. A significant teaching experience under the direct supervision of a faculty member or as part of a regularly recognized course in the College of Engineering, i.e., ENGRG 470 Peer Teaching in Engineering or CEE 401 Undergraduate Teaching in CEE (1–3 credits per semester).
3. Advanced or graduate courses at the 500 level or above.

### Procedures

Application to the program shall be a registration form for CEE 400 and a letter from the student describing the specific proposed honors program and including the explicit approval of the major advisor and the honors advisor. The program must be approved by the CEE Curriculum Committee, although the



committee may delegate approval authority to the associate director for all but unusual proposals.

## COMPUTER SCIENCE

Offered by the Department of Computer Science

Contact: 303 Upson Hall, 255-0982, [www.cs.cornell.edu](http://www.cs.cornell.edu)

The Department of Computer Science is affiliated with both the College of Arts and Sciences and the College of Engineering. Students in either college may major in computer science.

Computer science majors take courses in algorithms, data structures, logic, programming languages, scientific computing, systems, and theory. Electives in artificial intelligence, computer graphics, computer vision, databases, multimedia, and networks are also possible. Requirements include:

- MATH 191, 192, and 294
- two semesters of introductory computer programming (COM S 100 and ENGRD 211)
- a 1-credit project (COM S 212)
- a seven-course computer science core (COM S 280, 312, 314, or 316; one of 321, 322, 421, or 428; 381, 414, and 482)
- two 400+ level computer science electives, totaling at least 6 credits (COM S 490 not allowed)
- a computer science project course (COM S 413, 415, 419, 433, 468, 473, 501, 514, or 664)
- a math elective course (e.g., ENGRD 270, MATH 293, MATH 300+, T&AM 310)
- two 300+ level courses (major-approved electives) that are technical in nature and total at least 6 credits
- a three-course specialization in a topic area other than computer science, all numbered 300 level or greater

All the major electives described above must be courses of at least 3 credits, with the exception of the COM S project course, which is at least 2 credits.

The program is broad and rigorous, but it is structured in a way that supports in-depth study of outside areas. Intelligent course selection can set the stage for graduate study or employment in any technical area or any professional area such as business, law, or medicine. With the advisor, the computer science major is expected to put together a coherent program of study that supports career objectives and is true to the aims of a liberal education.

### Computer Science Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" with a set of coherent courses and research activities that satisfy the following requirements.

1. at least one COM S course (at least 3 credit hours) at or above the 500 level with at least A- (no seminars)

2. at least two 3-credit semesters of COM S 490 (independent research), with at least A- each semester

Honors determinations are made during the senior year. Students wanting to be considered for the honors program should notify the undergraduate office in the Department of Computer Science at [ugrad@cs.cornell.edu](mailto:ugrad@cs.cornell.edu). The subject line for this message should read "HONORS TRACK". Address related questions to the same e-mail address; call or stop by 303 Upson Hall, 255-0982; or visit [www.cs.cornell.edu/ugrad](http://www.cs.cornell.edu/ugrad) for more information on eligibility.

## ELECTRICAL AND COMPUTER ENGINEERING

Offered by the School of Electrical and Computer Engineering

Contact: Student Services Office, 223 Phillips Hall, 255-4309, [www.ece.cornell.edu](http://www.ece.cornell.edu)

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

The Electrical and Computer Engineering major (ECE), leading to a B.S. degree, provides a foundation that reflects the broad scope of this engineering discipline.

Concentrations include computer architecture and organization, digital systems and computer vision; power systems, control, optimization, numerical and state-space methods; communications, computer networks, information theory and coding, signal processing; electronic circuits, VLSI, solid state physics and devices, MEMs, nanotechnology, lasers and optoelectronics; electromagnetics, radiophysics, space sciences, plasmas.

Students planning to affiliate with ECE must take ENGRD 230 as an engineering distribution course. Prospective majors are encouraged, but not required, to take ENGRD 211 as the other engineering distribution course. The major normally begins in the spring of the sophomore year. Of the courses listed below, only ENGRD/ECE 210, ECE 220, ENGRD 230, and ECE 315 are taught in both the fall and spring semesters.

Course	Credits
<b>Major-required courses</b>	
ECE/ENGRD 210 Introduction to Circuits for Electrical and Computer Engineers	4
ENGRD 230 Introduction to Digital Logic Design	4
ECE 220 Signals and Information	4
ECE 303 Electromagnetic Fields and Waves	4
ECE/COM S 314 Computer Organization	4
ECE 315 Introduction to Microelectronics	4
ECE 320 Networks and Systems	4

### Major-approved electives

(29-credit minimum in the following categories)

Advanced ECE electives† (six lecture courses)	
Outside ECE electives‡ 9 minimum credits	
Total minimum major credits	53

ECE 310 should be taken to satisfy the major requirement of probability and statistics

requirement. Alternatively, a student may take either ENGRD 270 or T&AM 310.

†These electives must include two 400-level Electrical and Computer Engineering culminating design experience (CDE) courses and at least two additional courses at the 400 level or above. The remaining electives may not include independent project courses, such as ECE 391, 392, 491, or 492, and must be at the 300 level or above in Electrical and Computer Engineering.

Courses that meet the CDE requirement are described in the *Engineering Undergraduate Handbook*. The list is dynamic and changes frequently. An updated list of courses that meet the CDE requirements will be posted each semester on the bulletin board outside 222 Phillips Hall. All courses must have a college-level prerequisite.

‡Must include one course at the 300 level or above (see *Electrical and Computer Engineering Web Handbook* for details).

Undergraduate concentration is achieved through the various Electrical and Computer Engineering elective courses, as well as other courses in related technical fields within engineering, math, the physical sciences, and the analytical biological sciences. The School of Electrical and Computer Engineering offers more than 30 courses that are commonly taken as electives by undergraduates.

### Academic Standards

Majors in Electrical and Computer Engineering are expected to meet the following academic standards:

1. GPA  $\geq$  2.3 every semester.
2. At least C- in all courses used to satisfy degree requirements in the major or that serve as a prerequisite for a subsequent Electrical and Computer Engineering course.
3. Satisfactory completion of MATH 294, PHYS 214, and two of ENGRD/ECE 210, ECE 220, and ENGRD 230 by the end of the sophomore year and adequate progress toward the degree in subsequent semesters.

### Electrical and Computer Engineering Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements:

Students must apply during the first three weeks of the sixth semester. They must achieve a B or better in the three required courses taken for honors designation.

### Honors Seminar

Prospective honors students must take an honors seminar in the spring semester of their junior year, for a letter grade and 2 credits. The honors seminar consists of a weekly series of introductory research lectures by ECE faculty members. Each honors seminar enrollee will write two short papers on topics covered in the lecture series. Many ECE faculty members will give a lecture or short series of lectures as part of the honors seminar.

### Honors Project

A student in the honors program is required to accumulate at least 3 credit hours from a senior year honors project with an ECE faculty member, consisting of either design, research, or directed reading at the 400 level. All honors projects emphasize the development of communication skills. Design- and reading-oriented honors projects explicitly require a written submission summarizing and concluding the project.

### Additional Course Work

At least 3 credit hours are required of advanced (senior level) ECE course work that has at least a 300-level prerequisite. These credit hours are in addition to any credit hours required as part of the ECE major.

The requirement for at least 9 credits over and above the 128 credits required for a B.S. degree means that an honors degree requires 137 credit hours.

## ENGINEERING PHYSICS

Offered by the School of Applied and Engineering Physics

Contact: 212 Clark Hall, 255-5198, [www.aep.cornell.edu](http://www.aep.cornell.edu)

The engineering physics (EP) major is designed for students who want to pursue careers of research or development in applied science or advanced technology and engineering. Its distinguishing feature is a focus on the physics and math fundamentals, both experimental and theoretical, that are at the base of modern engineering and research and have a broad applicability in these areas. By choosing areas of concentration within this major, students may combine this physics base with a good background in a conventional area of engineering or applied science.

The industrial demand for EP B.S. graduates is high, and many students go directly to industrial positions where they work in a variety of engineering or developmental areas that either combine, or are in the realm of, various more conventional areas of engineering. Recent examples include bioengineering, computer technology, electronic-circuit and instrumentation design, energy conversion, environmental engineering, geological analysis, laser and optical technology, microwave technology, nuclear technology, software engineering, solid-state-device development, technical management, and financial consulting. A number of EP graduates go on for advanced study in all areas of basic and applied physics as well as in a diverse range of areas in advanced science and engineering. Examples include applied physics, astrophysics, atmospheric sciences, biophysics, cell biology, computer science and engineering, electrical engineering, environmental science, fluid mechanics, geotechnology, laser optics, materials science and engineering, mathematics, mechanical engineering, medical physics, medicine, nuclear engineering, plasma physics, oceanography, and physics. The major can also serve as an excellent preparation for medical school, business school, or specialization in patent law.

The EP major fosters this breadth of opportunity because it both stresses the

fundamentals of science and engineering and gives the student direct exposure to the application of these fundamentals. Laboratory experimentation is emphasized, and ample opportunity for innovative design is provided. Examples are ENGRI/A&EP 110 Lasers and Photonics; ENGRI/A&EP 102 Introduction to Nanoscience and Nanoengineering; ENGRD 242/A&EP 252 Physics of Life; ENGRD/A&EP 264 Computer-Instrumentation Design (a recommended sophomore engineering distribution course); A&EP 330 Modern Experimental Optics (a junior/senior course); A&EP 363 Electronic Circuits (a sophomore/junior course); PHYS 410 Advanced Experimental Physics; and A&EP 438 Computational Engineering Physics (a senior computer laboratory).

Students who plan to affiliate with the EP major are advised to arrange their common curriculum with their developing career goals in mind. They are encouraged to take PHYS 112 or 116 during their first semester (if their advanced placement credits permit) and are recommended to satisfy the technical writing requirement with the engineering distribution course ENGRD 264. EP students need to take only one engineering distribution course, since A&EP 333, taken in the junior year, counts as the second one. EP students are advised to take A&EP 363 (taking ECE 210 and 230, 4 credits each, can satisfy A&EP 363. Count ECE 210 as an approved elective and ECE 230 as A&EP 363) in the spring semester of the sophomore year. Students with one semester of advanced placement in math and who have received at least A- in MATH 192 may wish to explore accelerating their math requirements so as to enroll in A&EP 321 and 322 in the sophomore year. For advice on this option, consult with the A&EP associate director.

In addition to the requirements of the Engineering Common Curriculum,\* the major requirements are as follows:

Course	Credits
A&EP 333 Mechanics of Particles and Solid Bodies	4
A&EP 355 Intermediate Electromagnetism	4
A&EP 356 Intermediate Electrodynamics	4
A&EP 361 Introductory Quantum Mechanics	4
A&EP 363 Electronic Circuits	4
A&EP 423 Statistical Thermodynamics	4
A&EP 434 Continuum Physics	4
PHYS 410 Advanced Experimental Physics	4
A&EP 321 Mathematical Physics I; or	
MATH 421 (applied mathematics)	4
A&EP 322 Mathematical Physics II; or	
MATH 422 (applied mathematics)	4

Six major-approved electives (18–23 credits), of which five must be technical upper-level courses (300 or above).

Total major credits=58 credit hours minimum

\*The Engineering Common Curriculum suggests that freshmen take only four courses each semester. This course load is fully consistent with the requirements of the EP major, but freshmen with strong preparation are encouraged to consider taking an additional course during one or both semesters so that they may have additional flexibility in developing a strong,

individualized educational program in their later years and for allowing options such as a semester or year abroad or early graduation.

Two of the 4 credits of PHYS 410 required for the B.S. degree in EP can be satisfied by completing A&EP/PHYS 330 or ASTRO 410. The remaining 2 credits of PHYS 410 can then be satisfied by taking PHYS 400 for 2 credits, provided that the experiments completed in PHYS 400 do not overlap with those in A&EP/PHYS 330 or ASTRO 410. (A list of experiments that are not appropriate will be prepared by A&EP faculty and made available in the A&EP office.) If a student chooses this option, A&EP/PHYS 330 or ASTRO 410 may also count as a technical elective, provided the remaining three technical electives are 4 credits each.

**Choosing elective courses.** The EP major provides the students with a strong opportunity to develop individualized programs of study to meet their particular educational and career goals. These can include the pursuit of a dual major or the development of a broad expertise in a number of advanced technical and scientific areas. With at least seven electives in the sophomore, junior, and senior years, EP majors are encouraged to work closely with their advisor to develop a coherent academic program that is consistent with those goals. For students who look toward an industrial position after graduation, the electives should be chosen to widen their background in a specific area of practical engineering. A different set of electives can be selected as preparation for medical, law, or business school. For students who plan on graduate studies, the electives provide an excellent opportunity to explore upper-level and graduate courses and to prepare for graduate study in any one of a number of fields. Various programs are described in a special brochure available from the School of A&EP, Clark Hall. Students are advised to consult with their EP advisor, a professor active in their area of interest, or with the associate director of the school.

Electives need not be all formal course work: qualified students are encouraged to undertake independent study under the direction of a member of the faculty (A&EP 490). This may include research or design projects in areas in which faculty members are active.

The variety of course offerings and many electives provide flexibility in scheduling. If scheduling conflicts arise, the school may allow substitution of courses nearly equivalent to the listed required courses.

### Academic Standing

Students are expected to pass every course in which they are registered, to earn at least C- in specifically required courses, and to attain a semester GPA  $\geq 2.3$  each semester.

### Engineering Physics Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

1. At least 8 credits of major-approved electives at the 400 level or higher with at least A- in each, not counting credits given for item 2.

2. Two semesters of A&EP 490 or an equivalent course, with at least 2 credits the first semester and 4 credits the second. The student will complete an independent research project or senior thesis under the supervision of an engineering or science faculty member. The level of work required for successful completion is to be consistent with the amount of academic credit granted.

### Procedures

Before enrolling in A&EP 490 or the equivalent, the honors candidate must submit a brief proposal outlining the topic and scope of the project or thesis and an honors advisor's written concurrence to the associate director for undergraduate studies. This proposal will be reviewed by the A&EP Honors Committee and either approved or returned to the candidate to correct deficiencies. The proposed project or thesis is to consist of a research, development, or design project and must go beyond a literature search. The final steps in completing the honors project are a written and oral report. The written report is to be in the form of a technical paper with, for example, an abstract, introduction, methods section, results section, conclusions section, references, and figures. This report will be evaluated by the faculty supervisor and the chair of the A&EP Honors Committee. Following completion of the written report, an oral report is to be presented to an audience consisting of the faculty supervisor, the chair of the Honors Committee, and at least one other departmental faculty member, along with the other honors candidates. A copy of the final report is to be given to the chair of the A&EP Honors Committee. The final research project course grade will be assigned by the faculty supervisor after consultation with the chair of the Honors Committee. At least A- is required for successful completion of the honors requirement.

## ENVIRONMENTAL ENGINEERING

Offered jointly by the Department of Biological and Environmental Engineering and the School of Civil and Environmental Engineering.

Contact: 221 Hollister Hall, 255-3412, [www.cee.cornell.edu](http://www.cee.cornell.edu), or 207 Riley-Robb Hall, 255-2173, [www.hee.cornell.edu](http://www.hee.cornell.edu)

Environmental Engineering is the study and practice of analyzing, designing, and managing natural and engineered systems in ways consistent with the maintenance or enhancement of environmental quality and sustainability. It requires the ability to predict multiple interactions and impacts among natural and engineering-system components at various spatial and temporal scales in response to alternative design and management policies. It requires a thorough understanding of the interactions among the natural environment, the constructed environment, and human activities.

The School of Civil and Environmental Engineering and the Department of Biological and Environmental Engineering each offer a concentration in environmental engineering. With appropriate course selection, students taking these concentrations can double major in Environmental Engineering with minimal

additional course requirements (as defined in the BEE and CEE undergraduate handbooks).

The major requires a GPA  $\geq 2.0$  in engineering and science courses and at least a C- in ENGRD 251.

Students matriculating in the College of Engineering (COE) may affiliate with this major in their second year. Students matriculating in the College of Agriculture and Life Sciences (CALS) may enroll in this major in their first semester. Students planning to affiliate with this major will be taking the following courses:

### Mathematics-science requirements

MATH 191, 192, 293, 294

PHYS 112, 213

CHEM 211, 257

COM S 100 or BEE 151\* (computer programming)

### Introduction to engineering

ENGRI 113 Water Treatment Design (recommended), or

BEE 200\* The BEE Experience (required for students matriculating in CALS)

### Engineering distribution courses†

ENGRD 251 Engineering for a Sustainable Society 3

ENGRD 202, 241, or 221 are recommended (other good choices include ENGRD 201, or BIO G 101 and 103, BIO G 105, BIO G 107). 3-4

### Major-required courses

#### Major Courses Credits

BIO G 10X Introductory Biology\*\* (BIO G 101/103, 102/104 recommended; other good choices include BIO G 105, BIO G 107, or BIO G 109) 3-4

ENGRD 202 Mechanics of Solids\*\* 4

ENGRD 241 Engineering Computation\*\* 3

or

ENGRD 221 Thermodynamics\*\* 3

CEE 304 Uncertainty Analysis in Engineering\*\*\* 4

CEE 331 Fluid Mechanics 4

Earth Science (one from the following list): 3-4

CEE 341 Introduction to Geotechnical Engineering and Analysis

or

EAS 201 (ENGRD 201) Introduction to the Physics and Chemistry of the Earth\*\*

or

EAS 321 Introduction to Biogeochemistry

or

CSS 365 Environmental Chemistry: Soil, Air, and Water

or

BEE 371 Physical Hydrology for Ecosystems

CEE 351 Environmental Quality Engineering 3

CEE 451 Microbiology for Environmental Engineering†† 3

Laboratory Course (one from the following list):

CEE 453 Lab course Lab Research in Environmental Engineering 3

or

BEE 427 Water Sampling and Measurement

or

BEE 473 Watershed Engineering

or

CEE 437 Experimental Methods in Fluid Dynamics

BEE 475 Environmental Systems Analysis 3

Engineering Economics:

CEE 323 Engineering Economics and Management 3

or

BEE 489 Engineering Entrepreneurship, Management, and Ethics 4

### Electives

Technical communications course††† (ENGRD 335 or 350; COMM 260, 263, or 252 in liberal studies category; or BEE 493 taken with BEE 473 or BEE 450; or BEE 489) 3-4

Three Environmental design electives 9-credit minimum‡

Two major-approved electives to complete total credit requirement‡‡

Two approved electives 6

Total credits (minimum) 125

\*BEE 151 and 200 together satisfy the ENGRI requirement for CALS-matriculated first-year students. Students using BEE 200 to satisfy the ENGRI requirement must make up the 2-credit difference with engineering course work.

\*\*Students using this course as a second engineering distribution must take an additional major-approved elective. BIO G 109 is not an engineering distribution course.

\*\*\*ENGRD 270/OR&IE 270 (f,s,3) may be accepted (by petition) to substitute for CEE 304 if taken prior to affiliation with the Environmental Engineering major or if necessary because of scheduling conflicts caused by co-op or study abroad.

†Students must complete two ENGRD courses.

††Students planning graduate-level study in Environmental Engineering may take BIOMI 290 Introduction to Microbiology in place of CEE 451.

†††If the course fulfilling the technical writing requirement also fulfills another requirement (e.g., liberal studies, major-approved elective), then it may be used to satisfy both requirements.

‡To be chosen from a list of design courses. Students are encouraged to take CEE 452, CEE 454, or BEE 473.

‡‡The list of suggested courses covers the areas of environmental engineering, hydraulics/hydrology, environmental systems engineering, geotechnical engineering, remote sensing, air pollution, and renewable energy systems. The respective lists are available at the departmental offices.

## Environmental Engineering Honors Program

Students interested in pursuing an honors program should contact the undergraduate program director of Biological and Environmental Engineering or the associate director of Civil and Environmental Engineering for information on the program requirements.

## GEOLOGICAL SCIENCES (SCIENCE OF EARTH SYSTEMS)

Offered by the Department of Earth and Atmospheric Sciences

Contact: 2124 Snee Hall, 255-5466, [www.eas.cornell.edu](http://www.eas.cornell.edu)

We live on a planet with finite resources and a finite capacity to recover quickly from human-induced environmental stresses. Natural hazards such as earthquakes, hurricanes, and volcanic eruptions can alter the course of history with little prior warning. As the human population grows, understanding the earth and its resources becomes progressively more important to both future policymakers and ordinary citizens, who must find new sources of energy and sustain the quality of our environment. Because the human need to understand the earth is so pervasive and the earth system is so multifaceted, the major covers the spectrum of modern earth sciences, including the structure, composition, and evolution of our planet; the planetary processes producing weather and climate; and processes on and near the earth's surface where the interactions of water, life, rock, and air produce our planetary environment.

The major is built on a rigorous introduction to this broad spectrum plus a concentration chosen by the student to obtain expertise in an area of interest and relevance to the student's career plans.

The major prepares students for a number of career paths including further graduate study in geology, geophysics, geochemistry, biogeochemistry, atmospheric sciences, ocean sciences, hydrology, or environmental sciences and engineering. Career opportunities cover a wide range, including university research groups, governmental agencies and the private sector dealing with energy and mineral resources, natural hazards, weather and climate, ocean sciences, water, air and ground quality, and contamination. The major also prepares students for careers in environmental policy, law or medicine, science in the media, and K-12 science teaching.

### Requirements for the Major

The Geological Sciences major of the Engineering College has the same requirements as the Science of Earth Systems major in other Cornell undergraduate colleges. The Geological Sciences curriculum includes strong preparation in mathematics, physics, chemistry and biology. A second semester of chemistry (CHEM 208) is required with PHYS 214 optional. Two semesters of biology are required (either BIO G 101/103-102/104 or BIO G 109-110). A second semester of biology can be replaced by CHEM 257 Introduction to Organic Chemistry.

A required introductory course in earth science can be satisfied by either EAS 201 (ENGRD 201) or EAS 220. Only one of these courses should be taken.

The core courses emphasize the interconnectedness of the earth system, and are founded on the most modern views of the planet as an interactive and ever-changing system. Each crosses the traditional boundaries of disciplinary science. Three courses selected from the following four core courses are required for the major.

EAS 301 Evolution of the Earth System

EAS 303 Biogeochemistry

EAS 304 Interior of the Earth

EAS 305 Climate Dynamics

The concentration is achieved by completion of four intermediate to advanced-level courses (300 level and up) that build on the core courses and have prerequisites in the required basic sciences and mathematics courses. Note that additional basic math and science courses may be required to complete the concentration courses, depending upon the student's choice of concentration. The concentration courses build depth and provide the student with a specific expertise in some facet of Earth system science. Four defined areas of specialization include geology, biogeochemistry, atmospheric sciences, and ocean sciences. Students may also design other concentrations. Examples include planetary science, ecological systems, geohydrology, and soil science. The concentration should be chosen during the junior year or before in consultation with the student's advisor with approval required of the Director of Undergraduate Studies. For concentrations beyond the four first named, approval by the SES Curriculum Advisory and Oversight committee is needed.

Exposure to the basic observations of earth science, whether directly in the out-of-doors, or indirectly by the many advanced techniques of remote sensing of our planet, or in the laboratory, is necessary to understand fully the chosen area of concentration in the major. Three credits of appropriate course work are required. Possibilities include the following:

Courses in the Hawaii Environmental Semester Program; or

Courses given by the Shoals Marine Laboratory; or

EAS 250 Meteorological Observations and Instruments; or

EAS 352 Synoptic Meteorology I; or

EAS 417 Field Mapping in Argentina, plus one credit of EAS 491 or 492; or

EAS 437 Geophysical Field Methods; or

EAS 491 and/or EAS 492 Undergraduate Research with appropriate choice of project; or

Field course or courses taught by another college or university (e.g. Semester at Sea).

Students should discuss with their faculty advisor whether the fourth core course listed above or the course used to fulfill the observation/field requirement may also be used to satisfy the concentration.

For more information contact Professor Bryan Isacks, Department of Earth and Atmospheric

Sciences, [bli1@cornell.edu](mailto:bli1@cornell.edu), or visit [www.eas.cornell.edu](http://www.eas.cornell.edu).

### Field Study in Hawaii

Field study is a fundamental aspect of earth system science. Students wishing to increase their field experience may fulfill some of the requirements for the Geological Sciences major by off-campus study through the Cornell Earth and Environmental Semester program (EES). The EES program, offered during the spring semester, emphasizes field-based education and research. It is based on the island of Hawaii, an outstanding natural laboratory for earth and environmental sciences. Courses that may be applied to the Geological Sciences major include EAS 240, 322, and 351. The EES program also offers opportunities for internships with various academic, nonprofit, and government organizations. Typically, students participate in the EES program during their junior year, although exceptions are possible. For further information, see [www.geo.cornell.edu/geology/classes/hawaii/](http://www.geo.cornell.edu/geology/classes/hawaii/).

### Geological Sciences Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

1. Acceptance of the written proposal of the honors project by the faculty advisor and the director of undergraduate studies.
2. An honors thesis involving research (EAS 491-492 or 499, 2 or more credits each) of breadth, depth, and quality.

## INDEPENDENT MAJOR

Offered by the Independent Major Committee

Contact: Associate Dean for Undergraduate Programs, 167 Olin Hall, 255-8240

The independent major is designed for students whose educational objectives cannot be met by one of the regular majors. With the exception of certain faculty-sponsored programs, this major consists of an engineering primary area (32 credits) and an educationally related secondary area (16 credits). The primary area may be in any subject area offered by schools or departments of the college; the secondary area may be in a second engineering subject area or in a logically connected nonengineering area. The combination must form an engineering education in scope and substance and should include engineering design and synthesis as well as engineering sciences. Each program includes the normally required common-curriculum requirements and approved electives.

Students should apply to the independent major during the sophomore year. A student should seek assistance in developing a coherent program from professors in the proposed primary and secondary areas (an advisor in each area is required). The program must also be approved by the Independent Major Committee. If approved, the program is the curricular contract to which the student must adhere.

Because no single standardized curriculum exists, the independent major is not

accredited by ABET. Independent major students who intend to seek legal licensing as a Professional Engineer should be aware that this nonaccredited degree program will require additional education, work, and/or experience to qualify for eligibility to take the Fundamentals of Engineering examination and may affect acceptance into engineering graduate programs.

## INFORMATION SCIENCE, SYSTEMS, AND TECHNOLOGY

Offered jointly by the Department of Computer Science and the School of Operations Research and Industrial Engineering

Contact: 303 Upson Hall, 255-9837, [www.infosci.cornell.edu](http://www.infosci.cornell.edu), or 202 Rhodes Hall, 255-5088, [www.orie.cornell.edu](http://www.orie.cornell.edu)

Digital information technologies have become pervasive in science, engineering, manufacturing, business, finance, culture, law, and government, dramatically changing the way people work and live. The proliferation and significance of these new technologies demands a new focus in engineering education—one that remains rigorous and technically oriented but is simultaneously devoted to integrating engineering design, theory, and practice within the social and organizational contexts in which these complex digital information systems are employed.

The information science, systems, and technology (ISST) major studies the design and management of complex information systems. Just as structural engineers and nanofabricators use physics at radically different scales, so also there is a scale difference between the focus of the ISST major and the more traditional, look-under-the-hood majors in computer science and operations research and industrial engineering. Rather than focusing on the computing and communication technologies that underlie digital information systems, the ISST major emphasizes information systems engineering in broad application contexts, where issues at the confluence of information science, technology, and management are the primary concerns.

The ISST major has two options. The management science option educates students in methods for quantitative decision making and their application to information technology as well as the broader role that information technology plays in making these methods effective. Students in the information science option will obtain advanced training in methods for the creation, representation, organization, access, and analysis of information in digital form.

Note: Students may not double major in both COM S and ISST or OR&IE and ISST.

### Engineering distribution courses

Majors are required to take ENGRD 270 Basic Engineering Probability and Statistics as an engineering distribution course. ENGRD 211 Computers and Programming is required for the major and is recommended as the second engineering distribution course.

### Major program

<i>Core courses</i>	<i>Credits</i>
Probability, Statistics, and Optimization	
OR&IE 320 Optimization I	3
OR&IE 360 Engineering Probability and Statistics II	3
Information Systems	
INFO 230 Intermediate Design and Programming for the Web	3
OR&IE 311 Information Systems and Analysis	3
INFO 330 Data-Driven Web Applications	3
Economic, Organizational, and Social Context	
ECON 301 or 313 Microeconomics	3
One of:	
ILROB 170 Introduction to Micro-Organizational Behavior and Analysis	3
ILROB 175 Behavior, Values, and Performance	3
INFO 245 Psychology of Social Computing	3
ENGRC 335 Communications for Engineering Majors	3

### Requirements for the information science option:

1. Three courses from Information Systems (Area II below).
2. One course from Mathematical Modeling in IT (Area III).
3. Three electives, all from either Human-Centered Systems (Area V) or Social Systems (Area VI).
4. Two electives from any of the six areas (INFO 490 may be used to fulfill one of these electives).

### Requirements for the management science option:

1. Four courses from Mathematical Models in Management Science (Area I).
2. Three electives, one from each of
  - Information Systems (Area II)
  - Mathematical Modeling in IT (Area III)
  - Information Technology Management Solutions (Area IV)
3. Two electives from any of the six areas (INFO 490 may be used to fulfill one of these electives).

### Area I. Mathematical Models in Management Science

- OR&IE 350 Financial and Managerial Accounting
- OR&IE 361 Introductory Engineering Stochastic Processes I
- OR&IE 480 Information Technology
- OR&IE 580 Simulation Modeling and Analysis

### Area II. Information Systems

- COM S 419 Computer Networks
- INFO 430 Information Retrieval
- INFO 431 Web Information Systems
- COM S 432 Introduction to Database Systems

- COM S 465 Computer Graphics I
- COM S 472 Foundations of Artificial Intelligence
- COM S 474 Introduction to Natural Language Processing
- COM S 501 Software Engineering
- COM S 513 System Security
- INFO 530 Architecture of Large-Scale Information Systems
- COM S 578 Empirical Methods in Machine Learning and Data Mining

### Area III. Mathematical Modeling in IT

- INFO 372 Explorations in Artificial Intelligence
- OR&IE 431 Discrete Models
- OR&IE 464 Extreme Value Analysis with Applications to Finance and Data Communications
- OR&IE 474 Statistical Data Mining I
- COM S 478 Machine Learning
- OR&IE 483 Applications of Operations Research and Game Theory to IT
- ECE 562 Fundamental Information Theory
- OR&IE 574 Statistical Data Mining II

### Area IV. IT Management Solutions

- OR&IE 481 Delivering OR Solutions with Information Technology
- OR&IE 518 Supply Chain Management

### Area V. Human-Centered Systems

- PSYCH/COGST 342 Human Perceptions: Applications to Computer Graphics, Art, and Visual Display\*
- INFO 345 Human-Computer Interaction Design
- PSYCH 347 Psychology of Visual Communications
- PSYCH 380 Social Cognition\*
- PSYCH 413 Information Processing: Conscious and Unconscious
- PSYCH 416 Modeling Perception and Cognition\*
- INFO 440 Advanced Human-Computer Interaction Design
- INFO 445 Seminar in Computer-Mediated Communication
- INFO 450 Language and Technology
- DEA 470 Applied Ergonomic Methods

\*Students who take PSYCH 342 or 416 may also count their prerequisite, PSYCH 205 or 214. Students who take PSYCH 380 may also count PSYCH 280. At most one of these 200-level prerequisites can be counted.

### Area VI. Social Systems

- SOC 304 Social Networks and Social Processes
- AEM 322 Technology, Information, and Business Strategy\*
- INFO 349 Media Technologies
- INFO 355 Computers: From the 17th Century to the Dot.com Boom
- INFO 356 Computing Cultures
- ECON 368 Game Theory (formerly ECON 467)\*



INFO 387 The Automatic Lifestyle: Consumer Culture and Technology

LAW 410 Limits on and Protection of Creative Expressions—Copyright Law and Its Close Neighbors

S&TS 411 Knowledge, Technology, and Property

ECON 419 Economic Decisions Under Uncertainty

INFO 429 Copyright in the Digital Age

INFO 435 Seminar on Applications of Information Science

OR&IE 435 Introduction to Game Theory\*

S&TS 438 Minds, Machines, and Intelligence

INFO 447 Social and Economic Data

H ADM 474 Strategic Information Systems\*

ECON 476/477 Decision Theory I and II

H ADM 489 The Law of the Internet and E-Commerce

INFO 515 Culture, Law, and Politics of the Internet

\*Only one of ECON 368 and OR&IE 435 may be taken for ISST credit. Only one of AEM 322 and H ADM 474 may be taken for ISST credit.

### Information Science, Systems, and Technology Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

1. 4 credit hours of ISST course work at or above the 500 level (no S-U courses; no seminars or 2-credit courses)
2. 6 credit hours of INFO 490 independent study and research with an ISST faculty member, spread over at least two semesters, with at least A- each semester or  
3 credit hours of INFO 490 independent study and research with an ISST faculty member and 3 credit hours of INFO 491 teaching experience, both with grades of at least A-.

The ISST research is expected to result in a programming project or a written report (or both).

Any 500- or 600-level course taken to fulfill the honors requirements may not be counted toward fulfillment of the associated primary or secondary option requirements.

### Procedures

Each program must be approved by the appropriate co-director of the ISST major, and any changes to the student's program must also be approved.

## MATERIALS SCIENCE AND ENGINEERING

Offered by the Department of Materials Science and Engineering

Contact: 214 Bard Hall, 255-9159, [www.mse.cornell.edu](http://www.mse.cornell.edu)

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Prospective majors are required to take ENGRD 261 or 262 before affiliating with the major. It is highly recommended that the course be taken as an engineering distribution during the sophomore year.

The major program develops a comprehensive understanding of the physics and chemistry underlying the unique properties of modern engineering materials and processes.

Students are required to complete a series of electives to develop knowledge of materials, such as biomaterials, ceramics, polymers, and semiconductors. Application-related courses include the areas of biotechnology and life science, energy and environment, materials for information science, nanotechnology, and technology management and ethics. These requirements are satisfied through a series of technical electives taken mainly in the senior year, selected from various engineering and science departments. Optional research involvement courses provide undergraduates with the opportunity to work with faculty members and their research groups on current projects.

The major requirements for a B.S. degree in materials science and engineering are:

1. ENGRD 261 Mechanical Properties of Materials: From Nanodevices to Superstructures *or*  
ENGRD 262 Electronic Materials for the Information Age
2. 13 required major courses:  
MS&E 206 Atomic and Molecular Structure of Matter  
MS&E 261 or MS&E 262 (whichever was not taken as a distribution course)  
MS&E 301 Materials Chemistry  
MS&E 303 Thermodynamics of Condensed Systems  
MS&E 304 Kinetics, Diffusion, and Phase Transformations  
MS&E 305 Electronic, Magnetic, and Dielectric Properties of Materials  
MS&E 307 Materials Design Concepts I  
MS&E 311 Junior Lab I  
MS&E 312 Junior Lab II  
MS&E 402 Mechanical Properties of Materials, Processing, and Design  
MS&E 403/405 Senior Materials Lab I or Senior Thesis I  
MS&E 404/406 Senior Materials Lab II or Senior Thesis II  
MS&E 407 Materials Design Concepts II
3. Two materials-related electives covering two groups of different materials
4. Three application-related electives in at least two different types of applications

5. Two of the application-related electives must be taken from outside MS&E
6. One additional technical elective outside MS&E

### Materials Science and Engineering Honors Program

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

1. The 9 credits (giving a total of 140) of additional courses must be technical in nature, i.e., in engineering, math, chemistry, and physics at the 400 and graduate level, with selected courses at the 300 level. The courses must be approved by the major advisor.
2. Senior honors thesis (MS&E 405/406) with a grade of at least A.

## MECHANICAL ENGINEERING

Offered by the Sibley School of Mechanical and Aerospace Engineering

Contact: 108 Upson Hall, 255-3573, [maeug@cornell.edu](mailto:maeug@cornell.edu), [www.mae.cornell.edu](http://www.mae.cornell.edu)

This major is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

This major is designed to provide a broad background in the fundamentals of the discipline as well as to offer an introduction to the many professional and technical areas in which mechanical engineers work. The program covers both major streams of mechanical engineering.

(1) *Mechanical systems, design, and materials processing* is concerned with the design, analysis, testing, and manufacture of machinery, vehicles, devices, and systems. Other topics covered are computer-aided design, vibrations, control systems, and dynamics. Particular areas of concentration are mechanical systems and design, vehicle engineering, biomechanics, and engineering materials.

(2) *Engineering of fluids, energy, and heat-transfer systems* is concerned with the efficient conversion of energy, aerospace and surface transportation, the environmental impact of engineering activity (including pollutants and noise), aeronautics, and the experimental and theoretical aspects of fluid flow, heat transfer, thermodynamics, and combustion. Specific areas of concentration include aerospace engineering and thermo-fluids engineering.

During the fall semester, sophomores who plan to affiliate with the mechanical engineering major take ENGRD 202 (also T&AM 202) as an engineering distribution course. ENGRD 221/M&AE 221 is required for the major and is recommended as the second engineering distribution course. The Sibley School supports students who have unusual requirements, but delays or substitutions must be discussed with and receive approval from their major advisor.

The major requires 13 courses (beyond ENGRD 202 already mentioned) and five major-approved elective courses.

**Required courses**

M&AE 212 Mechanical Properties and Selection of Engineering Materials  
 ENGRD 221 Thermodynamics  
 M&AE 225 Mechanical Synthesis  
 ENGRD 203 Dynamics  
 M&AE 378 Mechatronics or ENGRD 210, Introduction to Electrical Circuits, Electrical and Computer Engineering, or PHYS 360, Electronic Circuits  
 M&AE 323 Introductory Fluid Mechanics  
 M&AE 324 Heat Transfer  
 M&AE 325 Analysis of Mechanical and Aerospace Structures  
 M&AE 326 System Dynamics  
 M&AE 327 Mechanical Property and Performance Laboratory  
 M&AE 427 Fluids/Heat Transfer Laboratory  
 M&AE 428 Seminar on Engineering Design  
 M&AE 429 Supervised Senior Design Experience

**Electives**

Students should use the flexibility provided by the major-approved electives, advisor-approved electives, and humanities, arts, and social sciences electives to develop a program to meet their specific goals.

**Major-approved electives**

The major includes five major-approved electives. At least three of these courses must be upper-level (300+) M&AE courses. Of these three, two must be a concentration of M&AE's upper-level courses providing depth in a specific subject area. Standard concentrations are shown below, but students may petition for approval of two other related courses to form a custom concentration.

The standard concentrations are:

Aerospace engineering, M&AE 305, 306, 415, 423, 506, 507

Biomechanics, M&AE 463, 464, 466, 565

Engineering materials, M&AE 312, 313, 455, 464, 470, 513

Mechanical systems and design, M&AE 378\*, 409, 415, 417, 470, 477, 478, 479, 514

Thermo-fluids engineering, M&AE 423, 449, 453, 501, 543

Vehicle engineering, M&AE 305, 306, 425, 449, 486, 506, 507

\*Students who took M&AE 378 as a required course (see above) may not use it again as a major-approved elective.

One major-approved elective must be a senior design elective involving M&AE 429 "Supervised Senior Design Experience". One way to satisfy this requirement is to take a 3+ credit section of M&AE 429, directed by a faculty member as a individual or team exercise. The other option is to take a senior design elective course (M&AE 400, 423, 425, 470, 479, or 489) along with the corresponding one-credit section of M&AE 429.

One of the major-approved electives must be an approved upper-level math course taken after MATH 294. The course must include some statistics. Currently, the approved

courses are T&AM 310, ENGRD 270, CEE 304, and ENGRD 241.

One of the major-approved electives, the "technical elective," may be any course at an appropriate level, chosen from engineering, math, or science (physics, chemistry, or biological sciences). Appropriate level is interpreted as being at a level beyond the required courses of the college curriculum. Courses in economics, business, and organizational behavior are not accepted. Advisors may approve such courses as advisor-approved electives. M&AE 498 may not be used as a major-approved elective.

**Advisor-approved electives**

To maximize flexibility (i.e., the option for study abroad, COOP, internships, pre-med, and flexibility during the upper-class years), the Sibley School faculty recommends that students delay use of advisor-approved (AA) electives until after the third semester. Students must seek advisor approval before taking an AA elective. Advanced placement credit may not count as an AA elective. Up to 6 credits of Reserve Officer Training Corps (ROTC) courses numbered 300 or above or co-listed in an academic department are allowed as AA electives. Students must document AA electives approved before M&AE affiliation within a month of registration as an M&AE student. The faculty encourages students to consider the following as possible AA electives:

- an engineering distribution course
- courses stressing oral or written communications
- courses stressing the history of technology
- rigorous courses in the physical sciences (physics, biology, chemistry)
- courses in information science (mathematics, computer science)
- courses in methodologies (modeling, problem solving, synthesis, design)
- courses in technology (equipment, machinery, instruments, devices, processes)
- courses in business enterprise operations (e.g., economics, financial, legal)
- courses in organizational behavior
- courses in cognitive sciences

**Other considerations**

It is recommended that humanities, arts, and social sciences electives include studies in:

- history of technology
- societal impacts of technology
- history
- foreign languages
- ethics
- communications
- political science
- aesthetics
- economics
- architecture

The Sibley School encourages its students to spend a junior year abroad at foreign universities with which the college has an exchange agreement, such as the Ecole Centrale de Paris.

The technical-writing requirement of the common curriculum is satisfied by M&AE 427.

A limited set of third-year courses is offered each summer under the auspices of the Engineering Cooperative Program.

**Preparation in Aerospace Engineering**

There is no separate undergraduate accredited program in aerospace engineering, but students may prepare for a career or graduate program in this area by majoring in mechanical engineering and taking courses from the aerospace engineering concentration, for example spacecraft engineering, introduction to aeronautics, and aerospace propulsion systems. It is also possible to prepare for a career or graduate program in aerospace engineering through appropriate course selection in other majors, for example: electrical and computer engineering, engineering physics, or the physical sciences. Other subjects recommended as preparation for aerospace engineering endeavors include thermodynamics, fluid mechanics, structures, vibrations, feedback controls, applied mathematics, chemistry, and physics.

**OPERATIONS RESEARCH AND ENGINEERING**

Offered by the School of Operations Research and Industrial Engineering

Contact: 203 Rhodes Hall, 255-5088, [www.orie.cornell.edu](http://www.orie.cornell.edu)

This major provides a broad education in the techniques and modeling concepts needed to analyze and design complex systems and an introduction to the technical and professional areas of operations research and industrial engineering. The major prepares students for a wide range of careers including operations research, industrial engineering, entrepreneurship, information technology, operations management, consulting, financial engineering, financial services, and management.

The foundation of the major is the development of basic skills in calculus, statistics, probability, mathematical optimization, and computer science. Required courses in manufacturing systems, cost accounting, and simulation build on these skills and provide engineering design experiences. In the senior year the curriculum is quite flexible. Students take OR&IE electives to broaden and deepen their expertise in applied probability and statistics, industrial systems, optimization, information technology, or financial engineering.

Because of the wide range of career goals among ORE students, the major is designed with a minimum of required courses and a large number of required electives. Students should consult with their major advisors to select electives that best meet their future goals.

Exceptional students interested in pursuing graduate studies are encouraged to speak with their faculty advisors concerning an accelerated program of study.

A student who intends to affiliate with the major in operations research and engineering should take ENGRD 270 Basic Engineering Probability and Statistics after completing MATH 192; MATH 294 should be completed

before or concurrently with ENGRD 270. ORE affiliates are required to complete MATH 191, 192, and 294 (or their subject matter equivalents.) Either MATH 293, COM S 280, or MATH 304 can be used to satisfy the fourth-semester mathematics requirement. Students should discuss with their advisors which of these three courses is most appropriate to their future program of study in ORE. The following considerations should be borne in mind.

1. MATH 293 (differential equations) is essential for advanced study in financial engineering. Also, MATH 293 is a prerequisite for PHYS 214, thus students who do not take MATH 293 must plan to take CHEM 208.
2. COM S 280 provides an introduction to discrete structures and algorithms of broad applicability in the field of operations research, particularly for fundamental models in the areas of optimization, production scheduling, inventory management, and information technology; it is also a prerequisite for certain upper-class Computer Science courses in the areas of information technology and algorithmic analysis.
3. MATH 304 covers fundamentals of formal proof techniques; this material is strongly recommended for students who intend advanced (PhD-level) study in Operations Research or a related field.

Early consultation with a faculty member or the associate director for undergraduate studies can be helpful in making appropriate choices.

The required courses for the ORE major and the typical terms in which they are taken are as follows:

<i>Semester 2 or 3</i>	<i>Credits</i>
ENGRD 211 Computers and Programming	3
ENGRD 270 Basic Engineering Probability and Statistics	3
<i>Semester 4</i>	
OR&IE 312 Industrial Data and Systems Analysis*	4
<i>Semester 5</i>	
OR&IE 320 Optimization I	4
OR&IE 360 Engineering Probability and Statistics II	4
Behavioral Science (Organizational Behavior)†	3
Humanities/social sciences elective	3
Major-approved elective	3
<i>Semester 6</i>	
OR&IE 350 Financial and Managerial Accounting (may be taken in semester 4)	
OR&IE 321 Optimization II	4
OR&IE 361 Introductory Engineering Stochastic Processes I	4
Advisor-approved elective	3
Humanities/social sciences elective	3

\*It is highly recommended that OR&IE 312 be taken in semester 4. If the student's schedule does not permit this, the course may be taken in semester 6 or 8.

†The behavioral science requirement can be satisfied by any of several courses, including the Johnson Graduate School of Management (JGSM) course NCC 554 (offered only in the fall), which is recommended for those contemplating the pursuit of a graduate business degree, ILROB 170, 171, and 175, H ADM 115, ENGRC 335 (which also satisfies the technical writing requirement), and others.

The basic senior-year program, from which individualized programs are developed, consists of the following courses:

#### *Minimum credits*

OR&IE 580 Simulation Modeling and Analysis	4
Three upper-class OR&IE electives as described below	9
Two major-approved electives (at least 3 credits must be outside OR&IE)	6
Two humanities/social sciences electives	6
One advisor-approved elective	3
Available OR&IE electives are as follows:	
Manufacturing and distribution systems: OR&IE 416, 451, 480, 481, 483, 518, 525, and 562 and JGSM NBA 641	
Optimization methods: OR&IE 431, 432, 434, 435, 436, and 533	
Applied probability and statistics: OR&IE 462, 464, 474, 476 (2 credits), 561, 563, 574, 575 (2 credits), 576 (2 credits), and 577	
Financial engineering: OR&IE 473, 567, 568, and 569	

### **Academic Standing**

The student in the major should obtain a passing grade in every course; at least C- in ENGRD 211 and 270, OR&IE 312, 320, 321, 350, 360, 361 and 580; a GPA of 2.0 each semester; a GPA of 2.0 for ORE major courses; and satisfactory progress toward completion of the degree requirements. Each student's performance is reviewed at the conclusion of each semester.

If at least C- is not earned in a required course, the course must be repeated within one year before the next course in the sequence may be taken (OR&IE 321 and 361, in particular). Failure to achieve at least C- in the second attempt will generally result in withdrawal from the major.

### **Operations Research and Engineering Honors Program**

The B.S. degree with honors is granted to engineering students who satisfy the requirements given at the beginning of the section "Engineering Majors" as well as the following requirements.

The 9 additional credits of course work shall be from one or more of the following, with at least 4 credits in the first category:

1. Advanced courses in OR&IE at the 500 level or above.
2. A significant research experience or honors project under the direct supervision of an OR&IE faculty member using OR&IE 499 OR&IE Project. A significant written report must be submitted as part of this component.
3. A significant teaching experience under the direct supervision of a faculty member

in OR&IE using OR&IE 490 Teaching in OR&IE or ENGRG 470 Undergraduate Engineering Teaching.

### **Procedures**

Each program must be approved by the associate director of undergraduate studies, and any changes to a program must be approved by the associate director.

## **ENGINEERING MINORS AND OPTIONS**

The engineering minor is a supplement to the B.S. degree majors in the college, including the independent major. It recognizes formal study of a particular subject area in engineering normally outside the major. Students undertaking a minor are expected to complete the requirements during the time of their continuous undergraduate enrollment at Cornell. Completing the requirements for an engineering minor (along with a major) may require more than the traditional eight semesters at Cornell. In many cases, however, courses that fulfill minor requirements may also satisfy other degree requirements (e.g., distribution courses, advisor-approved, or major-approved electives), and completion within eight semesters is possible.

An engineering minor or option requires:

- successful completion of all requirements for a B.S. degree in engineering.
- enrollment in an engineering major that approves participation in the minor or option.
- satisfactory completion of six courses (at least 18 credits) in a college-approved minor (or four courses and a seminar (at least 13 credits) in the option).

Students may apply for certification of an engineering minor at any time after the required course work has been completed in accordance with published standards. An official notation of certification of a minor or option appears on the Cornell transcript following graduation.

The College of Engineering offers minors and one option in the following areas (offering units are indicated in parentheses):

Applied Mathematics (T&M)

Biological Engineering (BEE)

Bioengineering Option (Bioengineering Program)

Biomedical Engineering (BME)

Civil Infrastructure (CEE)

Computer Science (COM S)

Electrical and Computer Engineering (ECE)

Engineering Management (CEE)

Engineering Statistics (OR&IE)

Environmental Engineering (BEE/CEE)

Geological Sciences (EAS)

Game Design (COM S)

Industrial Systems and Information Technology (OR&IE)

Information Science (INFO)

Materials Science and Engineering (MS&E)

Mechanical Engineering (M&AE)

Operations Research and Management Science (OR&IE)

Additional information on specific minors can be found below, in the *Engineering Undergraduate Handbook*, in the undergraduate major office of the department or school offering the minor or option, and in Engineering Advising.

## MINOR: APPLIED MATHEMATICS

Offered by the Department of Theoretical and Applied Mechanics

Contact: Richard Rand, 207 Kimball Hall, 255-7145, rhr2@cornell.edu, www.tam.cornell.edu/Undergrad.html

All engineering undergraduates are eligible to participate in this minor.

**Academic standards:** At least C in each course in the minor.

### Requirements

At least six courses beyond MATH 294, to be chosen as follows:

- a. At most one course from any one of the groups 1, 2, 3, or 4.
  - b. At least three courses from groups 5 and 6.
  - c. At most one 200-level course.
  - d. At most one course that is offered by the student's major department.
1. Analysis
    - T&AM 310 Introduction to Applied Mathematics I
    - MATH 321 Manifolds and Differential Forms
    - MATH 420 Differential Equations and Dynamical Systems
    - A&EP 321 Mathematical Physics I
  2. Computational Methods
    - ENGRD 322 Introduction to Scientific Computation
    - ENGRD 241 Engineering Computation
    - OR&IE 320 Optimization I
    - BEE 449 Computational Tools for Engineers
    - COM S 421 Numerical Analysis
  3. Probability and Statistics
    - ENGRD 270 Basic Engineering Probability and Statistics
    - OR&IE 360 Engineering Probability and Statistics II
    - ECE 310 Introduction to Probability and Random Signals
    - CEE 304 Uncertainty Analysis in Engineering
    - MATH 471 Basic Probability
  4. Applications
    - A&EP 333 Mechanics of Particles and Solid Bodies
    - CHEME 323 Fluid Mechanics
    - CEE 331 Fluid Mechanics
    - CEE 371 Modeling of Structural Systems
    - COM S 280 Discrete Structures

ECE 425 Digital Signal Processing

MS&E 303 Thermodynamics of Condensed Systems

M&AE 323 Introductory Fluid Mechanics

### 5. Advanced courses

Only one of these three may be chosen:

T&AM 311 Introduction to Applied Mathematics II

MATH 422 Applied Complex Analysis

A&EP 322 Mathematical Physics II

Only one of the following two may be chosen:

ECE 411 Random Signals in Communications and Signal Processing

OR&IE 361 Introductory Engineering Stochastic Processes I

Only one of the following two may be chosen:

COM S 381 Introduction to Theory of Computing

COM S 481 Introduction to Theory of Computing

Only one of the following two may be chosen:

M&AE 571 Applied Dynamics

T&AM 570 Intermediate Dynamics

Also, you may choose from:

COM S 482 Introduction to the Design of Algorithms

OR&IE 321 Optimization II

OR&IE 431 Discrete Models

OR&IE 435 Introduction to Game Theory

OR&IE 462 Introductory Engineering Stochastic Processes II

T&AM 578 Nonlinear Dynamics and Chaos

T&AM 610 Methods of Applied Mathematics I

T&AM 611 Methods of Applied Mathematics II

### 6. Mathematics courses

Any 300+ level course offered by the Mathematics Department in algebra, analysis, probability/statistics, geometry, or logic, with the following exceptions:

- a. MATH 323 or 420, if any course from group 1 is chosen
- b. MATH 471, if any course from group 3 is chosen
- c. MATH 422, if T&AM 311 or A&EP 322 is chosen from group 5
- d. Only one of the following may be chosen:

MATH 332 Algebra and Number Theory

MATH 335 Introduction to Cryptology

MATH 336 Applicable Algebra

## MINOR: BIOLOGICAL ENGINEERING

Offered by the Department of Biological and Environmental Engineering

Contact: 207 Riley-Robb Hall, 255-2173, www.bee.cornell.edu

Students in all majors except biological engineering may participate. Students should meet with the BE coordinator as soon as they decide to pursue the minor and before their senior year. They will work with a BEE faculty advisor, who will assist them in completing their minor.

### Educational objectives of the minor:

Biological engineering is the application of engineering to living systems. Examples of engineering efforts in this field include the development of new biosensor technologies, study and control of biologically based matter transformation systems, and development of engineered devices to study and regulate fundamental biological processes. The biological engineering minor is an opportunity for students to further their understanding of living systems and to increase their knowledge of the basic transport processes that occur within these systems. Courses in the minor provide opportunities to analyze and manipulate living systems at the molecular, cellular, and system levels.

**Academic standards:** At least C- in each course in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), as follows:

BEE 350 Biological and Environmental Transport Processes (3 credits): required

### 1. Analysis: Two (2) of these:

MS&E 304 Kinetics, Diffusion, and Phase Transformations (3 credits)

CHEME 313 Chemical Engineering Thermodynamics (3 credits)

CHEME 390 Reaction Kinetics and Reactor Design (3 credits)

CEE 437 Experimental Methods in Fluid Dynamics (3 credits)

### 2. Application: Two (2) of these:

BEE 450 Bioinstrumentation (4 credits)

BEE/M&AE 453 Computer-Aided Engineering Applications to Biomedical Processes (3 credits)

BEE 454 Physiological Engineering (3 credits)

BEE 459 Biosensors and Bioanalytical Techniques (3 credits)

BEE 655 Thermodynamics and Its Applications (3 credits)

CHEME 543 Bioprocess Engineering (3 credits)

### 3. Basic Sciences: One (1) of these:

BIOBM 233 Introduction to Biomolecular Structure (3 credits)

BIOBI 290 General Microbiology (3 credits)

BIOBM 330-333 Principles of Biochemistry (2-4 credits)

BIOBM 434 Applications of Molecular Biology (3 credits)

BIONB 470 Biophysical Methods (3 credits)

## OPTION: BIOENGINEERING

Offered by the Bioengineering Program

Contact: 270 Olin Hall, 255-7577

Students in all majors, except biological engineering, may participate. Students may participate in only one of the following: bioengineering option, biological engineering minor, or biomedical engineering minor.

The purpose of the option is to provide students with a guided, coherent, individualized plan of exploration in bioengineering. Bioengineering consists of subjects that fall at the interface between engineering and life science. It involves bioprocesses, bioenvironmental engineering, biomedical devices, biomaterials, biomolecular engineering, systems biology, and more.

Students are asked to enroll after affiliation and before the beginning of the sixth semester. Enrollment requires selecting a bioengineering advisor (in addition to the major advisor), who will help select appropriate bioengineering-related courses and provide advice on careers in bioengineering.

**Academic standards:** S in the bioengineering seminar and at least C- in the other courses and a 2.0 GPA in all bioengineering courses.

### Requirements

At least 12 credit hours consisting of two to three bioengineering courses, one to two biological sciences courses, and 1 credit of BME 501 Bioengineering Seminar. A list of approved courses can be found in 167 Olin Hall.

## MINOR: BIOMEDICAL ENGINEERING

Offered by the Department of Biomedical Engineering (BME)

Contact: Carol Casler, 120 Olin Hall, 255-1489, [www.bme.cornell.edu/academics/undergraduate/biomedminor.cfm](http://www.bme.cornell.edu/academics/undergraduate/biomedminor.cfm)

All undergraduates in the College of Engineering, College of Arts and Sciences, and College of Agriculture and Life Sciences are eligible to participate in this minor. Students may participate in only one of these areas of interest: the bioengineering option, the biological engineering minor, or the biomedical engineering minor.

**Educational Objectives:** Biomedical engineering is the application of engineering principles and methods to a wide array of problems associated with human health. The field includes the design of biocompatible materials, prostheses, surgical implants, artificial organs, controlled drug-delivery systems, and wound closure devices. Diagnosing diseases and determining their biological origins depend upon increasingly sophisticated instrumentation and the use of mathematical models. This minor allows students to gain exposure to the breadth and depth of biomedical engineering offerings at Cornell, to prepare for advanced studies in biomedical engineering, and to obtain transcript recognition for their interest and capability in biomedical engineering.

Students are asked to complete a form declaring their interest in the minor with the biomedical engineering undergraduate minor coordinator in 120 Olin Hall. On the form you will be asked to choose a BME faculty advisor that you can consult about the BME minor plan.

**Academic standards:** At least C- in each course in the minor. A cumulative GPA  $\geq 2.0$  for all courses in the minor.

### Requirements

The 1-credit Bioengineering Seminar as well as at least six courses ( $\geq 18$  credits) from the five categories listed below; two courses need to be in categories 1. Introductory biology and/or 2. Advanced biology with no more than one course from category 1. Four courses must come from the following categories: 3. Molecular and cellular biological engineering, 4. Biomedical engineering analysis of physiological systems, and 5. Biomedical engineering applications with courses from at least two of these categories. At least four of the six courses must not be specifically required major degree courses or cross-listings.

Required course: BME 501/BEE 501 Bioengineering Seminar (1 credit, 1 semester)

#### Category 1. Introductory biology (maximum of 4 credits and one course toward the BME minor)

- A 5 on AP biology exam
- A 4 on AP biology exam and ENGRI 131
- A 4 on AP biology exam and BIO G 103 or BIO G 104
- BIO G 101, 102, 103, and 104 Biological Sciences
- BIO G 105 and 106 Introductory Biology
- BIO G 107 and 108 General Biology
- BIO G 110 and ENGRI 131 Biological Principles and Introduction to Biomedical Engineering

#### Category 2. Advanced biology

- BIOAP 311/VTBMS 356 Introductory Animal Physiology Lectures
- BIOBM 330 Principles of Biochemistry, Individualized Instruction
- BIOBM 331 Principles of Biochemistry, Proteins and Metabolism
- BIOBM 332 Principles of Biochemistry, Molecular Biology
- BIOBM 333 Principles of Biochemistry, Proteins, Metabolism, and Molecular Biology
- BIOGD 281 Genetics
- BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology
- BIOMI 290 General Microbiology Lectures

#### Category 3. Molecular and cellular biomedical engineering

- A&EP 252/ENGRD 252 The Physics of Life
- BEE 360/BME 360 Molecular and Cellular Bioengineering
- BME 301/CHEME 401\* Molecular Principles of Biomedical Engineering
- BME 302/CHEME 402\* Cellular Principles of Biomedical Engineering

#### Category 4. BME analysis of physiological systems

- BEE 454 Physiological Engineering
- BIONB 330/BME 330/COGST 330/PSYCH 330 Introduction to Computational Neuroscience

BIONB 491/BME 491 Principles of Neurophysiology

BME 401/M&AE 466\* Biomedical Engineering of Metabolic and Structural Systems

BME 402\* Electrical and Chemical Physiology

CHEME 481/BME 481 Biomedical Engineering

M&AE 463/BME 463 Neuromuscular Biomechanics

M&AE 464/BME 464 Orthopaedic Tissue Mechanics

#### Category 5. Biomedical engineering applications

- A&EP 470/BIONB 470/BME 570 Biophysical Methods
- BEE 365 Properties of Biological Materials
- BEE 450 Bioinstrumentation
- BEE 453/M&AE 453 Computer-Aided Engineering: Applications to Biomedical Processes
- BEE 459 Biosensors and Bioanalytical Techniques
- BEE 494 Fundamentals of Tissue Engineering
- BIONB 440/BME 440 Electronics in Neurobiology
- BIONB 441/BME 441 Computers in Neurobiology
- COM S 321/BIOBM 321/ENGRD 321 Numerical Methods in Computational Molecular Biology
- ECE 402/BME 404 Biomedical System Design
- ECE 578 Computer Analysis of Biomedical Images
- M&AE 565/BME 565 Biomechanical Systems—Analysis and Design
- MS&E 461 Biological Materials and Their Applications
- MS&E 541/ECE 336 Nanofabrication
- TXA 439/BME 539 Biomedical Materials and Devices for Human Body Repair

\* Students interested in professional practice as biomedical engineers should consider an M.Eng. degree in BME. The recommended sequence for admission is as follows: two courses from categories 1 and 2, BME 301, 302, 401, and 402. The program requires students to have a knowledge of molecular and cellular biomedical engineering, and of biomedical engineering analysis of physiological systems.

## MINOR: CIVIL INFRASTRUCTURE

Offered by the School of Civil and Environmental Engineering

Contact: 221 Hollister Hall, 255-3412, [www.cee.cornell.edu](http://www.cee.cornell.edu)

Students affiliated with all majors except civil engineering are eligible to participate in this minor.

The minor in civil infrastructure is intended to introduce engineering undergraduates to the engineering methodologies of mechanics,



materials, analysis, design, and construction and to show how these are used in solving problems in the development, maintenance, and operation of the built environment that is vital for any modern economy.

**Academic standards:** At least C in each course in the minor

#### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

1. Required course: ENGRD 202 Mechanics of Solids
2. Additional courses: choose any five (groupings are for information only)\*

#### Geotechnical engineering

CEE 341 Introduction to Geotechnical Engineering  
CEE 440 Foundation Engineering  
CEE 441 Retaining Structures and Slopes  
CEE 444 Environmental Site and Remediation Engineering

#### Structural engineering

CEE 371 Structural Modeling and Behavior  
CEE 372 Inelastic and Nonlinear Behavior of Materials and Structures  
CEE 471 Fundamentals of Structural Mechanics  
CEE 472 Finite Element Analysis of Solids and Structures  
CEE 473 Design of Concrete Structures  
CEE 474 Design of Steel Structures  
CEE 478 Structural Dynamics and Earthquake Engineering

#### Other related courses

CEE 595 Construction Planning and Operations

\*Other CEE courses may be approved by petition in advance

### MINOR: COMPUTER SCIENCE

Offered by the Department of Computer Science

Contact: 303 Upson Hall, 255-9220, [www.cs.cornell.edu](http://www.cs.cornell.edu)

Students affiliated with all engineering majors except Computer Science are eligible to participate in this minor. This minor is for students who anticipate that computer science will play a prominent role in their academic and professional career.

**Academic standards:** At least C in each course in the minor.

#### Requirements

At least six courses (18 credits) chosen as follows:

1. Required courses  
COM S/ENGRD 211 Computers and Programming  
One of the following:  
COM S 321 Numerical Methods in Computational Molecular Biology,  
COM S/ENGRD 322 Introduction to Scientific Computing,

COM S 421 Numerical Analysis, or

COM S 428 Introduction to Computational Biophysics.

COM S/ECE 314 Computer Organization, or

COM S 316 Systems Programming

#### 2. Additional courses

Three COM S courses numbered 280 or higher (excluding seminars and COM S 490).

Computing courses offered by other departments cannot be applied toward the computer science minor, with the exception of ECE 314. All qualifying courses should be taken at Cornell for a letter grade. No substitutions allowed.

### MINOR: ELECTRICAL AND COMPUTER ENGINEERING

Offered by the School of Electrical and Computer Engineering

Contact: 223 Phillips Hall, 255-4309, [www.ece.cornell.edu](http://www.ece.cornell.edu)

Students affiliated with all majors except Electrical and Computer Engineering are eligible to participate in this minor, but MS&E students must receive prior written approval from both MS&E and ECE, via petition.

This minor offers the opportunity to study analog and digital circuits, signals and systems, and electromagnetics and to concentrate at higher levels in one of several different areas such as circuit design, electronic devices, communications, computer engineering, networks, and space engineering.

**Academic standards:** At least C- in each course in the minor. GPA  $\geq 2.3$  for all courses in the minor.

#### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

1. Two of the following:  
ECE/ENGRD 210 Introduction to Circuits for Electrical and Computer Engineers  
ECE 220 Signals and Information  
ENGRD 230 Introduction to Digital Logic Design
2. Two of the following:  
ECE 303 Electromagnetic Fields and Waves  
ECE/COM S 314 Computer Organization  
ECE 315 Introduction to Microelectronics  
ECE 320 Networks and Systems
3. One other ECE course at the 300 level or above (3-credit minimum)
4. One other ECE course at the 400 level or above (3-credit minimum)

### MINOR: ENGINEERING MANAGEMENT

Offered by the School of Civil and Environmental Engineering

Contact: 221 Hollister Hall, 255-3412, [www.cee.cornell.edu](http://www.cee.cornell.edu)

Students affiliated with all majors are eligible to participate in this minor. CEE students may not use courses simultaneously to satisfy a requirement for the minor and as a major-approved elective or design elective.

This minor focuses on giving engineering students a basic understanding of engineering economics, accounting, statistics, project management methods, and analysis tools necessary to manage technical operations and projects effectively. The minor provides an important set of collateral skills for students in any engineering discipline.

**Academic standards:** At least C in each course in the minor.

#### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

1. Required courses (3):  
CEE 323 Engineering Economics and Management  
or OR&IE 451 Economic Analysis of Engineering Systems  
OR&IE 350 Financial and Managerial Accounting<sup>1</sup>  
CEE 304 Uncertainty Analysis in Engineering<sup>2</sup>  
or ENGRD 270 Basic Engineering Probability and Statistics  
or ECE 310 Introduction to Probability and Random Signals
2. Additional courses—choose any three<sup>3</sup>  
CEE 406 Civil Infrastructure Systems  
CEE 492 Engineers for a Sustainable World: Engineering in International Development  
CEE 593 Engineering Management Methods: Data, Information, and Modeling<sup>4</sup>  
CEE 594 Economic Methods for Engineering and Management<sup>4</sup>  
CEE 595 Construction Planning and Operations  
CEE 596 Management Issues in Forensic Engineering  
CEE 597 Risk Analysis and Management  
CEE 598 Introduction to Decision Analysis  
NBA 507 Entrepreneurship for Scientists and Engineers  
or M&AE/ENGRG 461/OR&IE 452 Entrepreneurship for Engineers  
or BEE 489 Engineering Entrepreneurship, Management and Ethics

<sup>1</sup>OR&IE students must substitute NCC 556 or NBA 500 for OR&IE 350

<sup>2</sup>T&AM 310 cannot be substituted for CEE 304

<sup>3</sup>Other courses approved by petition in advance

<sup>4</sup>This course is not accepted for OR&IE students

## MINOR: ENGINEERING STATISTICS

Offered by the School of Operations Research and Industrial Engineering

Contact: 203 Rhodes Hall, 255-5088, [www.orie.cornell.edu](http://www.orie.cornell.edu)

Students affiliated with all majors except Operations Research and Engineering are eligible to participate in this minor.

The goal of the minor is to provide the student with a firm understanding of statistical principles and engineering applications and the ability to apply this knowledge in real-world situations.

**Academic standards:** At least C- in each course in the minor. GPA  $\geq 2.0$  for all courses in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

#### 1. Required courses:

ENGRD 270 Basic Engineering Probability and Statistics

OR&IE 360 Basic Engineering Probability and Statistics II or ECE 310 Introduction to Probability and Random Signals

#### 2. Four of these ( $\geq 11$ credits)\*:

OR&IE 361 Introductory Engineering Stochastic Processes I or ECE 411 Random Signals in Communications/Signal Processing

OR&IE 476 Applied Linear Statistical Models

OR&IE 576 Regression

OR&IE 563 Applied Time Series Analysis

OR&IE 575 Experimental Design

OR&IE 577 Quality Control

OR&IE 580 Simulation Modeling and Analysis

MATH 472 Basic Probability or BTRY 409 Theory of Statistics

BTRY 602 Statistical Methods II

BTRY 603 Statistical Methods III or ILRST 411 Statistical Analysis of Qualitative Data

ILRST 310 Statistical Sampling

ILRST 314 Graphical Methods for Data Analysis

ILRST 410 Techniques of Multivariate Analysis

\*Other course options approved by petition in advance. Some of these courses require others as prerequisites. All these courses are cross-listed under the Department of Statistical Science.

## MINOR: ENVIRONMENTAL ENGINEERING

Offered jointly by the Department of Biological and Environmental Engineering and the School of Civil and Environmental Engineering

Contact: 207 Riley-Robb Hall, 255-2173, [www.bee.cornell.edu](http://www.bee.cornell.edu), or 221 Hollister Hall, 255-3412, [www.cee.cornell.edu](http://www.cee.cornell.edu)

Students affiliated with all majors except environmental engineering are eligible to participate in this minor. Students majoring in biological engineering or civil engineering are eligible if they are not following the environmental concentration offered by those majors. Eligible civil engineering majors may not use courses simultaneously to satisfy a requirement for the minor and as a major-approved elective or design elective.

A fundamental challenge for the engineering profession is development of a sustainable society and environmentally responsible industry and agriculture reflecting an integration of economic and environmental objectives. We are called upon to be trustees and managers of our nation's resources, the air in our cities, and water in our aquifers, streams, estuaries, and coastal areas. This minor encourages engineering students to learn about the scientific, engineering, and economic foundations of environmental engineering so that they are better able to address environmental management issues.

**Academic standards:** At least C- in each course in the minor. GPA  $\geq 2.0$  for all courses in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen from the following groups, with at least one course from each group.

#### Group A. Environmental engineering processes:

BEE 251 Engineering for a Sustainable Society

CEE 351 Environmental Quality Engineering

CEE 451 Microbiology for Environmental Engineering

CEE 452 Water Supply Engineering

CEE 453 Laboratory Research in Environmental Engineering

CEE 454 Sustainable Small-Scale Water Supplies

CEE 455 Sustainable Water Supply Project

BEE 476 Solid Waste Engineering

BEE 478 Ecological Engineering

CEE 444 Environmental Site and Remediation Engineering

CEE 492 Engineers for a Sustainable World

BEE 651 Bioremediation

CEE 653 Water Chemistry for Environmental Engineering

CEE 656 Physical/Chemical Process

CEE 657 Biological Processes

CEE 658 Microbial Biodegradation and Biocatalysis Lab

#### Group B. Environmental systems

ENGRD/CEE 113\* Water Treatment Design (\*may count only if taken before the junior year)

BEE 475 Environmental Systems Analysis

CEE 597 Risk Analysis and Management

CEE 623 Environmental Quality Systems Engineering

#### Group C. Hydraulics, hydrology, and environmental fluid mechanics

CEE 331 Fluid Mechanics (CHEME 323 or M&AE 323 may be substituted for CEE 331)

CEE 332 Hydraulic Engineering

BEE 371 Physical Hydrology for Ecosystems

BEE 471 Introduction to Groundwater

CEE 432 Hydrology

CEE 436 Case Studies in Environmental Fluid Mechanics

CEE 437 Experimental Methods in Fluid Dynamics

BEE 473 Watershed Engineering

BEE 474 Water and Landscape Engineering Applications

CEE 631 Computational Simulation of Transport in the Environment

CEE 633 Flow in Porous Media and Groundwater

CEE 655 Transport, Mixing, and Transformation in the Environment

BEE 671 Analysis of the Flow of Water and Chemicals in Soils

BEE 672 Drainage

## MINOR: GAME DESIGN

Offered by the Department of Computer Science

See: [www.cs.cornell.edu](http://www.cs.cornell.edu)

## MINOR: GEOLOGICAL SCIENCES

Offered by the Department of Earth and Atmospheric Sciences

Contact: 2124 Snee Hall, 255-5466, [www.eas.cornell.edu](http://www.eas.cornell.edu)

Students affiliated with all majors except geological sciences are eligible to participate.

Some of the major problems facing mankind in this century involve earth science, especially the generation of new energy sources for a growing world population, and engineers will be challenged to solve these problems. This minor will prepare engineering students to understand the natural operating systems of Earth and the tools and techniques used by earth scientists to understand and monitor these solid and fluid systems.

**Academic standards:** At least C- in each course in the minor. GPA  $\geq 2.0$  for all courses in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

#### 1. One of these courses:

ENGRD 201 Introduction to the Physics and Chemistry of the Earth

EAS 220 The Earth System

#### 2. At least two of these courses:

EAS 301 Evolution of the Earth System

EAS 303 Introduction to Biogeochemistry

EAS 304 Interior of the Earth

EAS 305 Climate Dynamics

#### 3. Additional EAS courses at the 300 level or higher. These may include, e.g., additional courses from the above lists,

undergraduate research courses, and outdoor field courses.

## MINOR: INDUSTRIAL SYSTEMS AND INFORMATION TECHNOLOGY

Offered by the School of Operations and Industrial Engineering

Contact: 203 Rhodes Hall, 255-5088, [www.orie.cornell.edu](http://www.orie.cornell.edu)

Students affiliated with all majors except Operations Research and Engineering are eligible to participate in this minor.

The aim of this minor is to provide an in-depth education in the issues involved in the design and analysis of industrial systems, and the tools from information technology that have become an integral part of the manufacturing process. Students will become familiar with the problems, perspectives, and methods of modern industrial engineering and be prepared to work with industrial engineers in designing and managing manufacturing and service operations. That is, rather than providing a comprehensive view of the range of methodological foundations of operations research, this minor is designed to give the student a focused education in the application area most closely associated with these techniques.

**Academic standards:** At least C- in each course in the minor. GPA  $\geq 2.0$  for all courses in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen as follows:

- At least three of the following:
  - ENGRD 270 Basic Engineering Probability and Statistics
  - OR&IE 312 Industrial Data and Systems Analysis
  - OR&IE 320 Optimization I
  - OR&IE 480 Information Technology
- The remaining courses chosen from:
  - OR&IE 350 Financial and Managerial Accounting
  - OR&IE 416 Design of Manufacturing Systems
  - OR&IE 451 Economic Analysis of Engineering Systems
  - OR&IE 525 Production Planning and Scheduling Theory and Practice
  - OR&IE 577 Quality Control
  - OR&IE 580 Simulation Modeling and Analysis

## MINOR: INFORMATION SCIENCE

Offered by the Department of Computer Science

Contact: Undergraduate Programs Office, 303 Upson Hall, 255-9837, [www.infosci.cornell.edu](http://www.infosci.cornell.edu)

Students affiliated with any major except information science, systems, and technology are eligible to participate in this minor.

The interdisciplinary field of information science covers all aspects of digital information. The program has three main areas: information systems, human-centered systems, and social systems. Information systems studies the computer science problems of representing, storing, manipulating, and using digital information. Human-centered systems studies the relationship between humans and information, drawing from human-computer interaction and cognitive science. Social systems examines information in its economic, legal, political, cultural, and social contexts.

The minor has been designed to ensure that students have substantial grounding in all three areas in addition to having a working knowledge of basic probability and statistics necessary for analyzing real-world data.

**Academic standards:** At least C in all courses for the minor; S-U courses are not allowed.

### Requirements

Note: These requirements apply to students in the College of Engineering. Students who are not in the College of Engineering should refer to the IS minor requirements listed in the CIS section of this publication.

At least six courses (18 credits) chosen as follows:

- Statistics: one course (must be ENGRD 270 or CEE 304)
- Information systems (primarily computer science): two courses
- Human-centered systems (human computer interaction and cognitive science): one course
- Social systems (social, economic, political, cultural, and legal issues): one course
- Elective: one additional course from either human-centered systems or social systems

### Statistics

An introductory course that provides a working knowledge of basic probability and statistics and their application to analyzing real-world data.

ENGRD 270 Basic Engineering Probability and Statistics

CEE 304 Uncertainty Analysis in Engineering

### Information Systems

INFO 172 Computation, Information, and Intelligence

COM S 211 Computers and Programming\*

INFO 230 Intermediate Design and Programming for the Web\*

CIS 300 Introduction to Computer Game Design

INFO 330 Data-Driven Web Applications

LING 424 Computational Linguistics

INFO 430 Information Retrieval

INFO 431 Web Information Systems

COM S 432 Introduction to Database Systems

COM S 465 Computer Graphics I

COM S 472 Foundations of Artificial Intelligence

LING 474 Introduction to Natural Language Processing

OR&IE 474 Statistical Data Mining I

COM S 478 Machine Learning

OR&IE 480 Information Technology

OR&IE 481 Delivering OR Solutions with Information Technology

OR&IE 483 Applications of Operations Research and Game Theory to Information Technology

COM S 501 Software Engineering

COM S 513 System Security

COM S 530 Architecture of Large-Scale Information Systems

ECE 562 Fundamental Information Theory

OR&IE 574 Statistical Data Mining II

COM S 578 Empirical Methods in Machine Learning and Data Mining

\*Computer science majors may not use INFO 230. COM S 211 cannot be used by majors for which it is a required course, e.g., computer science and operations research and industrial engineering.

### Human-centered systems

COGST 101 Introduction to Cognitive Science

PSYCH 205 Perception

INFO 214 Cognitive Psychology

INFO 245 Psychology of Social Computing

PSYCH 280 Introduction to Social Psychology

PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display

INFO 345 Human-Computer Interaction Design

PSYCH 347 Psychology of Visual Communications

PSYCH 380 Social Cognition

PSYCH 413 Information Processing: Conscious and Unconscious

PSYCH 416 Modeling Perception and Cognition

INFO 440 Advanced Human-Computer Interaction Design

INFO 445 Seminar in Computer-Mediated Communication

INFO 450 Language and Technology

DEA 470 Applied Ergonomic Methods

### Social systems

S&TS 250 Technology in Society

INFO 292 Inventing an Information Society

ECON 301 Microeconomics\*

SOC 304 Social Networks and Social Processes

ECON 313 Intermediate Microeconomic Theory\*

AEM 322 Technology, Information, and Business Strategy\*

INFO 349 Media Technologies

INFO 355 Computers: From the 17th Century to the Dot.com Boom

INFO 356 Computing Cultures

ECON 368 Game Theory\*

INFO 387 The Automatic Lifestyle:  
Consumer Culture and Technology

LAW 410 Limits on and Protection of  
Creative Expression—Copyright Law and  
Its Close Neighbors

S&TS 411 Knowledge, Technology, and  
Property

ECON 419 Economic Decisions Under  
Uncertainty

COMM 428 Communication Law

INFO 429 Copyright in the Digital Age

OR&IE 435 Introduction to Game Theory\*

S&TS 438 Minds, Machines, and  
Intelligence

INFO 447 Social and Economic Data

H ADM 474 Strategic Information Systems\*

ECON 476/477 Decision Theory I and II

H ADM 489 The Law of the Internet and  
E-Commerce

INFO 515 Culture, Law, and Politics of the  
Internet

\*Only one of ECON 301 and 313 may be  
taken for IS credit. Only one of OR&IE 435  
and ECON 368 may be taken for IS credit.  
Only one of AEM 322 and H ADM 474 may  
be taken for IS credit.

## MINOR: MATERIALS SCIENCE AND ENGINEERING

Offered by the Department of Materials  
Science and Engineering

Contact: 214 Bard Hall, 255-9159, [www.mse.cornell.edu](http://www.mse.cornell.edu)

Students affiliated with all majors except  
materials science and engineering are eligible  
to participate in this minor.

Material properties are the foundation of many  
engineering disciplines including mechanical,  
civil, chemical, and electrical engineering. This  
minor provides engineers in related areas with  
a fundamental understanding of mechanisms  
that determine the ultimate performance,  
properties, and processing characteristics of  
modern materials.

**Academic standards:** At least C in each course  
in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen as  
follows:

1. ENGRD 261 Mechanical Properties  
of Materials: From Nanodevices to  
Superstructures, or ENGRD 262 Electronic  
Materials for the Information Age
2. Two of:  
MS&E 206 Atomic and Molecular Structure  
of Matter  
MS&E 301 Materials Chemistry  
MS&E 303 Thermodynamics of Condensed  
Systems  
MS&E 304 Kinetics, Diffusion, and Phase  
Transformations

MS&E 305 Electronic, Magnetic, and  
Dielectric Properties of Materials

MS&E 402 Mechanical Properties of  
Materials, Processing, and Design

### 3. Three electives chosen from:

Any MS&E course at the 300 level or  
above.

Selected courses in materials properties and  
processing (at the 300 level or above) from  
A&EP, CHEME, CEE, ECE, M&AE, PHYS,  
and CHEM, as approved by the MS&E  
undergraduate major coordinator.

## MINOR: MECHANICAL ENGINEERING

Offered by the Sibley School of Mechanical  
and Aerospace Engineering

Contact: 108 Upson Hall, 255-3573, [www.mae.cornell.edu](http://www.mae.cornell.edu)

Students affiliated with all majors except  
mechanical engineering are eligible to  
participate in this minor. Students intending  
to earn a minor in mechanical engineering  
should seek advice and pre-approval of their  
minor academic program from the associate  
director of undergraduate affairs in mechanical  
engineering before taking courses toward the  
minor.

**Academic standards:** At least C- in each  
course in the minor.

### Requirements

At least six courses ( $\geq 18$  credits) from among  
the following: M&AE courses at the 200 level  
or above; ENGRD 202 Mechanics of Solids;  
ENGRD 203 Dynamics.

Rules for selecting courses:

1. The selection of courses must satisfy the  
following three requirements.
  - a. At least two courses must be  
numbered above 300.
  - b. At least one course must be either (i)  
numbered above 500 or (ii) numbered  
above 326 and have as a prerequisite  
ENGRD 202, 203, or a M&AE course.
  - c. Each course must be worth at least 3  
credits.
2. All courses used to satisfy the M&AE minor  
must be M&AE courses, ENGRD 202 or  
203. No substitutions will be accepted from  
other departments at Cornell or elsewhere.  
Transfer credit may not be used to satisfy  
the M&AE minor. M&AE 111 Naval  
Ship Systems, or M&AE 498 Teaching  
Experience in Mechanical Engineering,  
may not be used toward satisfying the M.E.  
minor.

## MINOR: OPERATIONS RESEARCH AND MANAGEMENT SCIENCE

Offered by the School of Operations Research  
and Industrial Engineering

Contact: 203 Rhodes Hall, 255-5088, [www.orie.cornell.edu](http://www.orie.cornell.edu)

Students affiliated with all majors except  
Operations Research and Engineering are  
eligible to participate in this minor.

Operations research and management  
science aims to provide rational bases for  
decision making by seeking to understand  
and model complex situations and to use  
this understanding to predict system behavior  
and improve system performance. This minor  
gives the student the opportunity to obtain  
a wide exposure to the core methodological  
tools of the area, including mathematical  
programming, stochastic and statistical  
models, and simulation. The intent of this  
minor is to give a broad knowledge of  
these fundamentals, rather than to train the  
student in a particular application domain.  
With this preparation, students can adjust  
their advanced courses and pursue either  
methodological or application-oriented areas  
of greatest interest and relevance to the  
overall educational goals of their program.

**Academic standards:** At least C- in each  
course in the minor. GPA  $\geq 2.0$  for all courses  
in the minor.

### Requirements

At least six courses ( $\geq 18$  credits), chosen as  
follows:

1. At least three of these courses:  
ENGRD 270 Basic Engineering Probability  
and Statistics  
OR&IE 320 Optimization I  
OR&IE 321 Optimization II  
OR&IE 360 Engineering Probability and  
Statistics II  
OR&IE 361 Introduction to Engineering  
Stochastic Processes I  
OR&IE 580 Simulation Modeling and  
Analysis
2. Any OR&IE courses at the 300 level or  
higher (including those in 1).

## MASTER OF ENGINEERING DEGREES

Office of Research, Graduate Studies, and  
Professional Education (ORGSPPE), 222  
Carpenter Hall, [www.engineering.cornell.edu/grad](http://www.engineering.cornell.edu/grad)

The following one-year (30-credit)  
professional master of engineering (M.Eng.)  
degrees are offered (giving also the  
administering unit)

**M.Eng. (Aerospace):** mechanical and  
aerospace engineering

**M.Eng. (Biological and Environmental):**  
biological and environmental engineering

**M.Eng. (Biomedical):** biomedical engineering

**M.Eng. (Chemical):** chemical and biomolecular  
engineering

**M.Eng. (Civil and Environmental):** civil and  
environmental engineering

**M.Eng. (Computer Science):** computer science

**M.Eng. (Electrical):** electrical and computer  
engineering

**M.Eng. (Engineering Mechanics):** theoretical  
and applied mechanics

**M.Eng. (Engineering Physics):** applied and  
engineering physics

**M.Eng. (Geological Sciences):** earth and  
atmospheric sciences

**M.Eng. (Materials):** materials science and engineering

**M.Eng. (Mechanical):** mechanical and aerospace engineering

**M.Eng. (Nuclear):** graduate field of nuclear science and engineering

**M.Eng. (OR&IE):** operations research and industrial engineering

**M.Eng. (Systems):** systems engineering

These degrees are discussed below because the curricula are integrated with the undergraduate majors.

Many Cornell baccalaureate engineering graduates spend a fifth year at Cornell, earning an M.Eng. degree, although the program is also open to qualified graduates of other schools.

Requirements for admission vary by program. In general, the standard M.Eng. application requirements include:

- Statement of purpose
- Complete transcripts from each college or university attended
- At least two letters of recommendation
- Graduate Record Examination (GRE) scores—may not be required by all M.Eng. programs

Many M.Eng. programs waive the GRE requirement and one of the letters of recommendation for students with Cornell Engineering B.S. degrees. Check with the appropriate office for specific program requirements. A list of links and general admission information is posted on [www.engr.cornell.edu/grad](http://www.engr.cornell.edu/grad).

Superior Cornell students who will have between 1 and 8 credits remaining in their last undergraduate semester may petition for early admission to the M.Eng. program. They spend the last semester in both programming, finishing up their B.S. degree and also doing their first semester of the M.Eng. program.

### Master of Engineering Options

The following M.Eng. options are offered:

- bioengineering
- financial engineering
- manufacturing
- engineering management
- systems engineering

### Cooperative Program with the Johnson Graduate School of Management

Undergraduates may be interested in a cooperative program at Cornell that leads to both master of engineering and master of business administration (M.B.A.) degrees. With appropriate curriculum planning, such a combined B.S./M.Eng./M.B.A. program can be completed in six years at Cornell, with time out for work experience. For undergraduates from other schools, it may be feasible to complete the M.Eng./M.B.A. program in two years, possibly with an intervening summer or time out for work experience if they do not already have it on coming to Cornell. This accelerated program often incorporates the Twelve-Month M.B.A. Program of the Johnson Graduate School of Management (JGSM).

Because 95 percent of the students in the JGSM have work experience, there will typically be a gap for work experience between the M.Eng. and M.B.A. portions of the program for students who do not already have it when beginning the M.Eng. portion.

For further details, go to Engineering Advising (167 Olin Hall), the M.Eng. office (222 Carpenter Hall), the JGSM office in Sage Hall, or the office of your intended undergraduate major.

### Lester Knight Scholarship Program

The Lester Knight Scholarship Program is designed to assist and encourage Cornell Engineering students and alumni interested in combining their engineering education with a business degree. The program offers three options or categories of financial support:

- Alumni Knight Scholarship
- Undergraduate Knight Scholarship
- Six-Year Knight Scholarship

Each program has different qualifications and is open to Cornell engineering students and alumni at different stages of their educational or professional career. Participation in the program requires admission by each respective academic program (M.Eng., M.B.A.) as well as an application to participate in the Knight Scholarship Program.

Contact ORGSPE or refer to the Knight Scholarship web site ([www.engr.cornell.edu/grad/knight](http://www.engr.cornell.edu/grad/knight)) for program specifics.

### MASTER OF ENGINEERING (AEROSPACE)

Offered by the Sibley School of Mechanical and Aerospace Engineering

Contact: 107 Upson Hall, 255-5250, [www.mae.cornell.edu](http://www.mae.cornell.edu)

The M.Eng. (Aerospace) degree program provides a one-year course of study for those who wish to develop a high level of competence in engineering science, current technology, and engineering design.

The program is designed to be flexible so that candidates may concentrate on any of a variety of specialty areas. These include aerodynamics, acoustics and noise, turbulent flows, nonequilibrium flows, combustion, dynamics and control, and computational fluid dynamics.

A coordinated program of courses for the entire year is agreed upon by the student and the faculty advisor. This program and any subsequent changes must also be approved by the chair of the M&AE Master of Engineering committee. An individual student's curriculum includes a 4- to 8-credit design course, a minimum of 12 credits in aerospace engineering or a closely related field, and sufficient technical electives to meet the total degree requirement of 30 credits (of which at least 28 credits must have letter grades).

Design projects must have an aerospace engineering design focus and have the close supervision of a faculty member. The projects may arise from individual faculty and student interests or from collaboration with industry.

All courses must be of true graduate nature. In general, all courses must be beyond the

level of those required in an undergraduate engineering program; credit may be granted for an upper-level undergraduate course if the student has done little or no previous work in that subject area, but such courses must have the approval of the M&AE master of engineering chair.

Check with the M&AE graduate field office (107 Upson Hall) for additional degree requirements.

Students enrolled in the M.Eng. (Aerospace) degree program may take courses that also satisfy the requirements of the bioengineering, engineering management, or systems engineering options.

### MASTER OF ENGINEERING (BIOLOGICAL AND ENVIRONMENTAL)

Offered by the Department of Biological and Environmental Engineering

Contact: 207 Riley-Robb Hall, 255-2173, [www.bee.cornell.edu](http://www.bee.cornell.edu)

This degree is intended primarily for students who plan to enter engineering practice. The program is planned as an extension of an undergraduate major in biological and environmental engineering but can accommodate graduates of other engineering disciplines. The required 30 credits of courses are intended to strengthen the students' fundamental knowledge of engineering and develop their design skills. Of the 30 credits, 3 to 9 are earned for an engineering design project that culminates in a written and oral report.

Students may concentrate in one of the following areas: biological engineering, energy, environmental engineering, environmental management, food processing engineering, international agriculture, local roads, machine systems, soil and water engineering, and structures and environment. Elective courses are chosen from among engineering subject areas relevant to the student's interests and design project. Courses in technical communication, math, biology, and the physical sciences may also be taken as part of a coherent program. Students can qualify for the Dean's Certificate in energy, manufacturing, or bioengineering by choosing their design project and a number of electives from the designated topic areas.

### MASTER OF ENGINEERING (BIOMEDICAL)

Offered by the Department of Biomedical Engineering

Contact: 361 Olin Hall, 255-2573, [www.bme.cornell.edu](http://www.bme.cornell.edu)

Our mechanistic understanding of biology has increased rapidly over the past 20 years, and many expect biology to drive engineering and technology in the next 50 years in much the same way that physics drove them in the 20th century. As biology has become more mechanistic, the opportunities to apply engineering approaches have increased enormously. Simultaneously, humanitarian needs and economic opportunities for the application of engineering to improve



health care have increased significantly. Engineers who understand biology and can apply their knowledge and skills to improve human health are increasingly in demand. A professional degree in BME will prepare students to fill this increasing critical need.

The breadth and depth of knowledge needed in biomedical engineering makes a four-year B.S. degree program impractical. By combining the M.Eng. in BME with a strong B.S. program, a student can obtain the knowledge and skills necessary to be an effective professional biomedical engineer.

Students will acquire an in-depth knowledge of an essential area of biomedical engineering as well as a broad perspective of the biomedical engineering discipline that complements their undergraduate education in engineering or science. Graduates will be equipped to design biomedical devices and develop therapeutic strategies within the bounds of health care economics, the needs of patients and physicians, the regulatory environment for medical devices and pharmaceuticals, and stringent ethical standards.

Students will acquire depth by extending undergraduate concentrations, by selecting one of three areas for concentrated study, and by completing a design project in their area of concentration. The areas are biomedical mechanics and materials; bioinstrumentation/diagnostics; and drug delivery and cellular/tissue engineering. Design projects will be carried out in teams to take advantage of the diversity of student backgrounds and, when possible, projects will be done in collaboration with industrial or clinical partners.

Students from a wide variety of backgrounds in engineering and science are encouraged to apply. They are expected to have completed two semesters of calculus-based physics, at least three semesters of math, starting with calculus, and introductory computer science.

A knowledge of molecular- and cellular-based biomedical engineering and engineering analysis of physiological systems at the level of BME 301, 302, 401, and 402 is highly recommended. This knowledge can be demonstrated through appropriate undergraduate course work (at least C in each class). Students lacking the appropriate background may need to complete additional courses (beyond the normal 30 credits) to demonstrate appropriate knowledge in these two subject areas.

## MASTER OF ENGINEERING (CHEMICAL)

Offered by the School of Chemical and Biomolecular Engineering

Contact: 358 Olin Hall, 255-4550, [www.cheme.cornell.edu](http://www.cheme.cornell.edu)

This degree is awarded at the end of one year of graduate study with successful completion of 30 credits of required and elective courses in technical fields including engineering, math, chemistry, physics, and business administration. Courses emphasize design and optimization based on the economic factors that affect design alternatives for processes, equipment, and plants. General admission and degree requirements are described

at the beginning of the section "Master of Engineering Degrees."

Specific requirements include

1. 12 credits in CHEME courses distributed among chemical and biomolecular engineering fundamentals. One required from among CHEME 711, 731, and 751 and the remainder in chemical and biomolecular engineering applications (partial list: CHEME 480, 481, 484, 520, 543, 572, 631, 640, and 661).
2. A minimum of 3 credits of an individual or group project, CHEME 565.
3. Knowledge of business practices and techniques for pollution abatement and control. This knowledge may have already been acquired by students as undergraduates. If not, then CHEME courses (e.g., CHEME 572 and 661) or other courses covering these topics are required.

## MASTER OF ENGINEERING (CIVIL AND ENVIRONMENTAL)

Offered by the School of Civil and Environmental Engineering

Contact: 219 Hollister Hall, 255-7560, [www.cee.cornell.edu](http://www.cee.cornell.edu)

The Master of Engineering degree is a course work and project-oriented program. It is normally completed in nine months of intensive study. Thirty credit hours consisting of course work in major and supporting areas and a project are required.

Students may focus their studies in one of the following major subject areas: civil engineering materials, civil infrastructure systems, structural engineering, geotechnical engineering, environmental processes, environmental fluid mechanics and hydrology, environmental and water resource systems engineering, and transportation systems engineering. For the M.Eng. program in civil and environmental engineering, each program typically consists of course work in a major concentration and supporting areas as well as a project. Courses in supporting areas come from many disciplines, including microbiology, materials science, operations research, computer science, economics, architecture, historic preservation, and engineering management to name just a few.

## MASTER OF ENGINEERING (COMPUTER SCIENCE)

Offered by the Department of Computer Science

Contact: 4126 Upson Hall, 255-8593, [www.cs.cornell.edu/grad/meng](http://www.cs.cornell.edu/grad/meng)

The M.Eng. program in computer science can be started in either the fall or spring semester. This program is designed to develop expertise in system design and implementation in many areas of computer science, including computer networks, Internet architecture, fault-tolerant and secure systems, distributed and parallel computing, high-performance computer architecture, databases and data mining, multimedia systems, computer vision,

computational tools for finance, computational biology (including genomics), software engineering, programming environments, and artificial intelligence.

A typical program includes several upper-division and graduate courses and a faculty-supervised project. The flexible requirements allow students to build up a program that closely matches their interests. In fact, slightly under half the courses may be taken outside the computer science department (many students choose to take several business administration courses). Project work, which may be done individually or in a small group, can often be associated with ongoing research in the Department of Computer Science in one of the areas listed above.

Cornell seniors may use the early admission option to effectively co-register for the M.Eng. program while completing the undergraduate degree. This option can be started in either the fall or spring semester. It applies to students who have 1 to 8 credits remaining to complete their undergraduate program. All remaining undergraduate degree requirements must be satisfied by the end of the first semester the student is enrolled in the M.Eng. "early admit" program.

Undergraduates majoring in computer science may be interested in a program that can lead, in the course of six years, to B.S., M.Eng. (computer science), and M.B.A. degrees. See "Master of Engineering Degrees."

## MASTER OF ENGINEERING (ELECTRICAL)

Offered by the School of Electrical and Computer Engineering

Contact: Student Services Office, 223 Phillips Hall, 255-8414, [www.ece.cornell.edu/meng.cfm](http://www.ece.cornell.edu/meng.cfm)

The M.Eng. (Electrical) degree program prepares students either for professional work in Electrical and Computer Engineering and closely related areas or for further graduate study in a doctoral program. The M.Eng. degree differs from the master of science degree mainly in its emphasis on professional skills, engineering design, and analysis skills rather than basic research.

The program requires 30 credits of advanced technical course work beyond that expected in a typical undergraduate program, including at least four graduate-level courses in Electrical and Computer Engineering. The required Electrical and Computer Engineering design project may account for 3 to 8 credits of the M.Eng. program. Occasionally, students take part in very extensive projects and may petition to increase the project component to 10 credits. Students with special career goals, such as engineering management, may apply to use up to 11 credits of approved courses that have significant technical content but are taught in disciplines other than engineering, math, or the physical sciences.

Although admission to the M.Eng. (Electrical) program is highly competitive, all well-qualified students are urged to apply. Further information is available at the web site listed above.

## MASTER OF ENGINEERING (ENGINEERING MANAGEMENT)

The M.Eng. program in Engineering Management is aimed at engineers who want to stay in a technical environment but advance to managerial roles. Students learn to identify problems, formulate and analyze models to understand these problems, and interpret the results of analyses for managerial action.

A student's program of study is designed individually in consultation with an academic advisor and then submitted to the school's Professional Degree Committee for approval.

For the M.Eng. program in Engineering Management, the requirements are:

1. Three core courses: These include: CEE 590 Project Management, CEE 593 Engineering Management Methods, and CEE 591 Management Project.
2. Two focus courses, from a list that includes CEE 594, CEE 596, CEE 597, CEE 598, and CEE 690.
3. Two managerial breadth courses, including one in finance/accounting and one focused on behavior.
4. Three disciplinary or functional electives.

The School of Civil and Environmental Engineering cooperates with the Johnson Graduate School of Management in a joint program leading to both Master of Engineering and Master of Business Administration degrees. See the beginning of the section "Master of Engineering Degrees."

## MASTER OF ENGINEERING (ENGINEERING MECHANICS)

Offered by the Department of Theoretical and Applied Mechanics

Contact: 212 Kimball Hall, 255-0988, [www.tam.cornell.edu/meng1.html](http://www.tam.cornell.edu/meng1.html)

This two-semester professional degree program stresses applications of Engineering Mechanics and Applied Mathematics and Modeling. The centerpiece of the program is a project, either single or team-based, on important real-world problems.

**Engineering Mechanics:** Students in this program will deepen and broaden their knowledge of mechanics as applied to different material systems. The course work centers on additional study of solid mechanics, fracture mechanics, materials and computational methods widely used in industries such as the finite element method. Potential employers are companies interested in computer modeling of mechanical systems and failure and reliability analysis.

**Applied Mathematics and Modeling:** Students in this program do course work in mathematical modeling and computational methods. They will have great flexibility in their choice of studies. Students who graduate from this program are in a good position to pursue higher degrees or work for financial or informational organizations.

**Laboratories:** T&AM has many laboratories related to research areas and courses of study for the M.Eng. program:

- Ultrasonic and Materials Characterization Laboratory—*Wolfgang Sachse*
- Bio-robotics and Locomotion Laboratory—*Andy Ruina*
- Granular Flow Research Laboratory—*Jim Jenkins*
- Composites Laboratory—*Leigh Phoenix and Petru Petrina*
- Fracture Mechanics Laboratory—*Alan Zehnder*
- Dynamics Laboratory—*Dan Mittler*
- Mechanics of Solids Laboratory—*Dan Mittler*
- Biological Fluid Dynamics Laboratory—*Jane Wang*

Course Work:

(project 10–12 credit hours)

### Current Interesting Projects

1. Animal, Human and Robotic Locomotion—*Andy Ruina*
2. Dynamical Systems—*Richard Rand*
3. Stress Rupture Testing of High-Performance Fibers and Yarns—*S. Leigh Phoenix*
4. Mathematics of Finance (capital budgeting, economic analysis Scholes—Black Diffusion Theory)—*K. Bingham Cady*
5. Fracture and Reliability—*Hui, Phoenix, Zehnder*
6. Response Theory—*K. Bingham Cady*
7. Nuclear Reactor Theory—*K. Bingham Cady*
8. Determination of Elastic Constance of Composite Materials Using Ultrasonics—*Wolfgang Sachse*

### Engineering Mechanics

#### Fall semester

Course	Title	Credits
T&AM 663	Solid Mechanics I	4
T&AM 570	Intermediate Dynamics	3
or		
T&AM 610	Methods of Applied Mathematics I	3
T&AM 800	Seminar	1

#### Spring semester

CEE 786	Fracture Mechanics	3
or		
T&AM 713	Fracture	3
T&AM 655	Composite Materials	4
MS&E 582	Mechanical Properties of Material, Processing and Design	4
M&AE 570	Finite Element Analyses for Mechanical and Aerospace Design	4
T&AM 800	Seminar	1

### Applied Mathematics and Modeling

#### Fall semester

T&AM 610	Methods of Applied Mathematics I	3
T&AM 570	Intermediate Dynamics	3

CEE 771	Stochastic Mechanics in Science and Engineering	3
T&AM 800	Seminar	1
<i>Spring semester</i>		
T&AM 611	Methods of Applied Mathematics II	3
T&AM 578	Nonlinear Dynamics and Chaos	3
T&AM 671	Hamiltonian Dynamics	3
or		
T&AM 674	Nonlinear Vibrations	3
M&AE 570	Finite Element Analyses for Mechanical and Aerospace Design	4
or		
CEE 672	Finite Element Analysis of Solids and Structures	3
T&AM 800	Seminar	1

## MASTER OF ENGINEERING (ENGINEERING PHYSICS)

Offered by the School of Applied and Engineering Physics

Contact: 212 Clark Hall, 255-5198, [www.aep.cornell.edu](http://www.aep.cornell.edu)

The M.Eng. (Engineering Physics) degree may lead directly to employment in engineering design and development or may be a basis for further graduate work. Students have the opportunity to broaden and deepen their preparation in the general field of applied physics, or they may choose the more specific option of preparing for professional engineering work in a particular area such as laser and optical technology, nanostructure science and technology, device physics, materials characterization, or software engineering. Wide latitude is allowed in the choice of the required design project.

Students plan their program in consultation with the program chair. The objective is to provide a combination of a good general background in physics and introductory study in a specific field of applied physics. Candidates may enter with an undergraduate preparation in physics, engineering physics, or engineering. Those who have majored in physics usually seek advanced work with an emphasis on engineering; those who have majored in an engineering discipline generally seek to strengthen their physics base. Candidates coming from industry usually want instruction in both areas. Students granted the degree will have demonstrated competence in an appropriate core of basic physics. If this has not been accomplished before entering the M.Eng. program, undergraduate classes in electricity and magnetism, classical mechanics, and quantum mechanics may be required in addition to the classes taken to satisfy the M.Eng. requirements.

The degree requires 30 credits of graduate-level courses or their equivalent, with at least C- in each course, and distributed as follows:

1. a design project in applied science or engineering with a written final report (6 to 12 credits)

2. an integrated program of graduate-level courses, as discussed below (17 to 23 credits)
3. a required special-topics seminar course (1 credit)

The design project, which is proposed by the student and approved by the program chair, is carried out on an individual basis under the guidance of a member of the university faculty. It may be experimental or theoretical in nature; if it is not experimental, a laboratory physics course is required.

The individual program of study consists of a compatible sequence of courses focused on a specific area of applied physics or engineering. Its purpose is to provide an appropriate combination of physics and physics-related courses (applied math, statistical mechanics, applied quantum mechanics) and engineering electives (e.g., courses in biophysics, chemical engineering, electrical engineering, materials science, computer science, mechanical engineering, or nuclear engineering). Additional science and engineering electives may be included. Some courses at the senior level (400) are acceptable for credit toward the degree; other undergraduate courses may be required as prerequisites but may not be credited toward the degree.

## MASTER OF ENGINEERING (GEOLOGICAL SCIENCES)

Offered by the Department of Earth and Atmospheric Sciences

Contact: 2124 Snee Hall, 255-5466, [www.eas.cornell.edu](http://www.eas.cornell.edu)

The one-year M.Eng. (Geological Sciences) degree program provides future professional geologists or engineers with the geological and engineering background they will need to analyze and solve engineering problems that involve geological variables and concepts. Individual programs are developed within two established options: geohydrology and environmental geophysics.

Incoming students are expected to have a strong background in mathematics, the physical sciences, and chemistry and have a strong interest and substantial background in the geological sciences. The 30-hour M.Eng. program is intended to extend and broaden this background to develop competence in four subject categories. Typical categories for the geohydrology option are porous media flow, geology, geochemistry, and numerical modeling. Typical categories for the environmental geophysics option are geophysics, geology, porous media fluid flow, and computer methods. The courses a student selects in a category will vary depending on the student's background. No courses may be required in some categories, and the categories can be adjusted to the student's interest and needs. Alternatives to numerical modeling in the geohydrology option could be economics or biochemistry, for example. To count toward the 30-credit degree requirement, courses must be at a graduate or advanced undergraduate level.

At least 10 of the 30 hours in the program must involve engineering design. Much of this requirement is normally met through a design project, which can account for over

a third of the program (12 of 30 credits) and must constitute at least 3 credits. The design project must involve a significant geological component and lead to concrete conclusions or recommendations of an engineering nature. The project topic can be drawn from a student's nonacademic work experience but carried out or further developed with advice from a Cornell faculty member with expertise in the project area selected by the student. A design project in geohydrology would normally involve groundwater flow and mass transport. A design project in environmental geophysics might involve implementation of a field survey using seismological, geoelectrical, or ground-penetrating radar methods to map subsurface stratigraphic or structural features that control groundwater flow or contamination at a site. Projects are presented both in written form and orally in a design seminar at the end of the year.

## MASTER OF ENGINEERING (MATERIALS SCIENCE AND ENGINEERING)

Offered by the Department of Materials Science and Engineering

Contact: 214 Bard Hall, 255-9159, [www.mse.cornell.edu](http://www.mse.cornell.edu)

Students who have completed a four-year undergraduate program in engineering or the physical sciences can be considered for admission into the M.Eng. (Materials) program. This 30-credit program includes course work and a master's design project. The project, which requires individual effort and initiative, is carried out under the supervision of a faculty member. Twelve credits are devoted to the project, which is normally experimental in nature, although computational or theoretical projects are also possible.

Courses for the additional 18 credits are selected from the graduate-level classes in materials science and engineering and from other related engineering fields approved by the faculty. Typically half of the courses are from MS&E. One 3-credit technical elective must include advanced math (modeling, computer application, or computer modeling), beyond the MS&E undergraduate requirements.

## MASTER OF ENGINEERING (MECHANICAL)

Offered by the Sibley School of Mechanical and Aerospace Engineering

Contact: 107 Upson Hall, 255-5250, [www.mae.cornell.edu](http://www.mae.cornell.edu)

The M.Eng. (Mechanical) degree program provides a one-year course of study for those who wish to develop a high level of competence in engineering science, current technology, and engineering design.

Candidates may concentrate on any of a variety of specialty areas, including biomechanical engineering, combustion, propulsion and power systems, fluid mechanics, heat transfer, materials and manufacturing engineering, and mechanical systems and design.

A coordinated program of courses for the entire year is agreed upon by the student and the faculty advisor. This program and any subsequent changes must also be approved by the chair of the M&AE Master of Engineering committee. An individual student's curriculum includes a 4- to 8-credit design course, a minimum of 12 credits in mechanical engineering or a closely related field, and sufficient technical electives to meet the total degree requirement of 30 credits (of which at least 28 credits must have letter grades).

The design projects may arise from individual faculty and student interests or from collaboration with industry. All projects must have a mechanical engineering design focus and have the close supervision of a faculty member.

All courses must be of true graduate nature. In general, all courses must be beyond the level of those required in an undergraduate engineering program; credit may be granted for an upper-level undergraduate course if the student has done little or no previous work in that subject area, but such courses must have special approval of the M&AE master of engineering chair.

The technical electives may be courses of appropriate level in math, physics, chemistry, or engineering; a maximum of 3 credits may be taken in areas other than these if the courses are part of a well-defined program leading to specific professional objectives. Students are expected to use technical electives to develop proficiency in math beyond the minimum required of Cornell engineering undergraduates if they have not already done so before entering the program. Courses in advanced engineering math or statistics are particularly recommended.

Check with the M&AE graduate field office (107 Upson Hall) for additional degree requirements.

Students enrolled in the M.Eng. (Mechanical) degree program may take courses that also satisfy the requirements of the bioengineering, engineering management, or systems manufacturing programs leading to special dean's certificates in those areas.

## MASTER OF ENGINEERING (NUCLEAR)

Offered by the Nuclear Engineering Program

Contact: 312 Rhodes Hall, 255-1453, [www.gradschool.cornell.edu/academics\\_research/fields/nucl-sci.html](http://www.gradschool.cornell.edu/academics_research/fields/nucl-sci.html)

The two-semester curriculum leading to the M.Eng. (Nuclear) degree is intended primarily for individuals who want a terminal professional degree, but it may also serve as preparation for doctoral study in nuclear science and engineering. The course of study covers the basic principles of nuclear reactor systems with a major emphasis on reactor safety and radiation protection and control.

The interdisciplinary nature of nuclear engineering allows students to enter from a variety of undergraduate concentrations. The recommended background is (1) an accredited baccalaureate degree in engineering, physics, or applied science; (2) physics, including atomic and nuclear physics; (3) math, including advanced calculus; and (4) thermodynamics. Students should see that they fulfill these requirements before

beginning the program. In some cases, deficiencies in preparatory work may be made up by informal study during the preceding summer. General admission and degree requirements are described in the college's introductory section.

The following courses, or equivalents, are included in the 30-credit program:

#### Fall semester

NS&E 509 Nuclear Physics for Applications

Technical elective

#### Spring semester

NS&E 545 Energy Seminar

Technical elective

Engineering design project

Mathematics or physics elective

Note: Engineering electives should be in a subject area relevant to nuclear engineering, such as energy conversion, radiation protection and control, feedback control systems, magnetohydrodynamics, controlled thermonuclear fusion, and environmental engineering. The list below gives typical electives.

A&EP 606/ECE 581 Introduction to Plasma Physics (fall, 4 credits)

A&EP 607 Basic Plasma Physics (spring, 4 credits)

A&EP 661 Microcharacterization (fall, 3 credits)

ECE 457 Silicon Device Fundamentals (fall, 4 credits with lab)

M&AE 478/CHEME 372 Feedback Control Systems (fall, 4 credits)

MS&E 459 Physics of Modern Materials Analysis (spring, 3 credits)

MS&E 603 Analytical Techniques for Materials Science (spring, 4 credits)

NS&E/A&EP/ECE 484/M&AE 459 Introduction to Controlled Fusion: Principles and Technology (spring, 3 credits)

NS&E 521 Radiation Effects in Materials (fall, 1-3 credits)

## MASTER OF ENGINEERING (OPERATIONS RESEARCH AND INDUSTRIAL ENGINEERING)

Offered by the School of Operations Research and Industrial Engineering

Contact: 201 Rhodes Hall, 255-9128, [www.orie.cornell.edu](http://www.orie.cornell.edu)

This two-semester professional degree program stresses applications of operations research and industrial engineering. The centerpiece of the program is a team-based project on a significant real-world problem. The course work centers on additional study of analytical techniques, with particular emphasis on engineering applications, especially in the design or improvement of systems and methods in manufacturing, information, finance, and nonprofit organizations.

General admission and degree requirements are described in the introductory "Degree Programs" section. The M.Eng. (OR&IE) program is intended for three groups of

students: graduates of the undergraduate major in ORE who wish to expand their practical knowledge of the field; Cornell undergraduates in other math-based areas who want to broaden their exposure to OR&IE; and qualified non-Cornellians with strong backgrounds from other programs in the United States and abroad.

Undergraduates majoring in engineering may be interested in a program that can lead, in the course of six years, to B.S., M.Eng. (Operations Research and Industrial Engineering), and M.B.A. degrees. See "Master of Engineering Degrees."

To ensure completion of the program in two semesters, the entering student should have completed courses in probability and statistics and in computer science, as well as four semesters of mathematics, through differential equations, linear algebra, and multivariate calculus.

Program requirements include a core of OR&IE courses plus technical electives chosen from a broad array of offerings. The choice of a particular elective sequence plus a specific project course results in completion of one of several options within the program. These include the applied operations research option, the manufacturing option, the financial engineering option, the systems engineering option, the information technology option, the Semester in Strategic Operations, and the data mining and analytical marketing option (on a pilot basis). These options are offered jointly with various other Cornell departments and schools and they provide the opportunity to interact on projects and in class with specialists in other engineering fields and in business. Many students select the applied operations research option, offered only by OR&IE, which has project teams made up entirely of OR&IE M.Eng. students and offers the broadest choice of elective courses and career alternatives, in business and elsewhere. Students interested in an option other than the applied operations research option should obtain further information from the following: manufacturing option, Center for Manufacturing Enterprise, 291 Grumman Hall, 255-5545; financial engineering, systems engineering, information technology, and analytical marketing, 201 Frank H. T. Rhodes Hall, 255-9128; Semester in Strategic Operations, 304 Sage Hall, 255-4691. For students lacking an undergraduate degree in operations research, the financial engineering option, which is highly specialized, may entail additional prerequisites or more than two semesters.

1. For matriculants with preparation comparable to that provided by the undergraduate major in operations research and engineering:

Fall semester	Credits
OR&IE 516 Case Studies	1
OR&IE 893 Applied OR&IE Colloquium	1
M.Eng. project	1
Technical electives	12
Spring semester	
OR&IE 894 Applied OR&IE Colloquium	1
M.Eng. project	minimum of 4
Technical electives	10

2. For matriculants from other majors who minimally fulfill the prerequisite requirements (students who have the equivalent of OR&IE 520, 523, and 560 will take other OR&IE electives in their place):

Fall semester	Credits
OR&IE 560 Engineering Probability and Statistics II	4
OR&IE 520 Optimization I	4
OR&IE 522 Topics in Linear Optimization	1
OR&IE 516 Case Studies	1
OR&IE 580 Simulation Modeling and Analysis	4
OR&IE 893 Applied OR&IE Colloquium	1
M.Eng. project	1
Spring semester	
OR&IE 523 Introduction to Stochastic Processes I	4
OR&IE 894 Applied OR&IE Colloquium	1
M.Eng. project	minimum of 4
Technical electives	5

For both of the above pro forma schedules, at least 12 credit hours of the specified electives must be chosen from the list of courses offered by the School of Operations Research and Industrial Engineering. For scheduling reasons, some options may entail an additional summer or semester, depending on the student's preparation.

The project requirement can be met in a variety of ways. Common elements in all project experiences include working as part of a group of three to five students on an engineering design problem, meeting with a faculty member on a regular basis, and oral and written presentation of the results obtained. Most projects address problems that actually exist in manufacturing firms, financial firms, and service organizations such as hospitals.

Additional program requirements are described in the *Master of Engineering Handbook*. For further details, see the contact information at the beginning of this section.

As part of their undergraduate ORE major or M.Eng. (OR&IE) curriculum, students may study several subjects that are required for the Johnson Graduate School M.B.A. This early start on business degree requirements may make it possible to get both the M.Eng. and the M.B.A. in two years, rather than the usual three. For details, see "Cooperative Program with the Johnson Graduate School of Management" under "Master of Engineering Degrees," and contact the OR&IE M.Eng. office, 201 Rhodes Hall.

## MASTER OF ENGINEERING (SYSTEMS)

Offered by The Systems Engineering Program

Contact: 206 Rhodes Hall, 254-8998, [www.systemseng.cornell.edu](http://www.systemseng.cornell.edu)

Today's engineering environment is increasingly complex and changing rapidly. Due in part to emerging technologies and globalization, engineers must think in terms of integrated, globally optimized solutions to devise designs that address the complexity of the real world. Success in this environment

requires a comprehensive understanding of systems engineering.

The Systems Engineering Program emphasizes the fundamentals of requirements analysis, systems architecture, product development, project management, optimization, simulation, and systems analysis. The program's strength in these areas helps promote an understanding of the systems process throughout an organization and prepares students to transition from designing and managing independent engineering components and projects to creating integrated solutions that meet customer needs.

The M.Eng. (Systems) program is designed for students with a solid disciplinary background who want to specialize in Systems Engineering. It requires a minimum of 30 credit hours. Students must complete the following required courses:

Applied Systems Engineering (3 credits)

Systems Architecture, Behavior, and Optimization (3 credits)

Project Management (4 credits)

Systems Engineering Design Project (6–8 credits)

Approved electives account for the remaining credits to reach the minimum of 30 credits required for the degree and are to be chosen from the following areas:

Systems Modeling and Analysis (at least one course)

Courses that enrich the understanding of generic methods to design and analyze systems including courses in simulation, feedback and control, decision-making, or risk analysis.

Systems Applications

Courses that provide depth in the design and operation of specific systems such as power, communication, software, manufacturing, or transportation.

Systems Management (at most one course)

Courses that enhance student understanding of the management activities and processes which are necessary to successfully design and operate systems.

In addition to the Master of Engineering degree in Systems, the Systems Engineering Program offers a second course of study: the Option in Systems Engineering. The SE Option is designed for students who want Systems Engineering as part of the Master of Engineering degree in another engineering discipline.

## ENGINEERING COURSES

Courses offered in the College of Engineering are listed under the various departments and schools.

Courses are identified with a standard abbreviation followed by a three-digit number.

Engineering Communications	ENGRC
Engineering Distribution	ENGRD
Engineering General Interest	ENGRG
Introduction to Engineering	ENGRI
Biological and Environmental Engineering	BEE

Applied and Engineering Physics	A&EP
Chemical and Biomolecular Engineering	CHEME
Civil and Environmental Engineering	CEE
Computer Science	COM S
Earth and Atmospheric Sciences	EAS
Electrical and Computer Engineering	ECE
Information Science	INFO
Materials Science and Engineering	MS&E
Mechanical and Aerospace Engineering	M&AE
Nuclear Science and Engineering	NS&E
Operations Research and Industrial Engineering	OR&IE
Systems Engineering	SYSEN
Theoretical and Applied Mechanics	T&AM

## ENGINEERING COMMON COURSES

### Engineering Communications Courses

Courses in this category, offered by the Engineering Communications Program (ECP), develop writing and oral-presentation skills needed by engineers.

#### ENGRC 334(3340) Independent Study in Engineering Communications

1–3 credits, variable. Letter grades. TBA with instructor.

Members of the ECP occasionally give independent (also called "directed") studies in engineering communications, typically with students who are ready for advanced work in technical writing. A student doing a directed study works one-on-one with an ECP instructor to pursue an aspect of professional communications in more depth than is possible in the ECP's regular courses. Various types of projects are possible, e.g., studying forms of technical documentation, creating user manuals, analyzing and producing technical graphics, reading and writing about problems in engineering practice, and writing about technical topics for the public.

#### ENGRC 335(3350) Communications for Engineering Managers (LA)

Fall, spring. 3 credits. Fulfills college technical-writing requirement. May be used as free or approved elective in expressive arts. Intended for juniors and seniors. Limited to 20 students per sec. Prerequisite: two first-year writing seminars and major affiliation.

This seminar focuses on communications in organizational contexts common to engineering graduates. Topics may include internal and external communications; balancing visual and verbal elements in documents and oral presentations; teamwork and leadership; running and attending meetings; management strategies; and communicating with colleagues, superiors, subordinates, and clients. Students develop writing and management strategies that they apply in individual and team assignments. They learn how to organize technical and managerial information, articulate and support ideas, and communicate with technical and nontechnical audiences.

#### ENGRC 350(3500) Engineering Communications (LA)

Fall and spring. 3 credits. Designed for juniors and seniors. Fulfills college technical-writing requirement. May be used as free or approved elective in expressive arts. Limited to 20 students per sec. Prerequisite: two first-year writing seminars and affiliation with a major.

This course prepares students for important communication activities. They write various types of documents (e.g., letters, memos, executive summaries, problem analyses, proposals, progress reports), give oral presentations, and incorporate graphics in their oral and written work. Students learn how to communicate specialized information to different audiences (e.g., technical and nontechnical people, colleagues and clients, peers and supervisors, in-house departments, and government agencies), work in teams, and address organizational and ethical issues. The course material is drawn from professional contexts, principally engineering, and it generates lively discussion. The class size ensures close attention to each student's work. (Note: Absences are limited to three, after which sharp penalties occur.)

### Engineering Distribution Courses

Courses in this category are sophomore-level courses cross-listed with a department. These courses are intended to introduce students to more advanced concepts of engineering and may require pre- or corequisites.

#### ENGRD 201(2010) Introduction to the Physics and Chemistry of the Earth (also EAS 201(2010))

Fall. 3 credits. Prerequisite: PHYS 112 or 207. J. Phipps Morgan.

Covers the formation of the solar system; accretion and evolution of the earth; the rock cycle; radioactive isotopes and the geological time scale; plate tectonics, rocks and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, contaminant transport; and the weathering cycle: chemical cycles, CO<sub>2</sub> (weathering), controls on global temperature (CO<sub>2</sub> or ocean currents), oil and mineral resources.

#### ENGRD 202(2020) Mechanics of Solids (also T&AM 202(2020))

Fall, spring. 4 credits. Prerequisite: PHYS 112, co-registration in MATH 192, or permission of instructor. All students must take a lab section. Staff.

Covers principles of statics, force systems, and equilibrium; frames; mechanics of deformable solids, stress, strain, statically indeterminate problems; mechanical properties of engineering materials; axial force, shearing force, bending moment, thermal stress, stretching; bending and torsion of bars. Laboratory experiments demonstrate basic principles of solid mechanics.

#### ENGRD 203(2030) Dynamics (also T&AM 203(2030))

Fall, spring. 3 credits. Prerequisite: ENGRD/T&AM 202, co-registration in MATH 293, or permission of instructor. All students must take a lab and a section.

Newtonian dynamics of a particle, systems of particles, a rigid body. Kinematics, motion relative to a moving frame. Impulse, momentum, angular momentum, energy. Rigid-body kinematics, angular velocity, moment of momentum, the inertia tensor.



Euler equations, the gyroscope. Laboratory experiments demonstrate basic principles of dynamics.

**ENGRD 210(2100) Introduction to Circuits for Electrical and Computer Engineers (also ECE 210(2100))**

Fall, spring, 4 credits. Corequisites: MATH 293 and PHYS 213. All students must take a lab and a section.

First course in electrical circuits and electronics that establishes the fundamental properties of circuits with application to modern electronics. Topics include circuit analysis methods, operational amplifiers, basic filter circuits, and elementary transistor principles. The laboratory experiments are coupled closely with the lectures.

**ENGRD 211(2110) Computers and Programming (also COM S 211(2110))**

Fall, spring, summer, 3 credits.  
Prerequisite: COM S 100 or equivalent course in Java or C++.

Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, object-oriented programming (classes, objects, types, sub-typing), graphical user interfaces, algorithm analysis (asymptotic complexity, big "O" notation), recursion, data structures (lists, trees, stacks, queues, heaps, search trees, hash tables, graphs), simple graph algorithms. Java is the principal programming language.

**ENGRD 219(2190) Mass and Energy Balances (also CHEME 219(2190))**

Fall, 3 credits. Corequisite: physical chemistry course or permission of instructor. W. L. Olbricht.

Engineering problems involving material and energy balances. Batch and continuous reactive systems in the steady and unsteady states. Introduction to phase equilibria for multicomponent systems. Examples drawn from a variety of chemical and biological processes.

**ENGRD 221(2210) Thermodynamics (also M&E 221(2210))**

Fall, spring, may be offered summer, 3 credits. Prerequisites: MATH 192, Calculus for Engineers, and PHYS 112, Physics I, Mechanics. Staff.

Presents the definitions, concepts, and laws of thermodynamics. Topics considered include the first and second laws, thermodynamic property relationships, and applications to vapor and gas power systems, refrigeration, and heat pump systems. Examples and problems are related to contemporary aspects of energy and power generation and to broader environmental issues.

**ENGRD 230(2300) Introduction to Digital Logic Design**

Fall, spring, 4 credits. Prerequisite: COM S 100.

Introduction to the design and implementation of practical digital circuits. Topics include transistor network design, Boolean algebra, combinational circuits, sequential circuits, finite state machine design, and analog and digital converters. Design methodology using both discrete components and hardware description languages is covered in the weekly laboratory portion of the course.

**ENGRD 241(2410) Engineering Computation (also CEE 241(2410))**

Spring, 3 credits. Prerequisites: COM S 100 and MATH 293. Corequisite: MATH 294. Recommended: completion of MATH 294. C. A. Shoemaker.

Introduction to numerical methods, computational mathematics, and probability and statistics. Development of programming and graphics proficiency with MATLAB and spreadsheets. Topics include: Taylor-series approximations, numerical errors, condition numbers, operation counts, convergence, and stability, probability distributions, hypothesis testing. Included are numerical methods for solving engineering problems that entail roots of functions, simultaneous linear equations, statistics, regression, interpolation, numerical differentiation and integration, and solution of ordinary and partial differential equations, including an introduction to finite difference methods. Applications are drawn from different areas of engineering. A group project uses these methods on a realistic engineering problem.

**ENGRD 251(2510) Engineering for a Sustainable Society (also BEE 251(2510))**

Spring, 3 credits. Corequisite: MATH 293. Offered spring 2007 and fall 2007 and every fall thereafter.

Case studies of contemporary environmental issues including pollutant distribution in natural systems, air quality, hazardous waste management, and sustainable development. Emphasis is on the application of mathematics, physics, and engineering sciences to solve energy and mass balances in environmental sciences. Students are introduced to the basic chemistry, ecology, biology, ethics, and environmental legislation relevant to the particular environmental problem. BEE students must complete either BEE 251 or BEE 260 according to their academic plan. BEE students who complete both BEE 251 and BEE 260 receive engineering credit for only one of these courses.

**ENGRD 252(2520) The Physics of Life (also A&E 252(2520))**

Fall, 3 credits. Prerequisites: MATH 192, CHEM 207 or 211, and co-registration in or completion of PHYS 213. L. Pollack.

Introduces the physics of biological macromolecules (e.g., proteins, DNA, RNA) to students of the physical sciences or engineering who have little or no background in biology. The macromolecules are studied from three perspectives. First, the biological role or function of each class of macromolecules is considered. Second, a quantitative description of the physical interactions that determine the behavior of these systems is provided. Finally, techniques that are commonly used to probe these systems, with an emphasis on current research, are discussed.

**ENGRD 260(2600) Principles of Biological Engineering (also BEE 260(2600))**

Fall, 3 credits. Corequisite: MATH 293.

Focuses on the integration of biological systems with engineering, math, and physical principles. Students learn how to formulate equations for biological systems and practice it in homework sets. Topics range from molecular principles of reaction kinetics and molecular binding events to macroscopic applications, such as energy and mass

balances of bioprocessing and engineering design of implantable sensors. BEE students must complete either BEE 251 or BEE 260 according to their academic plan. BEE students who complete both BEE 251 and BEE 260 receive engineering credit for only one of these courses.

**ENGRD 261(2610) Mechanical Properties of Materials: From Nanodevices to Superstructures (also MS&E 261(2610))**

Fall, 3 credits. S. Sass.

Examines the mechanical properties of materials (e.g., strength, stiffness, toughness, ductility) and their physical origins. The relationship of the elastic, plastic, and fracture behavior to microscopic structure in metals, ceramics, polymers, and composite materials is explored. Effects of time and temperature on materials properties are discussed. This course emphasizes considerations for design and optimal performance of materials and engineered objects.

**ENGRD 262(2620) Electronic Materials for the Information Age (also MS&E 262(2620))**

Spring, 3 credits. Prerequisite: MATH 192. Corequisite: PHYS 213 or permission of instructor. G. Malliaras.

Examines the electrical and optical properties of materials. Topics include the mechanism of electrical conduction in metals, semiconductors and insulators, the tuning of electrical properties in semiconductors, the transport of charge across metal/semiconductor and semiconductor/semiconductor junctions, and the interaction of materials with light. Applications in electrophotography, solar cells, electronics, and display technologies are discussed.

**ENGRD 264(2640) Computer- Instrumentation Design (also A&E 264(2640))**

Fall, spring, 3 credits. Prerequisite: COM S 100; permission of instructor for seniors. 1 lec, 1 lab. T. Cool.

Covers the use of a small computer in an engineering or scientific research lab. The experiments and devices investigated include: analog to digital converters (ADC), digital to analog converters (DAC), digital input/output (I/O), counter/timers, serial port communications, digital temperature control, error analysis, nonlinear least squares fitting of experimental data, viscosity of fluids, a robot arm, and thermal diffusion. C++ programming and graphical programming with LabVIEW™ are used for computer interfacing to hardware. Students develop effective written communication skills in the context of science and engineering. They prepare progress reports, technical reports, and formal articles based on the experiments.

**ENGRD 270(2700) Basic Engineering Probability and Statistics**

Fall, spring, summer, 3 credits. Prerequisites: MATH 191 and 192. MATH 294 should be completed before or concurrently with ENGRD 270.

Gives students a working knowledge of basic probability and statistics and their application to engineering. Includes computer analysis of data and simulation. Topics include random variables, probability distributions, expectation, estimation, testing, experimental design, quality control, and regression.

**[ENGRD 321(3510) Numerical Methods in Computational Molecular Biology (also BIOBM 321(3210), COM S 321(3510))]**

Fall. 3 credits. Prerequisites: at least one calculus course (e.g., MATH 106, 111, or 191) and a linear algebra course (e.g., MATH 221 or 294 or BTRY 417); COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421. Offered odd-numbered years; next offered 2007–2008.

An introduction to numerical computing using MATLAB organized around five applications: the analysis of protein shapes, dynamics, protein folding, score functions, and field equations. Students become adept at plotting, solving linear equations, least squares fitting, and cubic spline interpolation. More advanced problem-solving techniques that involve eigenvalue analysis, the solution of ordinary and partial differential equations, linear programming, and nonlinear minimization are also treated. The goal of the course is to develop a practical computational expertise with MATLAB and to build mathematical intuition for the problems of molecular biology.]

**ENGRD 322(3220) Introduction to Scientific Computation (also COM S 322(3220))**

Spring, summer. 3 credits. Prerequisites: COM S 100 and MATH 221 or 294; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421. Staff.

An introduction to elementary numerical analysis and scientific computation. Topics include interpolation, quadrature, linear and nonlinear equation solving, least-squares fitting, and ordinary differential equations. Uses the MATLAB computing environment. Stresses sectorization, efficiency, reliability, and stability. Special lectures cover computational statistics.

**Courses of General Interest**

Courses in this category are of general interest and cover technical, historical, and social issues relevant to the engineering profession. These courses may also include seminar or tutorial type courses.

**ENGRG 100J(1000J) Cooperative Workshop for COM S 100J(1000J)**

Fall, spring. 1 credit. Corequisite: COM S 100J. S-U grades only.

Academic Excellence Workshop for COM S 100J. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in COM S 100J.

**ENGRG 100M(1000M) Cooperative Workshop for COM S 100M(1000M)**

Fall, spring. 1 credit. Corequisite: COM S 100M. S-U grades only.

Academic Excellence Workshop for COM S 100M. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course

material, designed to enhance understanding of core concepts in COM S 100M.

**ENGRG 150(1050) Engineering Seminar**

Fall. 1 credit. Prerequisite: freshman standing. S-U grades only.

First-year engineering students meet in groups of 18 to 20 students weekly with their faculty advisors. Discussions may include the engineering curriculum and student programs, what engineers do, the character of engineering careers, active research areas in the college and in engineering in general, and study and examination skills useful for engineering students. Groups may visit campus academic, engineering, and research facilities.

**ENGRG 160(1060) Exploration in Engineering Seminar**

Summer. 1 credit. Designed for junior and senior high-school students.

Introduction to several engineering fields, such as: bioengineering, chemical engineering, civil engineering, computer science, earth sciences, electrical and computer engineering, engineering physics, materials science, mechanical engineering, operations research. Hands-on experience in weekly labs, as well as design projects to introduce concepts of the engineering design process.

**ENGRG 191(1091) Cooperative Workshop for MATH 191(1910)**

Fall. 1 credit. Corequisite: MATH 191. S-U grades only.

Academic Excellence Workshop for MATH 191. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in MATH 191.

**ENGRG 192(1092) Cooperative Workshop for MATH 192(1920)**

Fall, spring. 1 credit. Corequisite: MATH 192. S-U grades only.

Academic Excellence Workshop for MATH 192. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in MATH 192.

**ENGRG 210(1010) Cooperative Workshop for COM S 211(2110)**

Fall, spring. 1 credit. Corequisite: COM S 211. S-U grades only.

Academic Excellence Workshop for COM S 211. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in COM S 211.

**ENGRG 211(1011) Cooperative Workshop for CHEM 211(2110)**

Fall. 1 credit. Corequisite: CHEM 211. S-U grades only.

Academic Excellence Workshop for CHEM 211. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in CHEM 211.

**ENGRG 235(2350) Career Development for Engineering**

Spring. 2 credits. Prerequisite: second-semester freshman or sophomore standing.

Introduces concepts and techniques that can be used now and in the future to set

appropriate personal and professional career goals.

**ENGRG 250(2500) Technology in Society (also ECE/HIST 250(2500), S&TS 250(2501))**

Fall. 3 credits. Approved for humanities distribution.

Investigates the history of technology in Europe and the United States from ancient times to the present. Topics include the economic and social aspects of industrialization; the myths of heroic inventors like Morse, Edison, and Ford; the government's regulation of technology; the origins of mass production; and the spread of the automobile and microelectronics cultures in the United States.

**ENGRG 293(1093) Cooperative Workshop for MATH 293(2930)**

Fall, spring. 1 credit. Corequisite: MATH 293. S-U grades only.

Academic Excellence Workshop for MATH 293. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in MATH 293.

**ENGRG 294(1094) Cooperative Workshop for MATH 294(2940)**

Fall, spring. 1 credit. Corequisite: MATH 294. S-U grades only.

Academic Excellence Workshop for MATH 294. Weekly two-hour cooperative learning sessions. Peer-facilitated group works on problems at or above the level of course material, designed to enhance understanding of core concepts in MATH 294.

**ENGRG 298(2980) Inventing an Information Society (also ECE 298(2980), AM ST 292(2980), HIST 292(2920), S&TS 292(2921), INFO 292(2921))**

Spring. 3 credits. Approved for humanities distribution.

Explores the history of information technology from the 1830s to the present by considering the technical and social history of telecommunications, the electric-power industry, radio, television, computers, and the Internet. Emphasis is on the changing relationship between science and technology, the economic aspects of innovation, gender and technology, and other social relations of this technology.

**ENGRG 323(3230) Engineering Economics and Management (also CEE 323(3230))**

Spring, usually offered in summer for Engineering Co-op Program. 3 credits. Primarily for juniors and seniors. Students must register under CEE 323. D. P. Loucks.

Introduction to engineering and business economics and to project management. Intended to give students a working knowledge of money management and how to make economic comparisons of alternative engineering designs or projects. The impact of inflation, taxation, depreciation, financial planning, economic optimization, project scheduling, and legal and regulatory issues are introduced and applied to economic investment and project-management problems.

**[ENGRG 357(3570) Engineering in American Culture (also AM ST 356[3570], S&TS 357[3571], HIST 357[3570])]**

Fall. 4 credits. Approved for humanities distribution. Next offered 2007-2008. The history of engineering in the United States from 1800 to the present. Investigates the education of engineers, how engineering changed from a masculine profession to one more open to women, the building of monumental projects, public images of the engineer, enthusiasm and disasters, and engineering in a global setting.]

**ENGRG 360(3600) Ethical and Social Issues in Engineering (also S&TS 360[3601]) (KCM)**

Spring. 3 credits. Open to sophomores. Studies major ethical and social issues involved in engineering practice. The issues include responsibility for designing products that do not harm public health, safety, and welfare; rights of engineers in large corporations; risk analysis and the principle of informed consent; conflict of interest; whistle blowing; trade secrets; and broader concerns such as environmental degradation, cost of health care, computer ethics, and working in multinational corporations. Codes of ethics of the professional engineering societies, ethical theory, and the history and sociology of engineering are introduced to analyze these issues.

**ENGRG 461(4610) Entrepreneurship for Engineers (also M&AE 461[4610], OR&IE 452[4152])**

Fall. 3 credits. Prerequisite: upper-class engineers or permission of instructor. Staff. For description, see M&AE 461.

**ENGRG 678(6780) Teaching Seminar**

Fall, spring. 1 credit. S-U grades only. Staff. Independent study promoting reflection on teaching styles and experiences for teaching assistants in the College of Engineering. Participants must be concurrently fulfilling a TA assignment. Requirements include participation in the College of Engineering's TA Development Program, consisting of an initial one and one-half day training session, followed by one evening microteaching session early in the semester; participation in the TA midterm evaluation process, followed by a formal feedback session with program staff; and completion of a reflective journal on teaching experiences. Designed to provide TAs with the opportunity to process their understanding of teaching and learning through the formulation of questions, concepts, and theories related to their experiences.

**Introduction to Engineering Courses**

Courses in this category are freshman-level courses intended to introduce students to various aspects of engineering. They have no prerequisites and are always cross-listed with a department.

**ENGRG 102(1020) Introduction to Nanoscience and Nanoengineering (also A&EP 102[1020])**

Fall, spring. 3 credits. Staff. Lecture/laboratory course designed to introduce freshmen to some of the ideas and concepts of nanoscience and nanotechnology. Topics include nanoscience and nanotechnology—what they are and why they are of interest; atoms and molecules; the solid state; surfaces; behavior of light and material

particles when confined to nanoscale dimensions; scanning tunneling microscopy (STM), atomic force microscopy (AFM), microelectromechanical systems (MEMS) design; basic micromachining and chemical synthesis methods, i.e., "top-down" and "bottom-up" approaches to nanofabrication; how to manipulate structures on the nanoscale; physical laws and limits they place on the nanoworld; some far-out ideas. In the laboratory, students use an AFM to record atomic resolution images, use a MEMS computer-aided design software package to model the entire manufacturing sequence of a simple MEMS device, examine the simulated behavior of the device and compare it with real behavior, construct a simple STM and learn through hands on experience the basic workings of the device.

**ENGRG 110(1100) Lasers and Photonics (also A&EP 110[1100])**

Fall. 3 credits. F. Wise. Lasers have had an enormous impact on communications, medicine, remote sensing, and material processing. This course reviews the properties of light that are essential to understanding the underlying principles of lasers and these photonic technologies. There also is a strong, hands-on laboratory component in which the students build and operate a nitrogen laser and participate in several demonstration experiments such as holography, laser processing of materials, optical tweezers, and fiber optics.

**ENGRG 111(1110) Nanotechnology (also MS&E 111[1110])**

Fall. 3 credits. E. Giannelis. Nanotechnology has been enabling the Information Revolution with the development of even faster and more powerful devices for manipulation, storing, and transmitting information. In this hands-on course students learn how to design and manipulate materials to build devices and structures in applications ranging from computers to telecommunications to biotechnology.

**ENGRG 112(1120) Introduction to Chemical Engineering (also CHEME 112[1120])**

Fall. 3 credits. Prerequisite: freshman standing. T. M. Duncan. Design and analysis of processes involving chemical change. Students learn strategies for design, such as creative thinking, conceptual blockbusting, and (re)definition of the design goal, in the context of contemporary chemical and biomolecular engineering. Includes methods for analyzing designs, such as mathematical modeling, empirical analysis by graphics, and dynamic scaling through dimensional analysis, to assess product quality, economics, safety, and environmental issues.

**ENGRG 113(1130) Water Treatment Design (also CEE 113[1130])**

Spring. 3 credits. M. L. Weber-Shirk. Students learn how to design: reservoirs to provide water during droughts, aqueducts to transport water, and water treatment plants to prevent waterborne diseases. The course includes field trips, building a computer-controlled miniature water treatment plant, and exploring new technologies for making safe drinking water.

**ENGRG 115(1101) Engineering Applications of Operations Research**

Fall, spring. 3 credits. Not open to OR&IE upper-class majors. Staff.

Introduction to the problems and methods of operations research and industrial engineering focusing on problem areas (including inventory, network design, and resource allocation), the situations in which these problems arise, and several standard solution techniques. In the computational laboratory, students encounter problem simulations and use some standard commercial software packages.

**ENGRG 116(1160) Modern Structures (also CEE 116[1160])**

Fall. 3 credits. Staff. Introduction to structural engineering in the 21st century—the challenges structural engineers face and the innovative approaches they are using to address them. Using case studies of famous structures, students learn to identify different structural forms and understand how various forms carry load—using principles of statics, mechanics, and material behavior. The historical, economic, social, and political context for each structure is discussed. Case studies of failures are used to explain how structures fail in earthquakes and other extreme events, and students are introduced to analytical and experimental approaches (shake table and wind tunnel testing) to quantifying loads on structures subjected to extreme events. Types of structures considered include skyscrapers, bridges, aircraft, and underground structures.

**ENGRG 117(1170) Introduction to Mechanical Engineering (also M&AE 117[1170])**

Fall. 3 credits. 2 lec and 1 lab per week. Introduction to fundamentals of mechanical and aerospace engineering. Students learn and understand materials characteristics, the behavior of materials, and material selection for performing engineering function. They also learn fundamentals of fluid mechanics, heat transfer, automotive engineering, engineering design and product development, patents and intellectual property, and engineering ethics. In the final project, students use the information learned to design and manufacture a product.

**[ENGRG 118(1180) Design Integration: DVDs and iPods (also T&AM 118[1180])]**

Spring. 3 credits. Not offered 2006-2007. W. Sachse.

This course examines the broad range of systems and engineering technologies required to build today's remarkable music/data and video sources.]

**ENGRG 119(1190) Biomaterials for the Skeletal System (also MS&E 119[1190])**

Fall. 3 credits. D. Grubb. Biomaterials are at the intersection of biology and engineering. This course explores natural structural materials in the human body, their properties and microstructure, and their synthetic and semi-synthetic replacements. Bones, joints, teeth, tendons, and ligaments are used as examples, with their metal, plastic, and ceramic replacements. Topics include strength, corrosion, toxicity, wear, and bio-compatibility. Case studies of design lead to consideration of regulatory approval requirements and legal liability issues.

**ENGRI 122(1120) Earthquake! (also EAS 122[1220])**

Spring, 3 credits.

Explores the science of natural hazards and strategic resources. Covers techniques for locating and characterizing earthquakes, and assesses the damage they cause; methods of using sound waves to image the earth's interior to search for strategic materials; and the historical importance of such resources. Includes seismic experiments on campus to probe for groundwater, the new critical environmental resource.

**ENGRI 124(1240) Designing Materials for the Computer (also MS&E 124[1240])**

Spring, 3 credits. Staff.

Introduces the materials, processes, and properties of the semiconductors, polymers, ceramics, and metals used in the microelectronics industry to form integrated circuits, electronic devices, and displays. Examines lithographic processing, metallization, diffusion, ion implantation, oxidation, and other processes used in fabricating electronic devices and their packages. Discusses the technology of displays, including liquid crystal displays and light-emitting devices.

**ENGRI 126(1260) Introduction to Signals and Telecommunications**

Spring, 3 credits.

Introduces the concepts that underlie wired and wireless communication systems. Students achieve a rudimentary understanding of basic ideas such as coding and data compression; frequency content, bandwidth, and filtering; sampling and reconstruction; and time- and frequency-division multiplexing. Discussions of practical applications focus on areas such as the public switched telephone network, ISDN, ATM, and TCP/IP. Students also develop an appreciation for the historical development of the field. The course includes both lectures and laboratory demonstrations.

**ENGRI 127(1270) Introduction to Entrepreneurship and Enterprise Engineering (also M&AE 127[1270])**

Spring, 3 credits. Open to all Cornell students regardless of major. Prerequisite: none.

Provides a solid introduction to the entrepreneurial process to students in engineering. The main objective is to identify and to begin to develop skills in the engineering work that occurs in high-growth, high-tech ventures. Basic engineering management issues, including the entrepreneurial perspective, opportunity recognition and evaluation, and gathering and managing resources are covered. Technical topics such as the engineering design process, product realization, and technology forecasting are discussed.

**ENGRI 131(1310) Introduction to Biomedical Engineering (also BME 131[1310])**

Spring, 3 credits. Prerequisite: freshman or sophomore standing. C. B. Schaffer and S. D. Archer.

Modern biology and medicine is undergoing a revolution as quantitative principles of measurement, analysis, and design are introduced to help solve a variety of scientific and medical problems. This course will provide an introduction to the study of biological systems with a quantitative perspective from the molecular to the cellular to the organism scale, as well as to the design

of practical devices for studying biological systems and treating disease. Collaborative work will be a key element in all aspects of the course, from the lectures and labs, to the assignments and term project.

**ENGRI 165(1610) Computing in the Arts (also ART 175, CIS 165[1610], COM S 165[1610], MUSIC 165[1465], PSYCH 165[1650])**

Fall, 3 credits. Complements ART 171+ and MUSIC 120+. S-U grades optional. For description, see COM S 165.

**ENGRI 167(1670) Visual Imaging in the Electronic Age (also ART 170[1700], CIS 167[1620], COM S 167[1620])**

Spring, 3 credits. S-U grades optional. Staff. For description, see ART 170.

**ENGRI 172(1700) Computation, Information, and Intelligence (also COGST 172, COM S 172[1700], INFO 172[1700])**

Fall, 3 credits. Prerequisites: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100. An introduction to computer science using methods and examples from the field of artificial intelligence. Topics include game playing, search techniques, learning theory, compute-intensive methods, data mining, information retrieval, the web, natural language processing, machine translation, and the Turing test. This is not a programming course; rather, "pencil and paper" problem sets are assigned. Some calculus required.

**APPLIED AND ENGINEERING PHYSICS**

J. D. Brock, director; B. R. Kusse, associate director for undergraduate studies; F. W. Wise, director of graduate studies; R. A. Buhrman, T. A. Cool, H. G. Craighead, A. L. Gaeta, V. O. Kostroun, M. Lindau, R. V. E. Lovelace, D. Muller, L. Pollack, J. Silcox, W. W. Webb, C. Xu. Adjunct faculty: D. H. Bilderback, S. Heinekamp. Senior research associate: E. J. Kirkland. Instructor: M. J. Plisch, L. Wickham

**A&EP 102(1020) Introduction to Nanoscience and Nanoengineering (also ENGRI 102[1020])**

Spring, 3 credits. Course in Introduction to Engineering series. For description, see ENGRI 130.

**A&EP 110(1110) Lasers and Photonics (also ENGRI 110[1100])**

Fall, 3 credits. F. Wise. Course in Introduction to Engineering series. For description, see ENGRI 110.

**A&EP 217(2170) Electricity and Magnetism (also PHYS 217[2217])**

Fall, spring, 4 credits. Prerequisites: permission of advisor and instructor; co-registration in PHYS 216 or knowledge of special relativity at level of PHYS 116; MATH 192 or equivalent and co-registration in MATH 293 or equivalent. Staff.

Intended for students who have done well in PHYS 112 or 116 (or equivalent) and mathematics and who desire a more analytic treatment than that of PHYS 213. At the level of *Electricity and Magnetism* by Purcell. Recommended for prospective engineering physics majors. Placement quiz may be given

early in semester, permitting students who find material too abstract or analytical to transfer into PHYS 213 without difficulty.

**A&EP 252(2520) The Physics of Life (also ENGRD 252[2520])**

Fall. Prerequisites: MATH 192, CHEM 207 or 211, and co-registration in or completion of PHYS 213. L. Pollack. For description, see ENGRD 252.

**A&EP 264(2640) Computer-Instrumentation Design (also ENGRD 264[2640])**

Fall, spring, 3 credits. Prerequisites: seniors by permission of instructor; COM S 100. 1 lec, 1 lab. For description, see ENGRD 264.

**A&EP 321(3210) Mathematical Physics I**Fall, summer, 4 credits. Prerequisite: MATH 294. Intended for upper-level undergraduates in physical sciences. B. Kusse. Review of vector analysis; complex variable theory, Cauchy-Riemann conditions, complex Taylor and Laurent series, Cauchy integral formula and residue techniques, conformal mapping; Fourier Series; Fourier and Laplace transforms; ordinary differential equations; separation of variables. Texts: *Mathematical Methods for Physicists* by Arfken and *Mathematical Physics* by Butkov.**A&EP 322(3220) Mathematical Physics II**

Spring, 4 credits. Prerequisite: A&amp;EP 321. Second of two-course sequence in mathematical physics intended for upper-level undergraduates in physical sciences. B. Kusse.

Topics include partial differential equations, Bessel functions, spherical harmonics, separation of variables, wave and diffusion equations, Laplace, Helmholtz, and Poisson's Equations, transform techniques, Green's functions; integral equations, Fredholm equations, kernels; complex variables, theory, branch points and cuts, Riemann sheets, method of steepest descent; tensors, contravariant, and covariant representations; group theory, matrix representations, class and character. Texts: *Mathematical Methods for Physicists* by Arfken and *Mathematical Physics* by Butkov.

**A&EP 324(3240) Maple Supplement to Mathematical Physics 321 and 322**

Spring, 1 credit. R. V. E. Lovelace. A broad introduction to Maple in applications to problems of mathematical physics similar to those covered in A&amp;EP 321 and 322. Uses Maple to solve differential equations—both linear and nonlinear. Makes extensive use of plotting capabilities of Maple. Also covers matrices, complex functions, Laplace and Fourier transforms (and FFTs), and group theory. Gives an introduction to LaTeX.

**A&EP 330(3330) Modern Experimental Optics (also PHYS 330[3300])**

Fall, 4 credits. Limited enrollment. Prerequisite: PHYS 214 or equivalent. E. Bodenschatz.

Practical laboratory course in basic and modern optics. The various projects cover a wide range of topics from geometrical optics to classical wave properties such as interference, diffraction, and polarization. Each experimental setup is equipped with standard, off-the-shelf optics and opto-mechanical components to provide the students with hands-on experience in practical laboratory techniques currently employed in physics,



chemistry, biology, and engineering. Students are also introduced to digital imaging and image processing techniques.

**A&EP 333(3330) Mechanics of Particles and Solid Bodies**

Fall, summer. 4 credits. Prerequisites: PHYS 112 or 116 and co-registration in A&EP 321 or equivalent or permission of instructor. Staff.

Covers Newton's mechanics; constants of the motion; many-body systems; linear oscillations; variational calculus; Lagrangian and Hamiltonian formalism for generalized coordinates; non-inertial reference systems; central-force motion; motion of rigid bodies; small vibrations in multi-mass systems; nonlinear oscillations; and basic introduction to relativistic mechanics. Emphasis is on mathematical treatments, physical concepts, and applications. (At the level of *Classical Dynamics* by Marion and Thornton.)

**A&EP 355(3550) Intermediate Electromagnetism**

Fall, summer. 4 credits. Prerequisites: PHYS 214 or 217 and co-registration in A&EP 321 or equivalent, or permission of instructor. Staff.

Topics include vector calculus, electrostatics, analytic and numerical solutions to Laplace's equation in various geometries, electric and magnetic multipoles, electric and magnetic materials, energy in fields, quasistatics, and magnetic circuit design. Emphasis is on developing proficiency with analytical and numerical solution techniques in order to solve real-world design problems.

**A&EP 356(3560) Intermediate Electrodynamics**

Spring. 4 credits. Prerequisite: A&EP 355 and co-registration in A&EP 322 or equivalent, or permission of instructor. Staff.

Topics include electromagnetic waves, waveguides, transmission lines, dispersive media, radiation, special relativity, interference phenomena. Emphasis is on physical concepts and developing ability to design/analyze microwave circuits and antenna arrays.

**A&EP 361(3610) Introductory Quantum Mechanics**

Spring. 4 credits. Prerequisites: A&EP 333 or PHYS 318. Corequisite: A&EP 322 or equivalent; A&EP 356 or PHYS 326.

First course in the systematic theory of quantum phenomena. Topics include wave mechanics, the Dirac formalism, spin and orbital angular momentum, the hydrogen atom, and perturbation theory.

**A&EP 363(3630) Electronic Circuits (also PHYS 360[3360])**

Fall, spring. 4 credits. Prerequisites: PHYS 208 or 213 or permission of instructor. No previous experience with electronics assumed; however, course moves quickly through introductory topics such as basic DC circuits. Fall semester usually less crowded. 1 lec, 2 labs. Fall: E. Kirkland; spring: J. Alexander.

Students analyze, design, build, and experimentally test circuits used in scientific and engineering instrumentation (with discrete components and integrated circuits). Analog circuits: resistors, capacitors, operational amplifiers (linear amplifiers with feedback, oscillators, comparators), filters, diodes, and transistors. Digital circuits: combinatorial (gates) and sequential (flip-flops, counters,

shift registers) logic. Computer interfacing introduced and used to investigate digital to analog (DAC) and analog to digital conversion (ADC) and signal averaging.

**A&EP 423(4230) Statistical Thermodynamics**

Fall. 4 credits. Prerequisite: introductory three-semester physics sequence and one year junior-level mathematics. Staff.

Quantum statistical basis for equilibrium thermodynamics, microcanonical, canonical and grand canonical ensembles, and partition functions. Classical and quantum ideal gases, paramagnetic and multiple-state systems. Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein statistics and applications. Introduction to systems of interacting particles. At the level of *Thermal Physics* by Kittel and Kroemer and *Statistical Physics* by Rosser.

**A&EP 434(4340) Continuum Physics**

Spring. 4 credits. Prerequisites: A&EP 333 and 356 or equivalent. Staff.

Topics: Elasticity and Fluid Mechanics: basic phenomena of elasticity, simple beams, stress and strain tensors, materials equations, equations of motion, general beam equations, waves; fluids: basic phenomena, Navier Stokes equation, scaling laws, Reynolds and Froude numbers, Poiseuille flows, Stokes drag on sphere, boundary layers, inviscid and incompressible flows, potential flow, conservation laws, Bernoulli equation, vorticity and circulation, life of wings, jets, instabilities, introduction to turbulence. Projects in combination with A&EP 438 possible. At the level of *Continuum Mechanics* by Lai, Rubin, and Krempf and *Introduction to Fluid Mechanics* by Tritton.

**A&EP 438(4380) Computational Engineering Physics**

Spring. 3 credits. Prerequisites: COM S 100, A&EP 321, 333, 355, 361, or equivalent, or permission of instructor; co-registration in 361 permitted. Staff.

Numerical computation (e.g., derivatives, integrals, differential equations, matrices, boundary-value problems, relaxation, Monte Carlo methods) is introduced and applied to engineering physics problems that cannot be solved analytically (e.g., three-body problem, electrostatic fields, quantum energy levels). Computer programming required (in C or optionally C++, FORTRAN, or Pascal). Some prior exposure to programming assumed but no previous experience with C assumed.

**A&EP 440(4440) Quantum and Nonlinear Optics**

Spring. 4 credits. Prerequisites: A&EP 356, 361, or equivalent. Staff.

Introduction to the fundamentals of the interaction of laser light with matter and to optical devices based on these processes. Topics include the propagation of laser beams in bulk media and guided-wave structures, the origins of optical nonlinearities, harmonic generation, parametric amplification, self-focusing, optical bistability, propagation of ultrashort pulses, solitons, four-wave mixing, optical phase conjugation, optical resonance and two-level atoms, atom cooling and trapping, multiphoton processes, spontaneous and simulated scattering, and ultra-intense laser-matter interactions.

**A&EP 450(4500) Introductory Solid State Physics (also PHYS 454[4454])**

Fall. 4 credits. Highly recommended: some exposure to quantum mechanics at level of PHYS 443, A&EP 361, or CHEM 793. Staff.

Introduction the physics of crystalline solids. Covers crystal structures; electronic states; lattice vibrations; and metals, insulators, and semiconductors. Computer simulations of the dynamics of electrons and ions in solids. Covers optical properties, magnetism, and superconductivity as time allows. The majority of the course addresses the foundations of the subject, but time is devoted to modern and/or technologically important topics such as quantum size effects. At the level of *Introduction to Solid State Physics* by Kittel or *Solid State Physics* by Ashcroft and Mermin.

**A&EP 470(4700) Biophysical Methods (also BIONB 470[4700])**

Fall. 3 credits. Prerequisites: solid knowledge of basic physics and mathematics through sophomore level. Recommended: some knowledge of cellular biology. Letter grades only.

Overview of the diversity of modern biophysical experimental techniques used in the study of biophysical systems at the cellular and molecular level. Topics include methods that examine both structure and function of biological systems, with emphasis on the applications of these methods to biological membranes. The course format includes assigned literature reviews by the students on specific biophysics topics and individual student presentations on these topics. The course is intended for students of the engineering, physics, chemistry, and biological disciplines who seek an introduction to modern biophysical experimental methods.

**A&EP 484(4840) Introduction to Controlled Fusion: Principles and Technology (also ECE/NS&E 484[4840], M&AE 459[4590])**

Spring. 3 credits. On demand. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students.

For description, see NS&E 484.

**A&EP 490-491(4900-4910) Independent Study in Engineering Physics**

Fall, spring. Credit TBA.

Laboratory or theoretical work in any branch of engineering physics under the direction of a member of the faculty. The study can take a number of forms; for example, design of laboratory apparatus, performance of laboratory measurements, computer simulation or software developments, theoretical design and analysis. Details TBA with respective faculty member.

**A&EP 550(5500) Applied Solid State Physics**

Spring. 3 credits. Prerequisites: A&EP 356, 361, 423, 450 or equivalent.

Directed at students who have had an introductory course in solid state physics at the level of Kittel. Concentrates on the application of the quantum mechanical theory of solid state physics to semiconductor materials, solid state electronic devices, solid state detectors and generators of electro-magnetic radiation, superconducting devices and materials, the nonlinear optical properties of solids, ferromagnetic materials, nanoscale devices, and mesoscopic quantum



mechanical effects. The course stresses the basic, fundamental physics underlying the applications rather than the applications themselves. At the level of *Introduction to Applied Solid State Physics* by Dalven.

**A&EP 571(5710) Biophysical Methods Advanced Laboratory**

Spring, first three weeks of Jan. or TBA during spring semester. 3 credits. Prerequisite: A&EP 470 highly recommended but qualified students who have not taken A&EP 470 also accepted. Letter or S-U grades. M. Lindau.

Offered to students in the engineering, physics, chemistry and biological disciplines who are interested in research at the interface between physical sciences/engineering and life sciences. In groups of two, participants perform five experiments in research laboratories on state-of-the-art equipment. Lab training sessions are arranged individually in January and throughout the spring semester. Typically each experiment is two days in the lab plus one day for analysis and report writing. The course is intended for students who seek hands-on introduction to modern biophysical experimental methods.

**A&EP 607(6070) Advanced Plasma Physics (also ECE 582[5820])**

Spring. On demand. 4 credits. Prerequisites: ECE 581 and A&EP 606. For description, see ECE 582.

**A&EP 633(6330) Nuclear Reactor Engineering (also NS&E 633[6330])**

Fall. 4 credits. Prerequisite: introductory course in nuclear engineering. Offered on demand. K. B. Cady. For description, see NS&E 633.

**A&EP 661(6610) Nanocharacterization**

Fall. 3 credits. Prerequisites: Fourier transforms, basic electromagnetism, and undergraduate quantum mechanics or chemistry. Undergraduates should consult with instructor before enrolling.

Graduate-level introduction to the tools used to image and probe optical, electronic, chemical, and mechanical properties at the nanoscale and below. Discussion centers on the physics of the interaction processes used for characterization, quantification, and interpretation of the collected signals, common artifacts, the engineering trade-offs made in constructing the actual instruments, and the fundamental detection limits for each method. Topics include the interaction of electrons, ions, and photons with materials; scanned probe and force microscopy; scanning and transmission electron microscopy; x-ray microanalysis; electron energy loss spectroscopy; and a brief survey of non-imaging methods such as RBS, XPS, and SIMS.

**A&EP 662(6620) Micro/Nano-fabrication and Processing**

Spring. 3 credits.

Introduction to the fundamentals of micro- and nano-fabricating and patterning thin-film materials and surfaces, with emphasis on electronic and optical materials, micro-mechanics, and other applications. Vacuum and plasma thin-film deposition processes. Photon, electron, X-ray, and ion-beam lithography. Techniques for pattern replication by plasma and ion processes. Emphasis is on understanding the physics and materials science that define and limit the various processes. At the level of Brodie and Muray.

**A&EP 663(6630) Nanobiotechnology (also BIO G 663[6630], MS&E 563[5630])**

Spring. 3 credits. Letter grades only. C. Batt.

Upper-level undergraduate and graduate-level course that covers the basics of biology and the principles and practice of microfabrication techniques. The course focuses on applications in biomedical and biological research. A team design project that stresses interdisciplinary communication and problem solving is one of the course requirements. The course meets twice weekly with 75-minute classes. All lectures are teleconferenced to NBTC associate institutes.

**A&EP 711(7110) Principles of Diffraction (also MS&E 671[6710])**

Fall. 3 credits. Letter grades only. J. D. Brock.

Graduate-level introduction to diffraction/scattering phenomena in the context of solid-state and soft condensed-matter systems. The primary topic is using the scattering and absorption of neutron, electron, and X-ray beams to study physical systems. Particular emphasis is placed on issues related to synchrotron X-ray sources. Specific topics that are covered in the course include: elastic and inelastic scattering; diffraction from two- and three-dimensional periodic lattices; the Fourier representation of scattering centers and the effects of thermal vibrations and disorder; diffraction, reflectivity, or scattering from surface layers; diffraction or scattering from gases and amorphous materials; small angle scattering; X-ray absorption spectroscopy; resonant (e.g., magnetic) scattering; novel techniques using coherent X-ray beams; and a survey of dynamical diffraction from perfect and imperfect lattices.

**A&EP 751(7510) M.Eng. Project**

Fall, spring. 6–12 credits TBA. Requirement for M.Eng. (engineering physics) students.

Independent study under the direction of a member of the university faculty. Students participate in an independent research project through work on a special problem related to their field of interest. A formal and complete research report is required.

**A&EP 753(7530) Special Topics Seminar in Applied Physics**

Fall. 1 credit. Requirement for M.Eng.

(engineering physics) students; recommended for seniors in engineering physics. Prerequisite: undergraduate physics.

Special topics in applied science, with focus on areas of applied physics and engineering that are of current interest. Subjects chosen are researched in the library and presented in a seminar format by the students. Effort is made to integrate the subjects within selected subject areas such as atomic, biological, computational, optical, plasma, and solid-state physics, or microfabrication technology, as suggested by the students and coordinated by the instructor.

**[A&EP 781(7810) Advanced Plasma Physics I: Cosmic Plasma Physics**

Fall. 3 credits. Not offered 2006–2007. R. Lovelace.

Uses *Cosmic Plasma Physics* by Somov and covers the following topics: charged particles and EM fields, statistical description of plasma, distribution functions and the Vlasov equation, propagation of particles, motion of particles in given fields, wave particle interactions, Coulomb collisions, hydrodynamic description

of plasmas, magnetohydrodynamic description of plasmas, and cosmic plasma flows.]

**A&EP 782(7820) Advanced Plasma Physics (also ECE 682[6820])**

Spring. 3 credits. Prerequisite: ECE 581. C. E. Seyler.

For description, see ECE 682.

## BIOLOGICAL AND ENVIRONMENTAL ENGINEERING

M. F. Walter, chair; B. A. Ahner, L. D. Albright, D. J. Aneshansley, A. J. Baemumner, J. A. Bartsch, A. K. Datta, K. G. Gebremedhin, D. A. Haith, J. B. Hunter, L. H. Irwin, W. J. Jewell, D. Luo, J. C. March, J.-Y. Parlange, N. R. Scott, R. M. Spanswick, T. S. Steenhuis, M. B. Timmons, L. P. Walker, M. T. Walter. Lecturers: T. J. Cook, L. D. Geohring, P. E. Hillman

For complete course descriptions, see "Biological and Environmental Engineering" under "College of Agriculture and Life Sciences" or visit the department web site, [www.bee.cornell.edu](http://www.bee.cornell.edu).

**BEE 102(1102) Introduction to Microcomputer Applications**

Fall, spring. 3 credits. All students, including those pre-enrolled, must attend first lec and first lab to guarantee admittance to a desired lab sec. All graduating seniors admitted as long as they attend first lec. After first lec, students admitted only by permission of instructor. No students admitted after first lab.

**BEE 110(1030) Introduction to Metal Fabrication Techniques**

Spring. 3 credits. Limited to 20 students per lab.

**BEE 132(1040) Introduction to Wood Construction**

Fall. 3 credits. Limited to 16 students per lab.

**BEE 151(1510) Introduction to Computer Programming**

Fall. 4 credits. Limited to 18 students per lab and rec. Pre- or corequisite: MATH 191 or equivalent. No previous programming experience assumed.

**BEE 200(1200) The BEE Experience**

Spring. 1 credit. Requirement for CALS BEE freshmen. Not required for students who have completed ENGRG 150. Prerequisite: BEE majors or permission of instructor.

**BEE 222(2220) Bioengineering Thermodynamics and Kinetics**

Spring. 3 credits. Prerequisites: MATH 192, BIO G 110, PHYS 213, and chemistry course.

**BEE 251(2510) Engineering for a Sustainable Society (also ENGRD 251[2510])**

Spring. 3 credits. Corequisite: MATH 293. Offered spring 2007 and fall 2007 and every fall thereafter.

**BEE 260(2600) Principles of Biological Engineering (also ENGRD 260[2600])**

Fall. 3 credits. Corequisite: MATH 293.

**BEE 299(3299) Sustainable Development: A Web-Based Course**

Spring, summer. 3 credits. Prerequisite: at least sophomore standing. S-U grades optional.

**BEE 305(3050) Principles of Navigation (also NAV S 301[3050])**

Spring. 4 credits. Four classes each week (lec-rec-project work).

**BEE 310(1050) Advanced Metal Fabrication Techniques**

Spring. 1-2 credits. Prerequisite: BEE 110 or permission of instructor.

**[BEE 325(3250) Environmental Management**

Fall. 3 credits.]

**BEE 331(3310) Bio-Fluid Mechanics**

Fall. 4 credits. Prerequisites: ENGRD 202 and engineering math sequence.

**BEE 350(3500) Biological and Environmental Transport Processes**

Fall. 3 credits. Pre- or corequisites: MATH 293 and fluid mechanics course.

**BEE 360(3600) Molecular and Cellular Bioengineering (also BME 360[3600])**

Spring. 3 credits. Prerequisite: biochemistry course or A&EP 252 or permission of instructor.

**BEE 362(3620) Fundamentals of Tissue Engineering**

Spring. 3 credits. Limited to 25 students. Prerequisites: biochemistry course, BEE 350. Priority given to graduating seniors.

**BEE 365(3650) Properties of Biological Materials**

Spring. 3 credits. Pre- or corequisite: ENGRD 202.

**BEE 368(3680) Biotechnology Applications: Animal Bioreactors**

Fall. 3 credits. Prerequisite: biochemistry course or permission of instructor.

**BEE 371(3710) Physical Hydrology for Ecosystems**

Spring. 3 credits. Prerequisite: MATH 192 or permission of instructor.

**BEE 401(4010) Renewable Energy Systems**

Spring. 3 credits. Prerequisite: college physics.

**BEE 427(4270) Water Sampling and Measurement**

Fall. 3 credits. Prerequisites: fluids or hydrology course and MATH 191.

**BEE 435(4350) Principles of Aquaculture**

Spring. 3 credits. Prerequisite: at least junior standing.

**BEE 450(4500) Bioinstrumentation**

Spring. 4 credits. Prerequisites: MATH 294, BEE 151, PHYS 213, or permission of instructor.

**BEE 453(4530) Computer-Aided Engineering: Applications to Biomedical Processes (also M&AE 453[4530])**

Spring. 3 credits. Prerequisite: heat and mass transfer course (BEE 350 or equivalent).

**BEE 454(4540) Physiological Engineering**

Fall. 3 credits. Corequisite: fluid mechanics course.

**[BEE 459(4590) Biosensors and Bioanalytical Techniques**

Fall. 3 credits. Prerequisite: biochemistry course or permission of instructor. Next offered 2007-2008.]

**BEE 464(4640) Bioseparation Processes**

Fall. 3 credits. Prerequisites: introductory biochemistry and physics, MATH 192, BEE 260, or permission of instructor.

**BEE 471(4710) Introduction to Groundwater (also EAS 471[4710])**

Spring. 3 credits. Prerequisites: MATH 293, fluid mechanics or hydrology course.

**BEE 473(4730) Watershed Engineering**

Fall. 3 credits. Prerequisite: fluid mechanics or hydrology course.

**BEE 474(4740) Water and Landscape Engineering Applications**

Spring. 3 credits. Prerequisite: fluid mechanics or hydrology course or permission of instructor.

**BEE 475(4750) Environmental Systems Analysis**

Fall. 3 credits. Prerequisites: computer programming course and one year of calculus.

**BEE 476(4760) Solid Waste Engineering**

Spring. 3 credits. Prerequisites: one semester of physics and chemistry.

**BEE 478(4780) Ecological Engineering**

Spring. 3 credits. Prerequisite: junior-level environmental quality engineering course or equivalent.

**BEE 481(4791) LRFD-Based Engineering of Wood Structures (also CEE 481[4781])**

Spring. 3 credits. Prerequisite: ENGRD 202.

**BEE 482(4820) Biothermal Engineering for Humans**

Fall. 3 credits. Prerequisites: BEE 350 or equivalent and introductory biology.

**BEE 484(4840) Metabolic Engineering**

Spring. 3 credits. Prerequisite: biochemistry course or permission of instructor.

**[BEE 487(4870) Sustainable Energy Systems**

Fall. 3 credits. Prerequisites: BEE 350 and thermodynamics course. Next offered 2007-2008.]

**BEE 489(4890) Engineering Entrepreneurship, Management, and Ethics**

Spring. 4 credits. Prerequisites: ENGRD 270 or CEE 304 or equivalent; junior standing.

**BEE 493(4930) Technical Writing for Engineers**

Fall, spring. 1 credit. Corequisite: BEE 450 (spring), 473 (fall).

**BEE 494(4940) Mini Baja (also M&AE 490, sec. 56)**

Fall, spring. 1-4 credits. Prerequisite: permission of instructor.

**BEE 495(4950) Honors Research**

Fall, spring. 1-6 credits. Prerequisite: enrollment in BEE Honors Research Program.

**BEE 496(4960) Capstone Design in Biological and Environmental Engineering**

Fall, spring. 1 credit. Corequisite: BEE 435 or 473 or 478, or 481.

**BEE 497(4970) Individual Study in Biological and Environmental Engineering**

Fall, spring. 1-4 credits. Prerequisite: written permission of instructor and adequate ability and training for work proposed. Normally reserved for seniors in upper two-fifths of their class. Students must register using independent study form (available in 207 Riley-Robb Hall).

**BEE 498(4980) Undergraduate Teaching**

Fall, spring. 1-4 credits. Prerequisite: written permission of instructor. Students must register using independent study form (available in 207 Riley-Robb Hall).

**BEE 499(4990) Undergraduate Research**

Fall, spring. 1-4 credits. Prerequisites: written permission of instructor; adequate training for work proposed. Normally reserved for seniors in upper two-fifths of their class. Students must register using independent study form (available in 207 Riley-Robb Hall).

**BEE 501(5010) Bioengineering Seminar (also BME 501[5010])**

Fall, spring. 1 credit. Prerequisite: junior, senior, or graduate standing. S-U grades only.

**BEE 520(5900) M.P.S. Project**

Fall, spring. 1-6 credits. Requirement for all M.P.S. candidates in field.

**BEE 551(5950) Master of Engineering Design Project**

Fall, spring. 3-6 credits. Prerequisite: admission to M.Eng. (biological and environmental) degree program.

**[BEE 625(6250) Environmental Management**

Fall. 3 credits.]

**[BEE 647(6470) Water Transport in Plants (also BIOPL 651[6510])**

Fall. 2 credits. Next offered 2007-2008.]

**BEE 649(6490) Solute Transport in Plants (also BIOPL 649[6490])**

Fall. 3 credits.

**BEE 651(6510) Bioremediation: Engineering Organisms to Clean Up the Environment**

Spring. 3 credits. Prerequisites: BIOMI 290 or BIOBM 331 or permission of instructor.

**[BEE 655(6550) Thermodynamics and Its Applications**

Fall. 3 credits. Prerequisite: MATH 293 or equivalent; for undergraduates, permission of instructor. Next offered 2007-2008.]

**[BEE 659(6590) Biosensors and Bioanalytical Techniques**

Fall. 3 credits. Prerequisites: biochemistry course and permission of instructor. Next offered 2007-2008.]

**BEE 671(6710) Analysis of the Flow of Water and Chemicals in Soils**

Fall. 3 credits. Prerequisites: four calculus courses and fluid mechanics course.

**BEE 672(6720) Drainage**

Spring. 4 credits. Prerequisite: BEE 471 or 473.

**BEE 673(6730) Sustainable Development Seminar (also NBA 573[5730])**

Spring. 1-3 credits. Prerequisite: upper-division undergraduate or graduate standing or permission of instructor.

**BEE 687(6870) The Science and Engineering Challenges to the Development of Sustainable Bio-Based Industries**

Fall. 1 credit. Prerequisite: graduate standing. S-U grades only.

**[BEE 694(6940) Ecohydrology**

Spring. 3 credits. Prerequisite: ecohydrology or hydrology course. Next offered 2007–2008.]

**BEE 697(6970) Graduate Individual Study in Biological and Environmental Engineering**

Fall, spring. 1–6 credits. Prerequisite: permission of instructor. S-U grades optional.

**BEE 700(7010) BEE Seminar Series**

Fall. 1 credit. S-U grades only.

**BEE 740(6430) Veterinary Perspectives on Pathogen Control in Animal Manure (also VTMED 740[6430], BIOMI 740[6430])**

Spring. 2 credits. Prerequisite: graduate standing or permission of instructor.

**BEE 750(7000) Orientation to Graduate Study**

Fall. 1 credit. Prerequisite: newly joining graduate students. S-U grades only.

**[BEE 754(7540) Watershed Management**

Spring. 2–3 credits. Prerequisite: graduate standing or permission of instructor. S-U grades only. Next offered 2007–2008.]

**BEE 760(7600) Nucleic Acid Engineering (also BME 760[7600])**

Spring. 2 credits. Prerequisite: BEE 360 or permission of instructor; graduate standing.

**BEE 771(7710) Soil and Water Engineering Seminar**

Fall, spring. 1–3 credits. Prerequisite: graduate standing or permission of instructor. S-U grades only.

**BEE 781(7810) Structures and Related Topics Seminar**

Spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only.

**BEE 785(7850) Biological Engineering Seminar**

Spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only.

**BEE 787(7870) Industrial Ecology of Agriculturally Based Bioindustries**

Spring. 3 credits. Prerequisites: one year calculus, MATLAB, BEE 687, graduate standing.

**BEE 788(7880) Biomass Conversion of Energy and Chemicals**

Fall. 3 credits. Prerequisites: one year college calculus and chemistry; minimum of one course in thermodynamics and computer programming.

**BEE 800(8900) Master's-Level Thesis Research**

Fall, spring. 1–15 credits. Prerequisite: permission of advisor. S-U grades only.

**BEE 900(9900) Doctoral-Level Thesis Research**

Fall, spring. 1–15 credits. Prerequisite: permission of advisor. S-U grades only.

## BIOMEDICAL ENGINEERING

M. L. Shuler, James M. and Marsha McCormick chair; L. J. Bonassar, associate chair; W. L. Olbricht, director of graduate studies; D. L. Bartel, P. C. Doerschuk, D. A. Putnam, C. B. Schaffer, D. J. Skorton, Y. Wang, W. R. Zipfel. Senior lecturers: S. D. Archer, D. Lipson

**BME 131(1310) Introduction to Biomedical Engineering (also ENGRI 131[1310])**

Spring. 3 credits. Prerequisite: freshman or sophomore standing. C. B. Schaffer and S. D. Archer.

For description, see ENGRI 131.

**BME 301(3010) Molecular Principles of Biomedical Engineering (also CHEME 401[4010])**

Fall. 3 credits. Prerequisite: Basic biology such as BIO G 110, BIOBM 330, or BIOMI 290. Lec and lab. M. P. DeLisa and S. D. Archer.

Introduction to genomics, proteomics, bioinformatics, and computational biology with an emphasis on the engineering challenges for these areas. Covers cytoskeletal and motor proteins and their relationship to nano- and micro-machines and nanobiotechnology. Existing and emerging technologies and instrumentation critical to molecular-level analysis in biomedical engineering.

**BME 302(3020) Cellular Principles of Biomedical Engineering (also CHEME 402[4020])**

Spring. 3 credits. Prerequisite: BME 301 or course work in basic biology such as BIO G 110, BIOBM 330, or BIOMI 290 plus mathematics through differential equations (e.g., MATH 221 or 294), or permission of instructor. Lec and lab. D. A. Putnam and S. D. Archer.

Integration of mammalian cell biology with engineering modeling principles, put into the context of medical pathology and disease states. Consists of three modules: (1) cell culture techniques/receptor ligand interactions, (2) cellular trafficking, and (3) signal transduction.

**[BME 330(3300) Introduction to Computational Neuroscience (also BIONB/PSYCH/COGST 330[3300])**

Fall. 3 or 4 credits; 4 credits includes lab providing additional computer simulation exercises. Limited to 25 students. Prerequisites: BIONB 222 or permission of instructor. S-U grades optional. Offered alternate years. C. Linster.

For description, see BIONB 330.

**BME 360(3600) Molecular and Cellular Bioengineering (also BEE 360[3600])**

Spring. 3 credits. Prerequisite: biochemistry course or A&EP 252 or permission of instructor. D. Luo.

For description, see BEE 360.

**BME 401(4010) Biomedical Engineering Analysis of Metabolic and Structural Systems (also M&AE 466[4660])**

Fall. 3 credits. Prerequisite: basic biology course work. Highly recommended: solid mechanics and fluid mechanics courses. Lec and lab. L. J. Bonassar and S. D. Archer.

Presents the quantitative biology of the renal, respiratory, cardiovascular, and musculoskeletal systems. Includes

mathematical modeling of physiological processes involving mechanics and transport in solid and fluid organs.

**BME 402(4020) Electrical and Chemical Physiology**

Spring. 3 credits. Prerequisite: BME 301, 302, or 401 or biology background or permission of instructor. Lec and lab. D. Lipson and S. D. Archer.

Focuses on understanding how circulating agents and bioelectric activity comprises inter-organ and central nervous system communication, and control of the human body. Additional emphasis includes examining medical devices involved in the treatment of human disease.

**BME 404(4040) Biomedical System Design (also ECE 402[4020])**

Spring. 1–4 credits. Pre- or corequisites: at least one of ECE 425, 476, 453. J. C. Belina. For description, see ECE 402.

**BME 440(4400) Electronics in Neurobiology (also BIONB 440[4400])**

Fall. 4 credits. Prerequisite: junior, senior, or graduate standing; calculus course. S-U grades optional. Offered alternate years. B. R. Land.

For description, see BIONB 440.

**[BME 441(4410) Computer in Neurobiology (also BIONB 441[4410])**

Fall. 4 credits. Prerequisite: junior, senior, or graduate standing; calculus course. S-U grades optional. Offered alternate years; next offered 2007–2008. B. R. Land.

For description, see BIONB 441.]

**[BME 463(4630) Neuromuscular Biomechanics (also M&AE 463[4630])**

Spring. 3 credits. Prerequisite: ENGRD 202 and 203 or permission of instructor. Offered alternate years.

For description, see M&AE 463.]

**BME 464(4640) Orthopaedic Tissue Mechanics (also M&AE 464[4640])**

Spring. 3 credits. Prerequisites: ENGRD 202 and M&AE 325 or permission of instructor. Offered alternate years.

For description, see M&AE 464.

**BME 481(4810) Biomedical Engineering (also CHEME 481[4810])**

Spring. 3 credits. Prerequisite: CHEME 324 or equivalent or permission of instructor. W. L. Olbricht.

For description, see CHEME 481.

**BME 490(4900) Independent Undergraduate Project in Biomedical Engineering**

Fall, spring. Variable credit. Research or projects by an individual or a small group of undergraduates.

**BME 491(4910) Principles of Neurophysiology (also BIONB 491[4910])**

Spring. 4 credits. Limited to 20 students. Prerequisite: BIONB 222 or written permission of instructor. S-U grades optional for graduate students by permission of instructor. B. R. Johnson.

For description, see BIONB 491.

**BME 501(5010) Bioengineering Seminar (also BEE 501[5010])**

Fall, spring. 1 credit. Prerequisite: junior, senior, or graduate standing. D. Lipson. Gives the engineer-in-training a BROAD overview of different aspects of biological and

biomedical engineering including business, legal, and clinical issues. To give students a working knowledge of how abstracts are written and revised. Sessions may occasionally be held outside of scheduled times.

**BME 539(5390) Biomedical Materials and Devices for Human Body Repair (also TXA 439[4390])**

Spring. 2-3 credits. Prerequisites: college natural science requirement (chemistry or biology). C. C. Chu.

For description, see TXA 439. Extra project required; same lectures as TXA 439.

**BME 550(5500) Product Engineering and Design in Biomedical Engineering**

Spring. 3 credits. Prerequisite: graduate standing; requirement for M.Eng. students majoring in BME. D. Lipson.

A beginning to a cornerstone understanding of engineering, regulatory business, and individual issues for new medical product development. Student background and interests may be highly varied. To accommodate these varied perspectives, the initial focus of the class is on the engineering perspectives of design and development, enabling those undertaking projects (BME 591) to have timely exposure to key enabling concepts.

**BME 565(5650) Biomechanical Systems—Analysis and Design (also M&AE 565[5650])**

Spring. 3 or 4 credits. Prerequisites: undergraduate courses in dynamics and strength of materials (e.g., T&AM/ENGRD 202 and 203); senior or graduate standing or permission of instructor.

For description, see M&AE 565.

**BME 570(5700) Biophysical Methods (also BIONB/A&EP 470[4700])**

Fall. 3 credits. Prerequisites: solid knowledge of basic physics and mathematics through sophomore level. Recommended: some knowledge of cellular biology. Letter grades only.

For description, see A&EP 470.

**BME 578(5780) Computer Analysis of Biomed Images (also ECE 578[5780])**

Spring. 4 credits. Prerequisite: permission of instructor. A. P. Reeves.

For description, see ECE 578.

**BME 591(5910) Design Project**

Fall, spring. 3-6 credits. Requirement for M. Eng. students majoring in BME. Students encouraged to register for two semesters as continuing course. D. Lipson and staff.

Design and economic evaluation of a biomedical engineering device or therapeutic strategy. Team projects are encouraged.

**BME 593(5930) Independent Design Project**

Fall and spring. Variable credit. Prerequisite: graduate standing. D. Lipson and staff.

Graduate-level nonthesis research or studies on special projects in biomedical engineering.

**BME 618 (6180) Principles of Medical Imaging (also VTMED 618 [6180])**

Fall. 3 credits. Prerequisites: calculus-based general physics including electricity and magnetism, mechanics, thermal physics, and some modern physics; calculus; linear algebra. Graduate study. Y. Wang.

This is an introductory course on medical imaging. The course consists of lectures and field trips to radiology facilities to illustrate the basic physical principles of all major imaging modalities in current clinical practice, including x-ray, ultrasound, computerized tomography, nuclear medicine, and magnetic resonance imaging. There are also guest lectures from clinicians to demonstrate the clinical utility of medical imaging.

**BME 626(6260) Biomedical Optics, Imaging, and Spectroscopy**

Spring. 3 credits. Prerequisites: introductory physics, calculus and biology. W. R. Zipfel.

Fundamentals of optical systems design, application and analysis concepts used in biological imaging and biomedical optics. The course covers the theory and application of light sources, lenses, mirrors, dispersion elements, optical fibers, detectors and tissue optics; optical systems analysis concepts such as resolution, optical transfer functions, deconvolution and interference, all in relation to biomedical microscopy, spectroscopy and bioanalytical techniques.

**BME 631(6310) Engineering Principles for Drug Delivery (also CHEME 631[6310])**

Fall. 3 credits. Prerequisites: graduate standing and background in organic and polymer chemistry or permission of instructor. D. A. Putnam.

Application of engineering design principles to problems in drug formulation and delivery. Specific topics include traditional drug formulation, mechanisms and kinetics of pharmaceutical stability, stimuli-sensitive systems, controlled release devices, prodrugs, targeted drug delivery, biomaterials, gene therapy, and governmental regulatory issues.

**[BME 663(6630) Advanced Topics in Neuromuscular Biomechanics (also M&AE 663[6630])]**

Spring. 3 credits. Prerequisite: permission of instructor. Offered alternate years.

F. Valero-Cuevas.

For description, see M&AE 663.]

**BME 664(6640) Mechanics of Bone (also M&AE 664[6640])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years.

For description, see M&AE 664.

**BME 665(6650) Principles of Tissue Engineering (also M&AE/MS&E 665[6650])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

L. Bonassar.

Covers introductory concepts in tissue engineering, including polymeric biomaterials used for scaffolds, mechanisms of cell-biomaterial interaction, biocompatibility and foreign body response, cell engineering, and tissue biomechanics. This knowledge is applied to engineering of several body systems, including the musculoskeletal system, cardiovascular tissues, the nervous system, and artificial organs. These topics are discussed in the context of scale-up, manufacturing, and regulatory issues.

**BME 703(7030) Graduate Student Teaching Experience**

Fall, spring. Variable credit. S-U grades optional. Staff.

Guided individual experience in laboratory instruction and/or lectures/recitation

instruction. Provides a preparatory teaching experience for graduate students considering an academic career.

**BME 711(7110) Fundamentals of Biomedical Engineering Research I**

Fall. 3 credits. Prerequisite: BME M.S./Ph.D. graduate students. W. L. Olbricht and staff.

First part of a two-semester sequence that introduces students to a variety of subjects in biomedical engineering including nanobiotechnology, biomechanics, systems and computational biology, biomaterials, tissue engineering, statistics, and experimental design. The course also covers associated subjects including professional development, ethics, writing a scientific paper, authorship issues, patents, technology transfer, conflicts of interest, and preparing a research proposal. The course is a combination of lectures and discussions, with students taking an active role in the instruction.

**BME 712(7120) Fundamentals of Biomedical Engineering Research II**

Spring. 3 credits. Prerequisite: BME 711 or permission of instructor. W. L. Olbricht and Staff.

Continuation of BME 711.

**BME 716(7160) Immersion Experience in Medical Research and Clinical Practice**

Fall and spring. 6 credits. Prerequisite: Ph.D. students in BME. L. J. Bonassar and Y. Wang.

Six-week immersion at Weill Medical College. Students participate in lectures, rounds, and seminars; observe surgeries; and solve medical problems presented by the staff.

**BME 718 (7180) Advanced Medical Imaging**

Fall. 3 credits. Prerequisites: calculus based general physics including electricity and magnetism, mechanics, thermal physics, and some modern physics; calculus; linear algebra. Graduate study. Y. Wang.

Meets concurrently with BME 618. Requires a deeper background in physics and mathematics. Special homework assignments, projects, and occasional discussion periods. Primarily for Ph.D. students focusing on imaging.

**BME 731(7310) Advanced Biomedical Engineering Analysis of Biological Systems**

Fall. 3 credits. Prerequisite: graduate standing; priority given to M.S./Ph.D. and M.Eng. students majoring in BME.

P. C. Doerschuk.

Covers the fundamentals of quantitative analysis of biological systems. Illustrates analytical methods applicable to a variety of biological systems, ranging from molecular to cellular to organ to application of whole-body systems.

**BME 760(7600) Nucleic Acid Engineering (also BEE 760[7600])**

Spring. 2 credits. Prerequisite: graduate standing; BEE 360 or permission of instructor. D. Luo.

For description, see BEE 760.

**BME 790(7900) Biomedical Engineering Seminar**

Fall, spring. 1 credit. Prerequisite: graduate standing. M. L. Shuler.

Research-based seminars. May meet with other seminar series as appropriate.

**BME 890(8999) M.S. Thesis Research**  
Fall, spring. Variable credit.  
Thesis research for the M.S. degree in BME.

**BME 990(9999) Ph.D. Thesis Research**  
Fall, spring. Variable credit.  
Thesis research for the Ph.D. degree in BME.

## CHEMICAL AND BIOMOLECULAR ENGINEERING

P. Clancy, director; A. B. Anton, L. A. Archer, A. M. Center, C. Cohen, M. P. DeLisa, T. M. Duncan, J. R. Engstrom, F. A. Escobedo, Y. L. Joo, D. L. Koch, K. H. Lee, W. L. Olbricht, D. A. Putnam, M. L. Shuler, P. H. Steen, A. D. Stroock, J. D. Varner

**CHEME 112(1120) Introduction to Chemical Engineering (also ENGR112(1120))**

Fall. 3 credits. Prerequisite: freshman standing. T. M. Duncan.  
Course in the Introduction to Engineering series. For description, see ENGR112.

**CHEME 219(2190) Mass and Energy Balances (also ENGRD 219(2190))**

Fall. 3 credits. Corequisite: physical chemistry course or permission of instructor. W. L. Olbricht.  
For description, see ENGRD 219.

**CHEME 288(2880) Biomolecular Engineering: Fundamentals and Applications**

Spring. 3 credits. Prerequisite: ENGRD 219 Mass and Energy Balances. K. H. Lee.  
A basic introduction to modern biology including aspects of biochemistry, molecular and cellular biology intended for students with no significant background in this area. An emphasis on practical applications of this knowledge in a variety of settings including the production of industrial enzymes, pharmaceuticals, and biologics.

**CHEME 301(3010) Nonresident Lectures**

Spring. 1 credit. P. Clancy.  
Lecturers from industry and from selected departments of the university provide information to assist students in their post-graduate plans.

**CHEME 313(3130) Chemical Engineering Thermodynamics**

Fall. 3 credits. Prerequisite: physical chemistry II. F. Escobedo.  
Studies the first and second laws and their consequences for chemical systems. Covers thermodynamic properties of pure fluids, solids, and mixtures; phase and chemical reaction equilibrium; heat effects in batch and flow processes; and power cycles and refrigeration.

**CHEME 323(3230) Fluid Mechanics**

Spring. 3 credits. Prerequisites: CHEME 219 and engineering mathematics sequence. D. L. Koch.  
Fundamentals of fluid mechanics. Macroscopic and microscopic balances. Applications to problems involving viscous flow.

**CHEME 324(3240) Heat and Mass Transfer**

Fall. 3 credits. Prerequisite: CHEME 323. A. Stroock.  
Fundamentals of heat and mass transfer. Macroscopic and microscopic balances.

Applications to problems involving conduction, convection, and diffusion.

**CHEME 332(3320) Analysis of Separation Processes**

Spring. 3 credits. Prerequisites: CHEME 313 and 324. Y. L. Joo.  
Covers the analysis of separation processes involving phase equilibria and mass transfer. Topics include phase equilibria; equilibrium-based separations; rate-based separation processes (membrane separations, sorption operations); introduction to bioseparations and process simulators; choosing a separation option; and the design and synthesis of separation processes.

**CHEME 372(3720) Introduction to Process Dynamics and Control**

Spring. 2 credits. Prerequisites: CHEME 313 and 323. A. B. Anton.  
Modeling and analysis of the dynamics of chemical processes, Laplace transforms, block diagrams, feedback control systems, and stability analysis.

**CHEME 390(3900) Reaction Kinetics and Reactor Design**

Spring. 3 credits. Prerequisites: CHEME 313 and 323. T. M. Duncan.  
Study of chemical reaction kinetics and principles of reactor design for chemical processes.

**CHEME 401(4010) Molecular Principles of Biomedical Engineering (also BME 301(3010))**

Fall. 3 credits. Prerequisite: BIO G 110 or BIOBM 330. M. P. DeLisa.  
For description, see BME 301.

**CHEME 402(4020) Cellular Principles of Biomedical Engineering (also BME 302(3020))**

Spring. 3 credits. D. A. Putnam.  
For description, see BME 302.

**CHEME 432(4320) Chemical Engineering Laboratory**

Fall. 4 credits. Prerequisites: CHEME 323, 324, 332, and 390. A. M. Center and staff.  
Laboratory experiments in fluid dynamics, heat and mass transfer, separations, other operations. Correlation and interpretation of data. Technical report writing.

**CHEME 462(4620) Chemical Process Design**

Spring. 4 credits. Prerequisite: CHEME 432. A. M. Center and staff.  
Students prepare a full-scale feasibility study of a chemical process including product supply and demand forecasts, process design including reaction system design, separations scheme development, heat integration via application of pinch technology, and economic analysis of the process. Students develop presentation and teamwork skills through weekly presentations.

**CHEME 470(4700) Process Control Strategies**

Spring. 3 credits. A. M. Center.  
Introduction to how control concepts are represented, control valve sizing and selection, process control strategies, dynamic response of process systems as it relates to control loop tuning, statistical process control, advanced process control methods both for chemical and biological processes and programmable logic controllers and distributed control systems.

**CHEME 472(4720) Feedback Control Systems (also ECE 472(4720), M&AE 478(4780))**

Fall. 4 credits. Prerequisites: CHEME 372, ECE 220, M&AE 326, or permission of instructor.  
For description, see M&AE 478.

**CHEME 480(4800) Chemical Processing of Electronic Materials**

Spring. 3 credits. A. B. Anton.  
Introduction to chemical processing of semiconductor materials for the manufacture of microelectronic devices, with specific emphasis on thermodynamics, transport phenomena, and kinetics. Topics include semiconductor properties and behavior, microelectronic device operation, thermochemistry of deposition and etching reactions, vacuum transport, plasmas, PVD, oxidation, diffusion, CVD, and statistical process control.

**CHEME 481(4810) Biomedical Engineering (also BME 481(4810))**

Spring. 3 credits. Prerequisite: CHEME 324 or equivalent or permission of instructor. W. L. Olbricht.

Special topics in biomedical engineering, including cell separations, blood flow, design of artificial devices and artificial organs, biomaterials, image analysis, biological transport phenomena, pharmacokinetics and drug delivery, tissue engineering, and analysis of physiological processes such as adhesion, mobility, secretion, signaling, and growth.

**CHEME 484(4840) Microchemical and Microfluidic Systems**

Fall. 3 credits. Prerequisite: CHEME 390 or permission of instructor. J. R. Engstrom.  
Principles of chemical kinetics, thermodynamics, and transport phenomena applied to microchemical and microfluidic systems. Applications in distributed chemical production, portable power, micromixing, separations, and chemical and biological sensing and analysis. Fabrication approaches (contrasted with microelectronics), transport phenomena at small dimensions, modeling challenges, system integration, case studies.

**CHEME 490(4900) Undergraduate Projects in Chemical Engineering**

Fall, spring. Variable credit.  
Research or studies on special problems in chemical engineering.

**CHEME 499(4990) Senior Seminar**

Fall, spring. 1 credit. Prerequisite: CHEME seniors. Staff.  
Students attend seminars of their selection and write one-page summaries. Eligible seminars include all listings at "Colloquia and Seminars in Physics and Related Fields" which includes the weekly seminars in, for example, Chemical and Biomolecular Engineering, Chemistry and Chemical Biology, Earth and Atmospheric Sciences, History and Ethics of Engineering, and Materials Science and Engineering.

**CHEME 520(5200) Chemical, Polymer, Biomedical, and Electronic Materials Processing**

Fall, spring. 1-6 credits; 1 credit per sec.

**520.1 An Overview of Chemical Processing**

Spring, first third of semester. 1 credit.  
Prerequisite: nonchemical engineers. T. M. Duncan.

Introduction to chemical engineering design and analysis-mathematical modeling, graphical methods and dynamic scaling.



**520.2 Introduction to Biomedical Engineering**  
Spring, first third of semester. 1 credit. W. L. Olbricht.

Meets concurrently with CHEME 481.

**520.3 Introduction to Electronic Materials Processing**  
Spring, first third of semester. 1 credit. A. B. Anton.

Meets concurrently with CHEME 480.

**520.4 Introduction to Polymer Processing**  
Spring, second third of semester. 1 credit. L. A. Archer.

Overview and simple quantitative analyses of several plastic processes with an emphasis on the role of rheology in polymer processing.

**520.5 Chemical Engineering Tools and Equipment**  
Spring, first third of semester. 1 credit. A. M. Center.

Introduces the hardware used in chemical engineering processes and a discussion of how these mechanical devices are configured to meet their process objectives. Also includes an introduction to the evaluation techniques and trouble-shooting methods frequently used by chemical engineers.

**520.6 Introduction to Petroleum Refining**  
Fall, second third of semester. 1 credit. A. M. Center.

Covers the petroleum refining industry including crude oil evaluation, fuel quality, refining processes, refinery configurations, and refinery economics.

**520.7 Turbomachinery Applications**  
Fall, last third of semester. 1 credit. A. M. Center.

Introduction to pumps, compressors, steam turbines and gas turbines. How they are specified and selected for services in the chemical process industries.

**CHEME 524(5240) Physics of Micro- and Nanoscale Fluid Mechanics and Heat Transfer**

Spring. 3 credits. Prerequisites: undergraduate fluid or continuum mechanics (e.g., M&AE 323, CHEME 323, A&EP 434) or permission of instructor. B. L. Kirby.

For description, see M&AE 524.

**CHEME 543(5430) Bioprocess Engineering**

Fall. 3 credits. Prerequisite: CHEME 390 or permission of instructor. No prior background in biological sciences required. M. L. Shuler.

Discusses principles involved in using microorganisms, tissue cultures, and enzymes for processing. Primary emphasis is on production of biopharmaceuticals, but biological waste treatment and medical systems are also considered.

**CHEME 565(5650) Design Project**

Fall, spring. 3 or 6 credits. Requirement for Chemical Engineering M.Eng. students. Design study and economic evaluation of a chemical processing facility, alternative methods of manufacture, raw-material preparation, food processing, waste disposal, or some other aspect of chemical processing.

**CHEME 572(5720) Managing New Business Development**

Fall. 3 credits. Prerequisites: graduate standing or permission of instructor. A. M. Center.

Case study approach introducing the typical fundamental factors driving a business venture, examines how to develop implementation strategies for the venture, and teaches the project management skills necessary to successfully implement the venture.

**CHEME 590(5999) Special Projects in Chemical Engineering**

Fall, spring. Variable credit. Prerequisite: graduate standing.

Nonthesis research or studies on special problems in chemical engineering.

**CHEME 631(6310) Engineering Principles for Drug Delivery (also BME 631(6310))**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor. D. A. Putnam.

For description, see BME 631.

**CHEME 640(6400) Polymeric Materials**

Fall. 3 credits. C. Cohen.

Covers chemistry and physics of the formation and characterization of polymers; principles of fabrication.

**CHEME 661(6610) Air Pollution Control**

Spring. 3 credits. P. H. Steen.

Covers origin of air pollutants, U.S. emission standards, dispersion equations; design of equipment for removal of particulate and gaseous pollutants formed in combustion and chemical processing.

**CHEME 664(6640) Energy Economics**

Fall. 3 credits. A. J. Hunter.

Supply and demand for energy by sectors and regions. Operating systems and costs. Economic drivers used in simulating energy systems and consumption factors. Supply/demand projections. Interplay between energy, environment, politics, economics, and sustainability.

**CHEME 665(6650) Energy Engineering**

Spring. 3 credits. A. J. Hunter.

Applying thermodynamic concepts to large energy systems. Future energy scenarios. Project teams tasked with simulating complex energy systems and cost-benefit analysis.

**CHEME 675(6750) Synthetic Polymer Chemistry (also MS&E 622(6220), CHEM 671(6710))**

Spring. 4 credits. Prerequisites: CHEM 359-360 or equivalent or permission of instructor.

For description, see CHEM 671.

**CHEME 711(7110) Advanced Chemical Engineering Thermodynamics**

Fall. 3 credits. Prerequisite: CHEM 389-390 and CHEME 313 or equivalent. A. B. Anton.

Molecular thermodynamics of gases, lattices, and liquids, including special applications to problems in chemical engineering.

**CHEME 713(7130) Chemical Kinetics and Transport**

Spring. 5 credits. Prerequisite: CHEME 390 or equivalent. C. Cohen and A. D. Stroock.

Topics include microscopic and macroscopic viewpoints; connections between phenomenological chemical kinetics and molecular reaction dynamics; reaction cross sections, potential energy surfaces, and dynamics of biomolecular collisions; molecular beam scattering; transition state theory. Unimolecular reaction dynamics; complex chemically reacting systems: reactor stability,

multiple steady states, oscillations, and bifurcation; reactions in heterogeneous media; and free-radical mechanisms in combustion and pyrolysis.

**CHEME 731(7310) Advanced Fluid Mechanics and Heat Transfer**

Fall. 3 credits. Prerequisites: CHEME 323-324 or equivalent. Y. L. Joo.

Topics include derivation of conservation equations; conductive heat transfer; low Reynolds number fluid dynamics; lubrication theory; inviscid fluid dynamics; boundary layer theory; forced convection; and introduction to non-Newtonian fluid mechanics (polymeric liquids and suspensions), microfluidics, stability analysis, and turbulent flow.

**CHEME 741(7410) Selected Topics in Biochemical Engineering**

Fall, spring. 1 credit; may be repeated for credit. Prerequisite: permission of instructor. K. H. Lee, D. A. Putnam, and M. P. DeLisa.

Discussion of current topics and research in biochemical engineering for graduate students.

**CHEME 745(7450) Physical Polymer Science I**

Fall. 3 credits. Corequisite: CHEME 711 or equivalent. Offered alternate years. L. A. Archer.

Thermodynamic properties of solutions from both classical and scaling approaches. Characterization techniques of dilute solutions. Rubber elasticity; mechanical and thermodynamic properties of gels; polymer melts.

**CHEME 751(7510) Mathematical Methods of Chemical Engineering Analysis**

Fall. 4 credits. J. Varner.

Application of advanced mathematical techniques to chemical engineering analysis. Mathematical modeling, scaling, regular and singular perturbations, multiple scales, asymptotic analysis, linear and nonlinear ordinary and partial differential equations, statistics, data analysis, and curve fitting.

**[CHEME 753(7530) Analysis of Nonlinear Systems: Stability, Bifurcation, and Continuation]**

Fall. 3 credits. Prerequisite: CHEME 751 or equivalent. Offered alternate years; next offered 2006-2007. P. H. Steen.]

**CHEME 790(7900) Seminar**

Fall, spring. 1 credit each semester. Requirement for all graduate students in field of chemical and biomolecular engineering.

General chemical engineering seminar.

**CHEME 890(8999) Thesis Research**

Fall, spring. Variable credit.

Thesis research for the M.S. degree in chemical engineering.

**CHEME 990(9999) Thesis Research**

Fall, spring. Variable credit.

Thesis research for the Ph.D. degree in chemical engineering.

## CIVIL AND ENVIRONMENTAL ENGINEERING

J. M. Gossett, director; W. D. Philpot, associate director; J. F. Abel, W. Aquino, L. Banks-Sills, J. J. Bisogni, Jr., W. H. Brutsaert, P. G. Carr, E. A. Cowen, R. A. Davidson, P. J. Diamessis, R. I. Dick, L. B. Dworsky, C. Earls, H. O. Gao, K. Gebremedhin, M. D. Grigoriu, D. A. Haith, K. C. Hover, A. R. Ingraffea, F. H. Kulhawy, L. W. Lion, P. L-F. Liu, D. P. Loucks, J. R. Mbwana, W. McGuire, A. H. Meyburg, L. K. Nozick, T. D. O'Rourke, K. D. Papoulia, T. Peköz, P. Petrina, R. E. Richardson, M. J. Sansalone, R. E. Schuler, C. A. Shoemaker, J. R. Stedinger, H. E. Stewart, C. H. Trautmann, M. A. Turnquist, F. Wayno, M. Weber-Shirk, R. N. White

Courses in the School of Civil and Environmental Engineering are offered in three broad mission areas: Civil Infrastructure, Environment, and Engineering Systems and Management. Each area has several areas of specialization. The following are the course numbers and titles listed by specialization within each mission area. Some courses are listed in two or more mission areas because the course content is relevant to multiple areas. The school also offers a number of general courses that are not unique to one mission area. Full course descriptions follow in the subsequent section and are listed in numerical order.

### General

- CEE 113 Water Treatment Design (also ENGR 113) (s,3)
- CEE 116 Modern Structures (also ENGR 116) (f,3)
- CEE 241 Engineering Computation (also ENGRD 241) (s,3)
- CEE 304 Uncertainty Analysis in Engineering (f,4)
- CEE 308 Introduction to CADD (f,s,1)
- CEE 309 Special Topics in Civil and Environmental Engineering (f,s,var.)
- CEE 323 Engineering Economics and Management (also ENGRG 323) (s,su,3)
- CEE 400 Senior Honors Thesis (f,s,var.)
- CEE 401 Undergraduate Engineering Teaching in CEE (f,s,var.)

### Civil Infrastructure

See also: CEE 116, 241, 304, 308, 503, and 595

#### Geotechnical Engineering

- CEE 341 Introduction to Geotechnical Engineering (s,4)
- CEE 440 Foundation Engineering (f,3)
- CEE 441 Retaining Structures and Slopes (s,3)
- CEE 444 Environmental Site and Remediation (s,3)
- CEE 501/502 Design Project in Geotech/Structures (f,s,3)
- CEE 602 Seminar—Civil Infrastructure (f,s,1)
- CEE 640 Foundation Engineering (f,3)
- CEE 641 Retaining Structures and Slopes (s,3)
- CEE 644 Environmental Applications of Geotechnical Engineering (s,3)

- CEE 649 Special Topics in Geotechnical Engineering (f,s,var.)
- CEE 740 Engineering Behavior of Soils (f,3)
- CEE 741 Rock Engineering (f,3)
- CEE 744 Advanced Foundation Engineering (s,2)
- CEE 745 Soil Dynamics (s,3)
- CEE 746 Embankment Dam Engineering (s,2)
- CEE 749 Research in Geotechnical Engineering (f,s,var.)
- CEE 840 Thesis—Geotechnical Engineering (f,s,var.)

#### Structural Engineering

- CEE 116 Modern Structures (f,3)
- CEE 371 Structural Modeling and Behavior (s,4)
- CEE 372 Inelastic and Nonlinear Behavior of Materials and Structures (f,4)
- CEE 471 Fundamentals of Structural Mechanics (f,4)
- CEE 472 Introduction to the Finite Element Method (s,3)
- CEE 473 Design of Concrete Structures (f,4)
- CEE 474 Design of Steel Structures (s,4)
- CEE 475 Concrete Materials and Construction (s,3)
- CEE 477 Introduction to Composite Materials (f,3)
- CEE 478 Structural Dynamics and Earthquake Engineering (s,3)
- CEE 479 Collaborative Distance Design of Structural Systems (f,4)
- CEE 481 LRFD-Based Engineering of Wood Structures (s,3)
- CEE 501/502 Design Project in Structural Engineering (f,s,3)
- CEE 602 Seminar—Civil Infrastructure (f,s,1)
- CEE 671 Structural Mechanics (f,3)
- CEE 672 Introduction to the Finite Element Method (s,3)
- CEE 673 Design of Concrete, Masonry, and Steel Structures (f,4)
- CEE 675 Concrete Materials and Construction (s,3)
- CEE 676 Advanced Composite Materials (s,4)
- CEE 677 Engineering Analysis (f,3)
- CEE 678 Structural Dynamics and Earthquake Engineering (s,3)
- CEE 679 Evaluation and Failure of Structures (s,3)
- CEE 697 Special Topics in Structural Engineering (f,s,var.)
- CEE 770 Engineering Fracture Mechanics (f,3)
- CEE 771 Stochastic Mechanics (f,3)
- CEE 772 Random Vibration (f,3)
- CEE 773 Structural Reliability (f,3)
- CEE 774 Advanced Structural Concrete (f,3)
- CEE 775 Nonlinear Finite Element Analysis (f,3)
- CEE 776 Advanced Topics in Stability (s,3)
- CEE 777 Computational Solids and Structural Mechanics (s,4)

- CEE 779 Advanced Behavior of Metal Structures (f,4)
- CEE 781 National Disaster Risk Assessment and Management (s,3)
- CEE 783 Civil and Environmental Engineering Materials Project (f,s,var.)
- CEE 785 Research in Structural Engineering (f,s,var.)
- CEE 880 Thesis—Structural Engineering (f,s,var.)

### Environment

See also CEE 113, 241, 304, and 492

#### Environmental Engineering

- CEE 113 Water Treatment Design (s,3)
- CEE 255 Sustainable Water Supply Project (s,3)
- CEE 351 Environmental Quality Engineering (s,3)
- CEE 451 Microbiology for Environmental Engineering (f,3)
- CEE 452 Water Supply Engineering (s,3)
- CEE 453 Laboratory Research in Environmental Engineering (s,3)
- CEE 454 Sustainable Small-Scale Water Supplies (f,3)
- CEE 455 Sustainable Water Supply Project (s,3)
- CEE 501/502 Design Project in Environmental Engineering (f,s,3)
- CEE 601 Seminar—Water Resources and Environmental Engineering (f,1)
- CEE 653 Water Chemistry for Environmental Engineering (f,3)
- CEE 654 Aquatic Chemistry (s,3)
- CEE 655 Transport, Mixing, and Transformation in the Environment (f,3)
- CEE 656 Physical/Chemical Process (f,3)
- CEE 657 Biological Processes (s,3)
- CEE 658 Microbial Biodegradation and Biocatalysis Lab (s,3)
- CEE 659 Seminar—Environmental Quality Engineering (s,1)
- CEE 736 Turbulences and Turbulent Mixing in Environmental Stratified Flows (s,3)
- CEE 750 Research in Environmental Engineering (f,s,var.)
- CEE 759 Special Topics in Environmental Engineering (f,s,var.)
- CEE 850 Thesis—Environmental Engineering (f,s,var.)

#### Environmental Systems

See Engineering Systems and Management mission areas for a listing of courses in Environmental and Public Systems.

#### Environmental Fluid Mechanics and Hydrology

- CEE 331 Fluid Mechanics (f,su,4)
- CEE 332 Hydraulic Engineering (s,4)
- CEE 431 Introduction to Groundwater Hydrology (also EAS 445, BEE 471) (s,3)
- CEE 432 Hydrology (s,3)
- CEE 435 Coastal Engineering (s,3)
- CEE 436 Case Studies in Environmental Fluid Mechanics (s,4)

- CEE 437 Experimental Methods in Fluid Dynamics (s,3)
- CEE 601 Seminar—Water Resources and Environmental Engineering (f,1)
- CEE 609 Advanced Numerical Methods for Engineers (f,3)
- CEE 630 Computational Fluid Dynamics for Environmental Flows (s,3)
- CEE 631 Computational Simulation of Transport in the Environment (s,3)
- CEE 632 Hydrology (s,3)
- CEE 633 Flow in Porous Media and Groundwater (f,3)
- CEE 634 Boundary Layer Meteorology (f,3)
- CEE 635 Small and Finite Amplitude Water Waves (s,3)
- CEE 636 Environmental Fluid Mechanics (s,3)
- CEE 637 Experimental Methods in Fluid Dynamics (s,4)
- CEE 638 Seminar—Hydraulics (s,1)
- CEE 639 Special Topics in Hydraulics (f,s,var.)
- CEE 655 Transport, Mixing, and Transformation in the Environment (f,3)
- CEE 735 Research in Hydraulics (f,s,var.)
- CEE 830 Thesis—Fluid Mechanics and Hydrology (f,s,var.)

### Engineering Systems and Management

See also CEE 304.

#### Engineering Management

- CEE 490 Management Practice in Project Engineering (f,3)
- CEE 492 Engineers for a Sustainable World (f,3)
- CEE 590 Project Management (f,s,4)
- CEE 591/592 Engineering Management Project (f,s,3)
- CEE 593 Engineering Management Methods: Data, Information, and Modeling (f,3)
- CEE 594 Economic Methods for Engineering and Management (f,4)
- CEE 595 Construction Planning and Operations (f,3)
- CEE 596 Management Issues in Forensic Engineering (f,3)
- CEE 597 Risk Analysis and Management (s,3)
- CEE 598 Introduction to Decision Analysis (f,3)
- CEE 690 Creativity, Innovation, and Leadership (f,3)
- CEE 692 Special Topics in Engineering Management (f,s,var.)

#### Environmental and Public Systems

- CEE 323 Engineering Economics and Management (also ENGRG 323) (s,su,3)
- CEE 501/502 Design Project in Environmental or Water Resource Systems (f,s,3)
- CEE 597 Risk Analysis and Management (s,3)
- CEE 620 Water Resources Systems Engineering (s,3)
- CEE 621 Stochastic Hydrology (s,3)
- CEE 623 Environmental Quality Systems Engineering (f,3)

- CEE 628 Seminar—Environmental and Water Resources Systems Analysis (s,1)
- CEE 636 Case Studies in Environmental Fluid Mechanics (s,4)
- CEE 722 Environmental and Water Resources Systems Analysis Research (f,s,var.)
- CEE 729 Special Topics in Environmental and Water Resources Systems Analysis (f,s,var.)
- CEE 820 Thesis—Environmental and Water Resources Systems (f,s,var.)

#### Remote Sensing

- CEE 411 Remote Sensing: Resource Inventory Methods (also CSS 411) (s,3)
- CEE 610 Remote Sensing Fundamentals (f,3)
- CEE 615 Digital Image Processing (s,3)
- CEE 617 Special Topics—Remote Sensing (f,s,var.)
- CEE 710 Research—Remote Sensing (f,s,var.)
- CEE 810 Thesis—Remote Sensing (f,s,var.)

#### Systems Engineering

- CEE 406 Civil Infrastructure Systems (f,3)
- CEE 504 Applied Systems Engineering (also M&AE 591, ECE/OR&IE 512, SYSEN 510, COM S 504) (f,3)
- CEE 505 Systems Architecture, Behavior, and Optimization (also M&AE 592, ECE/OR&IE 513, SYSEN 520, COM S 505) (s,3)
- CEE 509 Heuristic Methods for Optimization (also COM S 574, CIS 572, OR&IE 533) (f,3-4)
- CEE 603 Seminar—Engineering Systems and Management (f,s,1)
- CEE 606 Civil Infrastructure Systems (f,3)
- CEE 693 Special Topics in Systems Engineering (f,s,var.)

#### Transportation

- CEE 361 Introduction to Transportation Engineering (s,su,3)
- CEE 461 Urban Transportation Planning and Modeling (s,3)
- CEE 463 Transportation and Information Technology (f,3)
- CEE 464 Transportation Systems Design (s,3)
- CEE 465 Transportation, Energy, and the Environment (f,3)
- CEE 501/502 Design Project in Transportation Engineering (f,s,3)
- CEE 661 Urban Transportation Planning and Modeling (fall, 3 credits)
- CEE 662 Urban Transportation Network and Design (f,3)
- CEE 663 Network Flows and Algorithms (s,3)
- CEE 665 Transportation, Energy, and the Environment (f,3)
- CEE 668 Seminar—Transportation (f,s,1)
- CEE 762 Practicum in Modeling Transportation Systems (f,3)
- CEE 764 Special Topics in Transportation (f,s,var.)
- CEE 860 Thesis—Transportation Engineering (f,s,var.)

### CEE 113(1130) Water Treatment Design (also ENGR 113[1130])

Spring. 3 credits. Students must register under ENGR 113. M. L. Weber-Shirk.  
Course in Introduction to Engineering series. For description, see ENGR 113.

### CEE 116(1160) Modern Structures (also ENGR 116[1160])

Fall. 3 credits. Students must register under ENGR 116. Staff.  
Course in Introduction to Engineering series. For description, see ENGR 116.

### CEE 241(2410) Engineering Computation (also ENGRD 241[2410])

Spring. 3 credits. Students must register under ENGRD 241. C. Shoemaker.  
For description, see ENGRD 241.

### CEE 255 (2550) Sustainable Water Supply Project

Spring. 3 credits. Meets with CEE 455. M. L. Weber-Shirk.  
For description, see CEE 455.

### CEE 304(3040) Uncertainty Analysis in Engineering

Fall. 4 credits. CEE Engineering co-op students may substitute summer ENGRD 270. Prerequisite: first-year calculus. J. R. Stedinger.

Introduction to probability theory and statistical techniques, with examples from civil, environmental, biological, and related disciplines. Covers data presentation, commonly used probability distributions describing natural phenomena and material properties, parameter estimation, confidence intervals, hypothesis testing, simple linear regression, and nonparametric statistics. Examples include structural reliability, windspeed/flood distributions, pollutant concentrations, and models of vehicle arrivals.

### CEE 308(3080) Introduction to CADD

Fall, spring. 1 credit. Students should enroll in only one sec. Preenrollment limited to CEE students. All other students by permission of instructor and only after first meeting of sec. Course begins second full week of classes. Staff.

Students learn to employ computer-aided design and drafting (CADD) to construct 2D drawings and 3D models using a variety of AutoCAD 2004 techniques. Alternative software tools for 3D visualization and solid modeling are introduced. Course meets in ACCEL once per week for 12 weeks, and grades are based on attendance, weekly exercises completed in class, and a semester project.

### CEE 309(3090) Special Topics in Civil and Environmental Engineering

Fall, spring. 1-6 credits. Staff.  
Supervised study by individuals or groups of upper-division students on an undergraduate research project or on specialized topics not covered in regular courses.

### CEE 323(3230) Engineering Economics and Management (also ENGRG 323[3230])

Spring; usually offered in summer for Engineering Co-op Program. 3 credits. Primarily for juniors and seniors. D. P. Loucks.

For description, see ENGRG 323.

**CEE 331(3310) Fluid Mechanics**

Fall; usually offered in summer for Engineering Co-op Program. 4 credits. Pre- or corequisite: ENGRD 202. E. A. Cowen. Covers hydrostatics, the basic equations of incompressible fluid flow, potential flow and dynamic pressure forces, viscous flow and shear forces, steady pipe flow, turbulence, dimensional analysis, laminar and turbulence boundary layer, flows around obstacles, and open-channel flow. Includes small-group laboratory assignments.

**[CEE 332(3320) Hydraulic Engineering**

Spring. 4 credits. Prerequisite: CEE 331. Next offered 2007–2008. Staff. Application of fluid-mechanical principles to problems of engineering practice and design: hydraulic machinery, open-channels, and river engineering. Lectures supplemented by laboratory work and a design project.]

**CEE 341(3410) Introduction to Geotechnical Engineering**

Spring. 4 credits. Prerequisites: ENGRD 202, CEE 331 (or equivalent), or permission of instructor. Letter grades only. H. E. Stewart. Fundamentals of geotechnical engineering. Topics include origins and descriptions of soil and rock as engineering materials, subsurface exploration methods, principles of effective stresses, stress distribution and ground settlements from surface loads, steady-state and time-dependent subsurface fluid flow, soil strength and failure criteria, geoenvironmental applications, and introduction to hazardous waste containment systems.

**CEE 351(3510) Environmental Quality Engineering**

Spring. 3 credits. L. W. Lion. Introduction to engineering aspects of environmental quality control. Quality parameters, criteria, and standards for water and wastewater. Elementary analysis pertaining to the modeling of pollutant reactions in natural systems, and introduction to design of unit processes for wastewater treatment.

**CEE 361(3610) Introduction to Transportation Engineering**

Spring; usually offered in summer for Engineering Co-op Program. 3 credits. A. H. Meyburg and J. Mbwana. Introduction technological, economic, and social aspects of transportation. Emphasizes design and functioning of transportation systems and their components. Covers supply-demand interactions; system planning, design, and management; traffic flow, intersection control and network analysis; institutional and energy issues; and environmental impacts.

**CEE 371(3710) Structural Modeling and Behavior**

Spring. 4 credits. Prerequisite: ENGRD 202. Corequisite: MATH 294. A. R. Ingraffea. Introduction to the structural engineering enterprise including aspects of design, loads, behavior, form, modeling, mechanics, materials, analysis, and construction/manufacturing. Case studies involve different scales and various materials. Topics include analytical and finite-element computational modeling of structural systems, including cables, arches, trusses, beams, frames, and 2-D continua; deflections, strains, and stresses of structural members, systems, and 2-D continua by analytical and work/energy methods, with a focus on linear elastic behavior; the

foundations of matrix structural analysis; and the application of finite-element software.

**CEE 372(3720) Inelastic and Nonlinear Behavior of Materials and Structures**

Fall. 4 credits. Prerequisites: MATH 294, CEE 371. W. Aquino. The course presents concepts related to inelastic and nonlinear behavior of engineering materials and structures, the concept of continuum, limit and plastic analysis, and fracture. The course will be a synergy of mathematical modeling, computer simulations, and physical experimentation.

**CEE 400(4000) Senior Honors Thesis**

Fall, spring. 1–6 credits. For students' admitted to CEE Honors Program. Staff. Supervised research, study, and/or project work resulting in a written report or honors thesis.

**CEE 401(4010) Undergraduate Engineering Teaching in CEE**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff. Methods of instruction developed through discussions with faculty and by assisting with the instruction of undergraduates under the supervision of faculty.

**CEE 406(4060) Civil Infrastructure Systems**

Fall. 3 credits. Prerequisites: probability and statistics (CEE 304 or equivalent) and engineering economics (CEE 323 or equivalent) course. Letter or S-U grades. Staff. Introduction to the framing and solution of civil infrastructure problems using a systems engineering approach. Systems tools, such as optimization, life-cycle cost analysis, decision analysis, simulation, and risk analysis are examined through case studies related to civil infrastructure.

**CEE 411(4110) Remote Sensing: Resource Inventory Methods (also CSS 411[4110])**

Spring. 3 credits. Prerequisite: permission of instructor. A. Lembo. For description, see CSS 411.

**CEE 432(4320) Hydrology**

Spring. 3 credits. Prerequisite: CEE 331. Intended for undergraduates. Lec concurrent with CEE 632. W. H. Brutsaert. Introduction to hydrology as a description of the water cycle and the role of water in the natural environment, and other issues for environmental engineers. See description for CEE 632.

**[CEE 435(4350) Coastal Engineering**

Spring. 4 credits. Prerequisite: CEE 331. P. L-F. Liu. Covers the following topics: review of hydrodynamics; small-amplitude wave theory; wave statistics; wave-structure interactions; coastal processes.]

**CEE 436(4360) Case Studies in Environmental Fluid Mechanics**

Spring. 4 credits. Prerequisite: CEE 331 or equivalent. E. A. Cowen. An introduction to fundamental fluid mechanics and transport processes of the environment through laboratory—and field—based studies (Cayuga Lake and Fall, Six-Mile, and Cascadilla Creeks) and case studies. Topics include surface and internal wave dynamics, sediment and nutrient/contaminant transport, and interfacial transfer. Lectures are

based on a laboratory/field projects. Course includes a design project.

**CEE 437(4370) Experimental Methods in Fluid Dynamics**

Spring. 3 credits. Pre- or corequisites: CEE 331 or equivalent and CEE 304 or equivalent. E. A. Cowen. Same as CEE 637 but no project required. For description, see CEE 637.

**CEE 440(4400) Foundation Engineering**

Fall. 3 credits. Prerequisite: CEE 341. F. H. Kulhawy. Covers soil exploration, sampling, and in-situ testing techniques; bearing capacity, stress distribution, and settlement; design of shallow and deep foundations; compaction and site preparation; and seepage and dewatering of foundation excavations.

**CEE 441(4410) Retaining Structures and Slopes**

Spring. 3 credits. Prerequisite: CEE 341. Staff. Covers earth pressure theories; design of rigid, flexible, braced, tied-back, slurry wall, soil nailing, and reinforced soil structures; stability of excavation, cut, and natural slopes; and design problems stressing application of course material under field conditions of engineering practice.

**[CEE 444(4440) Environmental Site and Remediation Engineering**

Spring. 3 credits. Prerequisite: CEE 341. Next offered 2008–2009. T. D. O'Rourke. Covers the principles of hydrogeology, contaminant migration, and remediation technologies related to geotechnical and environmental engineering. Emphasizes environmental site assessment, site feasibility studies, selection of remediation procedures, and engineered landfills. Design problems are based on real projects and involve visits from practicing engineers.]

**CEE 451(4510) Microbiology for Environmental Engineering**

Fall. 3 credits. Prerequisites: two semesters of college chemistry; organic chemistry or permission of instructor. R. E. Richardson. Introduction to the fundamental aspects of microbiology and biochemistry that are pertinent to environmental engineering and science. Provides an overview of the characteristics of bacteria, Archaea, unicellular Eukaryotes (protozoa, algae, fungi), and viruses. Includes discussions of cell structure, bioenergetics and metabolism, and microbial genetics. Focus is then applied to topics pertinent to environmental engineering: pathogens; disease and immunity; environmental influences on microorganisms; roles of microbes in the carbon, nitrogen, and sulfur cycles; enzymes; molecular microbiology; and microbial ecology. This is an introductory course and is inappropriate for those who have taken BIOMI 290 or equivalent.

**[CEE 452(4520) Water Supply Engineering**

Fall. 3 credits. Prerequisite: CEE 351. Next offered 2007–2008. J. J. Bisogni. Analysis of contemporary threats to human health from water supplies. Covers criteria and standards for potable-water quality; water-quality control theory; design of water supply facilities.]

**CEE 453(4530) Laboratory Research in Environmental Engineering**

Fall. 3 credits. Prerequisite: CEE 351 or permission of instructor. M. L. Weber-Shirk. Laboratory investigations of reactor flow characteristics; acid rain/lake chemistry; contaminated soil-site assessment and remediation; and wastewater treatment. Design of laboratory experiments, data analysis, computerized process control, and model development are emphasized.

**CEE 454(4540) Sustainable Small-Scale Water Supplies**

Fall. 3 credits. M. L. Weber-Shirk. This course covers the design and analysis of small-scale drinking water supply systems. We explore the technical, economic, and social constraints that form the sustainable space—i.e., the set of viable technologies that could be adopted progressively to improve the availability and quality of water. Students work in teams to design water supply and treatment systems.

**CEE 455 (4550) Sustainable Water Supply Project**

Spring. 3 credits. Prerequisite or co-requisite: CEE 452 or CEE 454. Meets with CEE 255. M. L. Weber-Shirk. Student teams conduct research, build working models, design full-scale prototypes, create design algorithms, and create educational materials for technology transfer to improve drinking water quality in Honduras. For more information see <http://eswserver.cee.cornell.edu/aguacalera/>.

**CEE 461(4610) Urban Transportation Planning and Modeling**

Spring. 3 credits. Prerequisite: CEE 361 or permission of instructor. A. H. Meyburg. Covers modern transportation planning practice and the analytical tools that are necessary to engage in this field. Emphasizes passenger transportation in the urban context. The legislative, political, and economic contexts of urban transportation planning (UTP) are discussed. The course presents the travel demand estimation process and the associated models and approaches and provides insights in travel survey data acquisition.

**CEE 463(4630) Transportation and Information Technology**

Fall. 3 credits. J. R. Mbwana. Improving the use of existing facilities has become an important objective in transportation planning. Examines the role of computer and telecommunications technologies to achieve these improvements. Focuses specific attention on the development of analyses to evaluate the benefits of inclusion of these technologies in transportation systems.

**CEE 464(4640) Transportation Systems Design**

Spring. 3 credits. Prerequisites: CEE 361 and CEE 406 or permission of instructor. M. A. Turnquist. Analysis of capacity and operational design of transportation systems, including analytical modeling techniques underlying design criteria. Evaluation of alternative designs. Management and operating policies, including investment strategies. Facility location decisions, networks, and passenger and freight terminals.

**CEE 465 (4650) Transportation, Energy, and the Environment**

Fall. 3 credits. Prerequisites: CEE 361 or permission of instructor. H. O. Gao. For description, see CEE 665.

**CEE 471(4710) Fundamentals of Structural Mechanics**

Fall. 3 credits. Prerequisites: ENGRD 202, MATH 294. M. D. Grigoriu. Topics include beam bending; beams on elastic foundations; stability analysis for columns and beam-columns; linear elasticity; numerical solutions for linear elasticity problems; and applications including stress concentration, torsion, and plates.

**CEE 472(4720) Introduction to the Finite Element Method**

Spring. 3 credits. Prerequisites: CEE 371, 372, and 471. W. Aquino. Covers the formulation of the finite element method in 2-D and 3-D continuum, basic 2-D and 3-D continuum isoparametric elements, modeling and programming aspects of the finite element method, and static and transient problems. A large part of the course is devoted to understanding element formulations, testing elements (patch test), and addressing problems such as shear and volumetric locking, among others. Emphasis is placed on understanding fundamental aspects of the method for making intelligent use of commercial software and obtaining a strong background for moving to further study and research.

**CEE 473(4730) Design of Concrete Structures**

Fall. 4 credits. Staff. Centered on the design of a multi-story building that is initially planned with masonry bearing walls and precast-prestressed concrete floors. The masonry walls are then replaced with steel beams and columns. In the next phase the precast concrete is replaced with cast-in-place reinforced concrete. Finally, the structural steel elements will be replaced with a reinforced concrete framing system. The course explore gravity loads, wind loads, and earthquake loads, and the behavior of individual members and the structure as a whole.

**CEE 474(4740) Design of Steel Structures**

Spring. 4 credits. Prerequisite: 341 or permission of instructor. Staff. Behavior and design of steel members, connections, and structures. Discussion of structural systems for building and bridges.

**[CEE 475(4750) Concrete Materials and Construction**

Spring. 3 credits. Next offered 2007–2008. K. C. Hover.

Covers the materials science, structural engineering, and construction technology involved in the materials aspects of the use of concrete. Topics include cement chemistry and physics, mix design, admixtures, engineering properties, testing of fresh and hardened concrete, and the effects of construction techniques on material behavior.]

**[CEE 476(4760) Evaluation and Failure of Structures**

Spring. 3 credits. Prerequisites: ENGRD 202, 261, and 203; CEE 371 and 473. Staff.

This course teaches material and structural evaluation through the lens of failure. The course builds upon and integrates what

students have learned in courses in physics, mechanics, dynamics, materials science, structural modeling/analysis, and design. In addition, the course teaches the physics of methods used for condition assessment of structures (e.g., stress wave propagation, electromagnetic wave propagation, heat flow), introduces students to structural damage and assessment of damage caused by earthquake/wind loads on structures, and introduces students to blast/impact loadings on structures and the concept of progressive collapse.]

**CEE 477(4770) Introduction to Composite Materials (also M&AE/T&AM 455[4550], MS&E 555[5550])**

Spring. 3 credits. L. Phoenix. For description, see T&AM 455.

**CEE 478(4780) Structural Dynamics and Earthquake Engineering**

Spring. 3 credits. M. D. Grigoriu. Covers modal analysis, numerical methods, and frequency-domain analysis. Introduction to earthquake-resistant design.

**CEE 479(4790) Collaborative, Distance Design of Structural Systems (also M&AE 429[4291])**

Fall. 4 credits. A. Ingrassia and A. Zehnder. Conceptual and preliminary design projects of contemporary aerospace structural systems. Emphasis on multidisciplinary teamwork and use of state-of-the-art information technologies. Involves synchronous distance education with faculty and students at Syracuse University.

**CEE 481(7491) LRFD-Based Engineering of Wood Structures (also BEE 481[4791])**

Spring. 3 credits. Prerequisite: ENGRD 202. For description, see BEE 481 under "College of Agriculture and Life Sciences."

**[CEE 490(4900) Management Practice in Project Engineering**

Fall. 3 credits. Prerequisite: permission of instructor. Next offered 2007–2008. K. C. Hover.

Introduction to the principles of project\* management. Covers planning, organizing, communicating, scheduling, and controlling of engineering work done in project teams.]

**CEE 492(4920) Engineers for a Sustainable World: Engineering in International Development**

Fall. 3 credits. R. A. Davidson and P. Doing. Engineering-based group service projects offer real-life engineering research and design experience, from problem formulation through implementation. They may be international or local, and may relate to any kind of engineering. Students work on interdisciplinary teams with a project supervisor and a partner community organization. Course readings and a writing assignment cover the relationship between engineering and international development, the philosophy and politics of technology, and ethics in engineering practice.

**CEE 501-502 Design Project**

Fall, spring. 3 credits each semester. Requirement for students in M.Eng. (civil and environmental) program. Staff. CEE design projects present students with an exemplary design experience that reflects those carried out in the course of professional practice. Projects are typically performed by student design groups, and the topics reflect



the diverse specialty areas of the civil and environmental engineering field as described below.

**CEE 501-502(5021-5022) Project in Environmental and Water Resources Systems**

**CEE 501-502(5031-5032) Project in Environmental Fluid Mechanics and Hydrology Staff.**

**CEE 501-502(5041-5042) Project in Geotechnical Engineering**

Design of major geotechnical engineering project. Planning and preliminary design during fall semester; final design completed in January intersession.

**CEE 501-502(5051-5052) Honduras Water Supply Project**

M. Weber-Shirk.

**CEE 501-502(5061-5062) Project in Transportation Engineering**

Systems analysis of a substantial transportation service.

**CEE 501-502(5071-5072) Project in Structural Engineering**

C. Earls and W. Aquino.

Design of a major civil engineering project. Planning and a preliminary design are completed during the fall semester; the final design is completed in the January intersession.

**CEE 501-502(5081-5082) Project in Civil Infrastructure Systems**

R. A. Davidson.

Analysis of a problem in civil infrastructure.

**CEE 501-502(5073-5074) Project in Civil Engineering Materials**

K. C. Hover.

**CEE 504(5240) Applied Systems Engineering (also COM S 504[5040], ECE/OR&IE 512[5120], M&AE 591[5910], SYSEN 510[5100])**

Fall. 3 credits. Prerequisite: senior or graduate standing in engineering field; concurrent or recent (past two years) enrollment in group-based project with strong system design component approved by course instructor. A. R. George and R. Roundy.

For description, see SYSEN 510.

**CEE 505(5252) System Architecture, Behavior, and Optimization (also COM S 505[5050], ECE 513[5130], OR&IE 513[5142], M&AE 592[5920], SYSEN 520[5200])**

Spring. 3 credits. Prerequisite: CEE/COM S 504, ECE/OR&IE 512, M&AE 591, or SYSEN 520. Staff.

For description, see SYSEN 520.

**CEE 509(5290) Heuristic Methods for Optimization (also COM S/CIS 572[5720], OR&IE 533[5330])**

Fall. 3 or 4 credits. Prerequisites: graduate standing or COM S, ENGRD 211 or 321; ENGRD 241 or permission of instructor. Staff.

Teaches heuristic search methods including simulated annealing, tabu search, genetic algorithms, derandomized evolution strategy, and random walk developed for optimization of combinatorial- and continuous-variable problems. Application project options include wireless networks, protein folding, job shop scheduling, partial differential equations, satisfiability, or independent projects. Statistical methods are presented for comparing algorithm results. Advantages and

disadvantages of heuristic search methods for both serial and parallel computation are discussed in comparison with other optimization algorithms.

**CEE 590(5800) Project Management**

Fall, spring. 4 credits. Prerequisite: permission of instructor. F. J. Wayno. Core graduate course in project management for people who will manage technical or engineering projects. Focuses both on the "technical" tools of project management (e.g., methods for planning, scheduling, and control) and the "human" side (e.g., forming a project team, managing performance, resolving conflicts), with somewhat greater emphasis on the latter.

**CEE 591(5910) Engineering Management Project**

Fall. 3 credits. Prerequisite: permission of instructor. Staff.

Intensive evaluation of the management aspects of a major engineering project or system. Most students work on a large group project in the area of project management, but students may also work singly or in small groups on an engineering management topic of special interest to them.

**CEE 592(5920) Engineering Management Project**

Spring. 3 credits. Prerequisite: permission of instructor. Staff. Continuation of CEE 591.

**CEE 593(5930) Engineering Management Methods: Data, Information, and Modeling**

Fall. 3 credits. Prerequisites: CEE 323 and 304 or equivalent. M. A. Turnquist. Methods for managing data and transforming data into information. Modeling as a means to synthesize information into knowledge that can form the basis for decisions and actions. Application of statistical methods and optimization to managerial problems in project design, scheduling, operations, forecasting, and resource allocation.

**CEE 594(5940) Economic Methods for Engineering and Management (also ECON 494[4940])**

Fall. 4 credits. Prerequisite: calculus, probability and statistics, and economics course; senior or graduate standing or permission of instructor. R. E. Schuler. Introduces economic concepts and uses them to select, calibrate and apply proper analytic decision tools in engineering design and management. Topics include market analysis and pricing strategies; production choices and cost estimation; input acquisition and employee motivation; project evaluation and the cost of capital; decision-making in risky and uncertain environments; industry structure, bidding strategies and game theory; plus the regulatory and ethical consequences of overall managerial strategies.

**CEE 595(5950) Construction Planning and Operations**

Fall. 3 credits. P. G. Carr. Covers the fundamentals of construction planning: organization of the work site; construction planning, scheduling, and cost estimating; bidding; temporary structures; contract documents and the relationships among owners, designers, contractors, suppliers, and developers.

**CEE 596(5960) Management Issues in Forensic Engineering**

Fall. 3 credits. P. G. Carr. Introduction to Management issues in Forensic Engineering, Contract Administration and Dispute Resolution, with particular emphasis on contract formation, performance, breach, and remedies. Through case studies in forensics, the engineer's standard of care and design obligations are explored. The engineer's technical and ethical duties to the client, the contractors, and the public are examined.

**CEE 597(5970) Risk Analysis and Management (also TOX 597[5970])**

Spring. 3 credits. Prerequisite: introduction to probability and statistics (e.g., CEE 304, ENGRD 270, ILRST 210, BTRY 261, or AEM 210); two semesters of calculus; senior or graduate standing or permission of instructor. J. R. Stedinger.

Develops a working knowledge of risk terminology and reliability engineering, analytic tools and models used to analyze environmental and technological risks, and social and psychological risk issues. Discussions address life risks in the United States historical accidents, natural hazards, threat assessment, transportation risks, industrial accidents, waste incineration, air pollution modeling, public health, regulatory policy, risk communication, and risk management.

**CEE 598(5980) Introduction to Decision Analysis**

Fall. 3 credits. Prerequisite: introduction to probability and statistics (e.g., CEE 304, ENGRD 270, ILRST 210, BTRY 261 or AEM 210); senior or graduate standing or permission of instructor. R. A. Davidson. Framework to structure the way we think about decision situations that are complicated by uncertainty, complexity, and competing objectives. Specific decision analysis concepts and tools, such as decision trees, sensitivity analysis, value of information, and utility theory. Applications to all areas of engineering and life. Includes a group project to analyze a real-world decision.

**CEE 601(6020) Seminar—Water Resources and Environmental Engineering**

Fall. 1 credit. Staff. Presents topics of current interest.

**CEE 602(6070) Seminar—Civil Infrastructure**

Fall, spring. 1 credit. Requirement for first-year graduate students. Staff. Presents topics of current interest.

**CEE 603(6080) Seminar—Engineering Systems and Management**

Fall, spring. 1 credit. Staff. Presents topics of current interest.

**[CEE 605(6050) Seminar—Issues in Risk Analysis (also NTRES 605[6050])**

Fall. 1 credit. S-U grades optional. Next offered 2007–2008. Staff. Discussion of current issues and ongoing research on risk analysis issues from many perspectives with an emphasis on environmental risk analysis. Speakers address problem formulation, quantitative/qualitative methods in assessment of risk, communication issues, and challenges to risk assessment methodologies. Some sessions held jointly with other seminar series. Enrollment in seminar requires short reports

and participation in two required discussion meetings for class members designed to integrate the issues raised during the semester.]

#### **CEE 606(6860) Civil Infrastructure Systems**

Fall. 3 credits. Prerequisites: probability and statistics course (CEE 304 or equivalent) and engineering economics course (CEE 323 or equivalent). Letter or S-U grades. Staff.

Introduction to the framing and solution of civil infrastructure problems using a systems engineering approach. Systems tools, such as optimization, life-cycle cost analysis, decision analysis, simulation, Markov modeling, and risk analysis, are examined through case studies related to civil infrastructure.

#### **CEE 609(6090) Numerical Methods for Engineers**

Fall. 3 credits. P. J. Diamessis.

The primary focus is algorithm implementation within the context of engineering applications (spanning fluid and solid/fracture mechanics and beyond). Student projects will include parallel implementation using resources at the Theory Center. Course topics will include: Sources of error and error propagation, eigenvalue/eigenvector computation, solution of linear systems via direct or iterative methods and issues of parallel implementation, least squares approximation of lab/simulation data, solution of non-linear equations, interpolation in one and two dimensions, fast Fourier transforms (serial vs. parallel) and wavelets.

#### **CEE 610(6100) Remote Sensing Fundamentals (also CSS 660(6100))**

Fall. 3 credits. Prerequisite: permission of instructor. W. D. Philpot.

An introduction to equipment and methods used in obtaining information about earth resources and the environment from aircraft or satellite. Coverage includes sensors, sensor and ground-data acquisition, data analysis and interpretation, and project design.

#### **CEE 615(6150) Digital Image Processing**

Spring. 3 credits. Prerequisite: facility with algebra, trigonometry, and basic statistics or permission of instructor. W. D. Philpot.

An introduction to digital image-processing concepts and techniques, with emphasis on remote-sensing applications. Topics include image acquisition, enhancement procedures, spatial and spectral feature extraction, and classification, with an introduction to hyperspectral data analysis. Assignments require the use of image-processing software and graphics.

#### **CEE 617(6015) Special Topics—Remote Sensing**

On demand. 1-6 credits. W. D. Philpot.

Students may elect to undertake a project in remote sensing. The work is supervised by a professor in this subject area.

#### **CEE 620(6200) Water-Resources Systems Engineering**

Spring. 3 credits. Prerequisites: CEE 323 and 593 or BEE 475. D. P. Loucks.

Development and application of deterministic and stochastic optimization and simulation models for water-resources planning and management. Covers river-basin modeling, including reservoir design and operation, irrigation planning and operation, hydropower-capacity development, flow

augmentation, flood control and protection, and water-quality prediction and control.

#### **[CEE 621(6210) Stochastic Hydrology**

Spring. 3 credits. Prerequisites: CEE 304 or permission of instructor. J. R. Stedinger.

Course examines statistical, time series, and stochastic optimization methods used to address water resources planning and management problems involving uncertainty objectives and hydrologic inputs. Statistical issues include: maximum likelihood and moments estimators; censored data sets and historical information; probability plotting; Bayesian inference; regionalization methods; ARMA models; multivariate stochastic streamflow models; stochastic simulation; and stochastic reservoir-operation optimization models.]

#### **[CEE 623(6230) Environmental Quality Systems Engineering**

Fall. 3 credits. Prerequisites: MATH 294, optimization, and graduate standing or permission of instructor. C. A. Shoemaker.

Applications of optimization, simulation methods, and uncertainty analysis to the prevention and remediation of pollution. Case studies include: regional waste and wastewater treatment, restoration of dissolved oxygen levels in rivers, and reclamation of contaminated groundwater. Applications use linear programming, integer, dynamic, nonlinear programming, and sensitivity analysis.]

#### **CEE 628(6021) Seminar—Environmental and Water Resources Systems Analysis**

Spring. 1 credit. Prerequisite: permission of instructor. C. A. Shoemaker.

Graduate students and faculty members give informal lectures on various topics related to ongoing research in environmental or water resources systems planning and analysis.

#### **CEE 630(6300) Computational Fluid Dynamics for Environmental Flows**

Spring. 3 credits. P. J. Diamessis.

Higher-order spatial discretization schemes (spectral and compact-finite difference). One-dimensional nonlinear partial differential equations (Burgers eqn., Korteweg-DeVries eqn. and Shallow Water eqns.) and implications for environmental fluid flow simulations. Two-dimensional problems and fast iterative solvers. Numerical solution of the incompressible Navier-Stokes equations in an environmental/geophysical context. Advanced topics may include: Introduction to turbulence subgrid scale modeling in stratified/rotating flow, free surface flow modeling and representation of complex topography.

#### **CEE 631(6310) Computational Simulation of Flow and Transport in the Environment**

Spring. 3 credits. Prerequisites: MATH 294 or equivalent, ENGRD 241 or experience in numerical methods and programming, and elementary fluid mechanics.

P. L.-F. Liu.

Covers fundamental equations of saturated and unsaturated flow in porous media; flow in fractured media; numerical modeling of transport in porous media; diffusion and advective diffusion in one, two, and three dimensions; anisotropy; and additional terms for reactive substances. Teaches various numerical methods including finite difference, finite elements, and boundary elements.

#### **CEE 632(6320) Hydrology**

Spring. 3 credits. Prerequisite: CEE 331.

W. H. Brutsaert.

Introduction to hydrology as a description of the water cycle and the role of water in the natural environment, and other issues for environmental engineers and scientists. Covers: physical and statistical prediction methods for design related to hydrologic processes; hydrometeorology and evaporation; infiltration and base flow; surface runoff and channel routing; linear and nonlinear hydrologic systems; and storage routing and unit hydrograph methods.

#### **CEE 633(6330) Flow in Porous Media and Groundwater**

Fall. 3 credits. Prerequisite: CEE 331.

W. H. Brutsaert.

Fluid mechanics and equations of single-phase and multiphase flow; methods of solution. Applications involve aquifer hydraulics, pumping wells; drought flows; infiltration, groundwater recharge; land subsidence; seawater intrusion, miscible displacement; and transient seepage in unsaturated materials

#### **[CEE 634(6340) Boundary Layer Meteorology**

Fall. 3 credits. Prerequisite: CEE 331 or permission of instructor. Next offered 2007-2008. W. H. Brutsaert.

Physical processes in the lower atmospheric environment: turbulent transport in the atmospheric boundary layer, surface-air interaction, disturbed boundary layers, radiation. Applications include sensible and latent heat transfer from lakes, plant canopy flow and evapotranspiration, turbulent diffusion from chimneys and cooling towers, and related design issues.]

#### **[CEE 635(6350) Small and Finite Amplitude Water Waves**

Spring. 3 credits. P. L.-F. Liu.

Reviews linear and nonlinear theories of ocean waves. Discusses the applicability of different wave theories to engineering problems.]

#### **CEE 636(6360) Environmental Fluid Mechanics**

Spring. 3 credits. Staff.

Covers analytic and modeling perspectives of environmental flows; mechanics of layered and continuously stratified fluids: internal waves, density currents, baroclinic motions, and turbulence; jets and plumes and their behavior in the environment; turbulent diffusion, shear flow dispersion, and wave-induced mixing processes; and applications to mixing processes in rivers, lakes, estuaries, and the coastal ocean.

#### **CEE 637(6370) Experimental Methods in Fluid Dynamics (also M&E 627(6272))**

Spring. 4 credits. Pre- or corequisites: CEE 331 or equivalent and CEE 304 or equivalent. E. A. Cowen.

Introduction to experimental data collection and analysis, in particular as they pertain to fluid flows. Covers computer-based experimental control, analog and digital data acquisition, discrete sampling theory, digital signal processing, uncertainty analysis. Also covers analog transducers, acoustic and laser Doppler velocimetry, full-field (2-D) quantitative imaging techniques. Includes laboratory experiments and a project.

**CEE 638(6030) Seminar—Hydraulics**

Spring. 1 credit. Requirement for graduate students majoring in hydraulics or hydraulic engineering. Open to undergraduates and graduates. Staff. Topics of current interest in fluid mechanics, hydraulic engineering, and hydrology.

**CEE 639(6035) Special Topics in Hydraulics**

On demand. 1–6 credits. Staff. Special topics in fluid mechanics, hydraulic engineering, or hydrology.

**CEE 640(6400) Foundation Engineering**

Fall. 3 credits. Prerequisite: CEE 341. F. H. Kulhawy. Covers soil exploration, sampling, and in-situ testing techniques; bearing capacity, stress distribution, and settlement; design of shallow and deep foundations; compaction and site preparation; and seepage and dewatering of foundation excavations.

**CEE 641(6410) Retaining Structures and Slopes**

Spring. 3 credits. Prerequisite: CEE 341. Staff. Covers Earth pressure theories; design of rigid, flexible, braced, tied-back, slurry wall, soil nailing, and reinforced soil structures; stability of excavation, cut, and natural slopes; and design problems stressing application of course material under field conditions of engineering practice.

**[CEE 644(6440) Environmental Site and Remediation Engineering**

Spring. 3 credits. Prerequisite: CEE 341 or equivalent or permission of instructor. Next offered 2008–2009. T. D. O'Rourke. Covers principles of hydrogeology, contaminant migration, and remediation technologies related to geotechnical and environmental engineering. Emphasizes environmental site assessment, site feasibility studies, selection of remediation procedures, and engineered landfills. Design problems are based on real projects and involve visits from practicing engineers.]

**CEE 649(6045) Special Topics in Geotechnical Engineering**

On demand. 1–6 credits. Staff. Supervised study of special topics not covered in the formal courses.

**CEE 653(6530) Water Chemistry for Environmental Engineering**

Fall. 3 credits. Prerequisite: one semester of college chemistry or permission of instructor. L. W. Lion. Covers principles of chemistry applicable to the understanding, design, and control of water and wastewater treatment processes and to reactions in receiving waters. Topics include chemical thermodynamics, reaction kinetics, acid-base equilibria, mineral precipitation/dissolution, and electrochemistry. Focuses on the mathematical description of chemical reactions relevant to engineered processes and natural systems, and the numerical or graphical solution of these problems.

**[CEE 654(6540) Aquatic Chemistry**

Spring. 3 credits. Prerequisite: CEE 653 or CHEM 287–288. J. J. Bisogni. Applies concepts of chemical equilibria to natural aquatic systems. Topics include acid-base reactions, buffer systems, mineral precipitation, coordination and redox reactions, Eh-pH diagrams adsorption phenomena, humic acid chemistry, and

chemical-equilibria computational techniques. In-depth coverage of topics covered in CEE 653.]

**CEE 655(6550) Transport, Mixing, and Transformation in the Environment**

Fall. 3 credits. Prerequisite: CEE 331. P. L. Liu. Application of fluid mechanics to problems of transport, mixing, and transformation in the water environment. Introduction to advective, diffuse, and dispersive processes in the environment. Boundary interactions: air-water and sediment-water processes. Introduction to chemical and biochemical transformation processes. Applications to transport, mixing, and transformation in rivers, lakes, and coastal waters.

**CEE 656(6560) Physical/Chemical Process**

Fall. 3 credits. Pre- or corequisite: CEE 653 or permission of instructor. J. J. Bisogni. Theoretical and engineering aspects of chemical and physical phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in the environment. Analysis and design of treatment processes and systems.

**CEE 657(6570) Biological Processes**

Spring. 3 credits. Prerequisites: introductory microbiology and CEE 656, or permission of instructor. J. M. Gossett. Theoretical and engineering aspects of biological phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in the environment. Bioenergetics analysis, stoichiometry, biokinetic, and design of biological treatment process.

**CEE 658(6580) Microbial Biodegradation and Biocatalysis Lab**

Spring. 3 credits. Prerequisites: CEE 451 or BIOMI 290 or equivalent; CEE 351 or CHEM 390 or permission of instructor. R. E. Richardson. Students explore the use of microbes in biodegradation and biocatalysis as well as the molecular techniques (i.e., analysis of DNA, RNA, and proteins) commonly used in these applications. Lectures cover enzyme classes and kinetics, selective isolation of organisms with desired bioconversion capabilities, effects of environmental parameters and cell-to-cell communication on gene expression, methods in microbial molecular biology, and contemporary case studies in biodegradation and biocatalysis. Laboratory sessions give students hands-on experience in molecular and analytical methods. Student teams design and then construct a bioreactor employing their own environmental isolates that degrade a selected contaminant or produce a desired compound.

**CEE 659(6051) Seminar—Environmental Quality Engineering**

Spring. 1 credit. Prerequisite: graduate students in environmental engineering. R. E. Richardson. Presentation and discussion of current research in environmental engineering.

**CEE 661(6610) Urban Transportation Planning and Modeling**

Spring. 3 credits. Prerequisite: CEE 361 or permission of instructor. A. H. Meyburg. For description, see CEE 461.

**CEE 662(6620) Urban Transportation Network Design and Analysis**

Fall. 3 credits. Prerequisite: CEE 361 or permission of instructor. M. A. Turnquist. Covers the development and use of mathematical models for the design and analysis of urban transportation networks, including formulations and solution procedures based on user equilibrium and stochastic user equilibrium. Students apply these tools to a substantive real-world case study.

**CEE 663(6630) Network Flows and Algorithms**

Spring. 3 credits. Prerequisite: CEE 662 or permission of instructor. Offered alternate years. M. A. Turnquist. Algorithms for network flow problems encountered in transportation systems modeling, including shortest path, multi-objective shortest path, minimum cost flows, multi-commodity flows and generalized flows, are presented. Applications to vehicle routing, dynamic vehicle allocation, and network design are included.

**CEE 665(6650) Transportation, Energy, and the Environment**

Fall. 3 credits. Prerequisites: CEE 361 or permission of instructor. H. O. Gao. The course focuses on the nexus of transportation and air quality, energy, and climate-change concerns. It is interdisciplinary: drawing upon transportation, environment, urban planning, statistics, economics, and policy. The course covers both the theoretical and practical aspects of relevant topics including mobile emissions inventory estimation, renewable fuels, air quality impact and benefit assessment of Intelligent Transportation Systems (ITS) and urban sprawl, and congestion mitigation and air quality (CMAQ).

**CEE 668(6060) Seminar—Transportation System Engineering**

Fall, spring. 1 credit. Staff. Presents topics of current interest.

**CEE 671(6710) Fundamentals of Structural Mechanics**

Fall. 3 credits. Prerequisites: ENGRD 202, MATH 294. M. D. Grigoriu. Topics include beam bending, beams on elastic foundation, stability analysis for columns and beam-columns, linear elasticity, numerical solutions for linear elasticity problems, and applications including stress concentration, torsion, and plates.

**CEE 672(6720) Introduction to the Finite Element Method**

Spring. 3 credits. Prerequisites: CEE 371, 372, and 471. W. Aquino. Covers the formulation of the finite element method in 2-D and 3-D continuum, basic 2-D and 3-D continuum isoparametric elements, modeling and programming aspects of the finite element method, and static and transient problems. A large part of the course is devoted to understanding element formulations, testing elements (patch test), and addressing problems such as shear and volumetric locking, among others. Emphasis is placed on understanding fundamental aspects of the method for making intelligent use of commercial software and obtaining a strong background for moving to further study and research.

**CEE 673(6730) Design of Concrete Structures**

Fall. 4 credits. Prerequisite: CEE 371 or permission of instructor. Staff.

Centered on the design of a multi-story building that is initially planned with masonry bearing walls and precast-prestressed concrete floors. The masonry walls are then replaced with cast-in-place reinforced concrete. Finally, the structural steel elements are replaced with a reinforced concrete framing system. The course explores gravity loads, wind loads, and earthquake loads, and the behavior of individual members and the structure as a whole.

**[CEE 675(6750) Concrete Materials and Construction]**

Spring. 3 credits. Next offered 2007-2008. K. C. Hover.

Covers the materials science, structural engineering, and construction technology involved in the materials aspects of the use of concrete. Topics include cement chemistry and physics, mix design, admixtures, engineering properties, testing of fresh and hardened concrete, and the effects of construction techniques on material behavior.]

**[CEE 677(6770) Engineering Analysis]**

Fall. 3 credits. Prerequisite: permission of instructor. Next offered 2008-2009. M. D. Grigoriu.

Vector spaces, linear transformations, and eigenvalue problems with applications to matrix structural analysis, linear dynamics, stability, and principal stresses, strains, and moments of inertia. Fourier analysis for periodic and non-periodic functions, with applications to the solution of ordinary differential equations, beams, plates, and other structural mechanics problems. Partial differential equations with applications to the analysis of static and dynamic response of continuous systems and transport problems.]

**CEE 678(6780) Structural Dynamics and Earthquake Engineering**

Spring. 3 credits. M. D. Grigoriu.

Covers modal analysis, numerical methods, and frequency-domain analysis. Introduces earthquake-resistant design.

**CEE 679(6760) Evaluation and Failure of Structures**

Spring. 3 credits. Staff.

Teaches material and structural evaluation through the lens of failure. Builds upon and integrates what students have learned in courses in physics, mechanics, dynamics, materials science, structural modeling/analysis, and design. In addition, the course teaches the physics of methods used for condition assessment of structures (e.g., stress wave propagation, electromagnetic wave propagation, heat flow), introduces students to structural damage and assessment of damage caused by earthquake/wind loads on structures, and introduces students to blast/impact loadings on structures.

**CEE 690 (6900) Creativity, Innovation, and Leadership**

Spring. 3 credits. Prerequisite or co-requisite: CEE 590 or permission of the instructor. F. J. Wayno.

Graduate course designed to help aspiring engineering managers to better understand individual creativity and organizational innovation and to develop the required skills to play a productive role in fostering both. Not incidentally, the course will also help

students who take it to become more creative themselves. The course is highly participative and has a flow that moves from the individual—to the group—to the organization, with theory, research results, and practical skills-development woven seamlessly together.

**CEE 692(6095) Special Topics in Engineering Management**

On demand. 1-6 credits. Staff.

Individually supervised study of one or more specialized topics not covered in regular courses.

**CEE 693(6930) Special Topics in Systems**

On demand. 1-6 credits. D. P. Loucks.

An introduction to the quantitative systems approach for identifying and evaluating alternative possible decisions and their physical, economic, environmental, and social impacts especially related to public sector planning and management.

**CEE 697(6075) Special Topics in Structural Engineering**

On demand. 1-6 credits. Staff.

Individually supervised study or independent design or research in specialized topics not covered in regular courses. Occasional offering of such special courses as Shell Theory and Design, and Advanced Topics in Finite Element Analysis.

**CEE 710(7010) Research—Remote Sensing**

On demand. 1-6 credits. W. D. Philpot.

For students who want to study one particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design procedures.

**CEE 722(7020) Environmental and Water Resources Systems Analysis Research**

On demand. 1-6 credits. Prerequisite: permission of instructor. Preparation must be suitable to investigation to be undertaken. Staff.

Investigations of particular environmental or water resources systems problems.

**CEE 729(6025) Special Topics in Environmental and Water Resources Systems Analysis**

Offered on demand. 1-6 credits.

D. P. Loucks.

Supervised study, by individuals or small groups, of one or more specialized topics not covered in regular courses.

**CEE 735(7030) Research in Environmental Fluid Mechanics and Hydrology**

On demand. 1-6 credits. Staff.

The student may select an area of investigation in fluid mechanics, hydraulic engineering, or hydrology. The work may be either experimental or theoretical in nature. Results should be submitted to the instructor in charge in the form of a research report.

**CEE 736 (7360) Turbulence and Turbulent Mixing in Environmental Stratified Flows**

Spring. 3 credits. Prerequisite: CEE 655 or a second course in fluid mechanics or with instructor's permission. P. J. Diamessis.

Fundamentals of stably stratified flows, stratified homogeneous turbulence (spectra, length scales, and time scales), kinematics of diapycnal mixing, basic turbulent flow processes in homogeneous and stratified fluids (shear layers, wakes, boundary layers, etc.).

energy budget analysis, and parameterizations of geophysical turbulence. Additional topics may include: fossil turbulence theory and vortex-internal wave decomposition in strongly stratified turbulence.

**CEE 740(7400) Engineering Behavior of Soils**

Fall. 3 credits. Prerequisite: CEE 341.

H. E. Stewart.

Detailed study of the physiochemical nature of soil. Stress states due to geostatic loading and stress-history effects. In-depth evaluation of stress-strain-strength, compressibility, and hydraulic conductivity of natural soils.

**CEE 741(7410) Rock Engineering**

Fall. 3 credits. Prerequisite: CEE 341 or permission of instructor. Recommended: introductory geology. T. D. O'Rourke.

Geological and engineering classifications of intact rock, discontinuities, and rock masses. Includes laboratory and field evaluation of properties. Covers: stress states and stress analysis; design of foundations on, and openings in, rock masses; analysis of the stability of rock slopes; and rock blasting.

**CEE 744(7440) Advanced Foundation Engineering**

Spring. 2 credits. Prerequisite: CEE 640.

F. H. Kulhawy.

Continuation of CEE 640, with detailed emphasis on special topics in soil-structure interaction. Typical topics include lateral and pullout loading of deep foundations, pile group behavior, foundations for offshore structures, foundations for special structures.

**CEE 745(7450) Soil Dynamics**

Spring. 3 credits. Prerequisite: permission of instructor. H. E. Stewart.

Study of soil behavior under dynamic loading conditions. Foundation design for vibratory loadings. Introductory earthquake engineering including field and laboratory techniques for determining dynamic soil properties and liquefaction potential. Covers design of embankments and retaining structures under dynamic loading conditions.

**CEE 746(7460) Embankment Dam Engineering**

Spring. 2 credits. Prerequisites: CEE 641 and 741, or permission of instructor.

F. H. Kulhawy.

Principles of analysis and design for earth and rockfill dams. Materials, construction methods, internal and external stability, seepage and drainage, performance monitoring, abutment and foundation evaluation. Introduction to tailings dams.

**CEE 749(7040) Research in Geotechnical Engineering**

On demand. 1-6 credits. Staff.

For students who want to pursue a particular geotechnical topic in considerable depth.

**CEE 750(7050) Research in Environmental Engineering**

On demand. 1-6 credits. Staff.

For students who want to study a particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design and analysis procedures.

**CEE 759(6055) Special Topics in Environmental Engineering**

On demand. 1-6 credits. Staff.

Supervised study in special topics not covered in formal courses.



**CEE 762(7620) Practicum in Modeling Transportation Systems**

Fall. 3 credits. Prerequisites: CEE 661, 662, and 663. L. K. Nozick.

**CEE 764(6065) Special Topics in Transportation**

On demand. 1–6 credits. Staff.

Advanced subject matter not covered in depth in other regular courses.

**CEE 770(7700) Engineering Fracture Mechanics**

Fall. 3 credits. Prerequisite: CEE 672 or equivalent and T&AM 753, or permission of instructor. A. Ingrassia.

Computational and physical modeling of crack growth processes. Finite and boundary element-based simulation of brittle fracture initiation and propagation, fatigue crack growth, and elasto-plastic and cohesive approaches to inelastic crack growth. Element formulation, meshing and remeshing, interactive steering. Case studies across scales from geomechanics to micromechanics, and including metals, ceramics, and polymers. Laboratory techniques for fracture toughness, crack growth rate, and trajectory testing.

**[CEE 771(7710) Stochastic Mechanics in Science and Engineering**

Fall. 3 credits. Prerequisite: permission of instructor. Next offered 2008–2009.

M. D. Grigoriu.

Review of probability theory, stochastic processes, and Ito formula with illustrations by Monte Carlo Simulation. Analytical and numerical methods for solving stochastic problems defined by algebraic, differential, and integral equations with random/deterministic coefficients and random/deterministic input. Applications include: solution of Laplace, transport, Schrödinger, and other deterministic partial differential equations; dynamic systems subjected to Gaussian and non-Gaussian noise; random eigenvalue problems; and homogenization, structure evolution, and pattern formation for random heterogeneous materials.]

**[CEE 772(7720) Random Vibration**

Fall. 3 credits. Prerequisites: M&AE 326 and OR&IE 260, or equivalent, and permission of instructor. Next offered 2008–2009. M. D. Grigoriu.

Reviews random-process theory, simulation, and first-passage time. Linear random vibration: second-moment response descriptors and applications from fatigue; seismic analysis; and response to wind, wave, and other non-Gaussian load processes. Nonlinear random vibration: equivalent linearization, perturbation techniques, Fokker-Planck and Kolmogorov equations, Itô calculus, and applications from chaotic vibration, fatigue, seismic analysis, and parametrically excited systems.]

**[CEE 773(7730) Structural Reliability**

Fall. 3 credits. Prerequisite: permission of instructor. Next offered 2008–2009.

M. D. Grigoriu.

Review of probability theory, practical measures for structural reliability, second-moment reliability indices, probability models for strength and loads, probability-based design codes, reliability of structural systems, imperfection-sensitive structures, fatigue, stochastic finite-element techniques, and elementary concepts of probabilistic fracture mechanics.]

**CEE 774(7740) Advanced Structural Concrete**

Fall. 3 credits. Staff.

Covers the fundamental aspects of the mechanical behavior of concrete subjected to axial and multiaxial states of stress, rate effects, time-dependent deformations, and multiscale modeling. Includes the behavior of reinforced concrete membrane elements subjected to plane states of stress, torsion, limit analysis, and gives an introduction to finite element modeling of reinforced concrete structures.

**CEE 775(7750) Nonlinear Finite Element Analysis**

Fall. 3 credits. W. Aquino.

Covers fundamental aspects of nonlinear finite element analysis including geometric and material nonlinearity. Also covers total and updated lagrangian formulations, implementation of constitutive models, numerical solutions of global nonlinear systems of equations, and regularization techniques for softening materials.

**[CEE 776(7760) Advanced Topics in Stability**

Spring. 3 credits. Prerequisite: CEE 374 or equivalent. Next offered 2007–2008. C. Earls.]

**CEE 777(7770) Computational Solid and Structural Mechanics**

Spring. 3 credits. Staff.

This course covers the formulation and numerical solution of problems of solids and structures using the finite element method. Topics include a review of solid mechanics: nonlinear kinematics, invariance, first and second law of thermodynamics, and constitutive equations with internal variables; strong forms and weak forms; implicit and explicit algorithms; variants of Newton's method; and Lagrangian and Eulerian formulations. Application topics are chosen from the following areas: 3D finite elasticity, fully nonlinear beams and shells, distributed and discrete damage, contact-impact, and plasticity.

**CEE 779(7790) Advanced Behavior of Metal Structures**

Fall. 4 credits. Prerequisite: CEE 341 or permission of instructor. Staff.

This course covers the behavior and design of steel members, connections, and structures. Discussion of structural systems for buildings and bridges is included.

**[CEE 781(7810) Natural Disaster Risk Assessment and Management**

Spring. 3 credits. Next offered 2007–2008. R. A. Davidson.

Explores ways to define, measure, and manage natural disaster risk using systems engineering, civil engineering, and social science perspectives and analysis tools. Considers multiple hazards and multiple viewpoints (local, international, individual, public sector, private sector).]

**CEE 783(7073) Civil and Environmental Engineering Materials Project**

On demand. 1–3 credits. Staff.

Individual projects or reading and study assignments involving engineering materials.

**CEE 785(7070) Research in Structural Engineering**

On demand. 1–6 credits. Staff.

Pursues a branch of structural engineering beyond what is covered in regular courses. Theoretical or experimental investigation of suitable problems.

**CEE 810(8100) Thesis—Remote Sensing**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. W. D. Philpot.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 820(8200) Thesis—Environmental and Water Resource Systems**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 830(8300) Thesis—Environmental Fluid Mechanics and Hydrology**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 840(8400) Thesis—Geotechnical Engineering**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 850(8500) Thesis—Environmental Engineering**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 860(8600) Thesis—Transportation Systems Engineering**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**CEE 880(8700) Thesis—Structural Engineering**

Fall, spring. 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.



**CEE 890(8800) Thesis—Civil Infrastructure Systems**

Fall, spring, 1–12 credits. Students must register for credit with professor at start of each semester. Staff.

The student selects a thesis research topic with the advice of the faculty member in charge and pursues it either independently or in conjunction with others working on the same topic.

**COMPUTER SCIENCE**

E. Tardos, chair; W. Arms, G. Bailey, K. Bala, K. Birman, C. Cardie, R. Caruana, R. L. Constable, R. Elber, D. Fan, P. Francis, J. Gehrke, D. Greenberg, D. Gries, J. Halpern, J. E. Hopcroft, D. Huttenlocher, T. Joachims, U. Keich, J. Kleinberg, R. Kleinberg, D. Kozen, L. Lee, S. Marschner, A. Myers, R. Rugina, F. B. Schneider, D. Schwartz, B. Selman, D. Shmoys, E. G. Sifer, R. Teitelbaum, C. Van Loan, S. Vavasis, R. Zabih

The Department of Computer Science is part of the College of Arts and Sciences, Computing and Information Science (CIS), and the College of Engineering. For complete course descriptions, see the Computer Science listing in the CIS section.

**COM S 099(1109) Fundamental Programming Concepts**

Summer, 2 credits. Prerequisite: freshman standing. Credit may not be applied toward engineering degree. S-U grades only.

**COM S 100H(1113) Introduction to Computer Programming—Honors**

Spring, 4 credits.

**COM S 100J(1110) Introduction to Computer Programming**

Fall, spring, summer, 4 credits. Assumes basic high school mathematics (no calculus), but no programming experience.

**COM S 100M(1112) Introduction to Computer Programming**

Fall, spring, 4 credits. Corequisite: MATH 111, 191, or equivalent. Assumes student is comfortable with mathematics (at level of one semester of calculus) but has no prior programming experience.

**COM S 100R(1114) Introduction to Computer Programming—Robotics**

Fall, 4 credits. Limited to 25 students. Prerequisite: programming experience at level of advanced placement computer science.

**COM S 101(1710) Introduction to Cognitive Science (also COGST 101[1010], LING 170[1700], PHIL 191[1910], PSYCH 102[1020])**

Fall, summer, 3 credits.  
For description, see COGST 101.

**COM S 113(2000) Introduction to C**

Fall, spring, usually weeks 1–4. 1 credit. Prerequisite: COM S 100 or equivalent programming experience. Credit granted for both COM S 113 and 213 only if 113 taken first. S-U grades only.

**COM S 114(2006) Unix Tools**

Fall, usually weeks 5–8. 1 credit. Prerequisite: COM S 100 or equivalent programming experience. Recommended: knowledge of at least one programming language. S-U grades only.

**COM S 130(1300) Introductory Design and Programming for the Web (also INFO 130[1300])**

Fall, 3 credits. Prerequisite: none. No computer background necessary.

**COM S 165(1610) Computing in the Arts (also ART 175, CIS 165[1610], ENGRI 165[1610], MUSIC 165[1465], PSYCH 165[1650])**

Fall, 3 credits. Recommended: good comfort level with computers and some of the arts.

**COM S 167(1620) Visual Imaging in the Electronic Age (also ART 170[1700], CIS 167[1620], ENGRI 167[1670])**

Spring, 3 credits.

For description, see ART 170.

**COM S 172(1700) Computation, Information, and Intelligence (also COGST 172, ENGRI 172[1700], INFO 172[1700])**

Fall, 3 credits. Prerequisite: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100.

**COM S 201(2710) Cognitive Science in Context Laboratory (also COGST 201[2010], PSYCH 201[2010])**

Spring, 4 credits. Limited to 24 students. Recommended: concurrent or prior registration in PSYCH 102/COGST 101/COM S 101/LING 170/PHIL 191.

Knowledge of programming languages not assumed.

For description, see COGST 201.

**COM S 211(2110) Computers and Programming (also ENGRD 211[2110])**

Fall, spring, summer, 3 credits. Prerequisite: COM S 100 or equivalent course in Java or C++.

**COM S 212(2111) Java Practicum**

Fall, spring, 1 credit. Pre- or corequisite: COM S/ENGRD 211. Letter grades only.

**COM S 214(2008) Advanced UNIX Programming and Tools**

Spring, usually weeks 5–8. 1 credit. Prerequisite: COM S 114 or equivalent. S-U grades only.

**COM S 215(2004) Introduction to C#**

Fall, spring, usually weeks 5–8. 1 credit. Prerequisite: COM S/ENGRD 211 or equivalent experience. S-U grades only.

**COM S 230(2300) Intermediate Design and Programming for the Web (also INFO 230[2300])**

Spring, 3 credits. Prerequisite: COM S 130 or equivalent knowledge.

**COM S 280(2800) Discrete Structures**

Fall, spring, 3 credits. Pre- or corequisite: COM S 100 or permission of instructor.

**COM S 305(3050) Creative Problem-Solving in Computer Science**

Spring, 3 credits. Prerequisites: COM S 211 and 280.

**COM S 312(3110) Data Structures and Functional Programming**

Fall, spring, 4 credits. Prerequisite: COM S 211 and 212 or equivalent programming experience. Should not be taken concurrently with COM S 314 or 316.

**COM S 314(3420) Computer Organization (also ECE 314[3140])**

Spring, 4 credits. Prerequisite: COM S 211 or ENGRD 230. Should not be taken concurrently with COM S 312.

**COM S 316(3410) Systems Programming**

Fall, 4 credits. Prerequisites: COM S 211 or equivalent programming experience. Should not be taken concurrently with COM S 312.

**[COM S 321(3510) Numerical Methods in Computational Molecular Biology (also BIOBM 321[3210], ENGRD 321[3510])]**

Fall, 3 credits. Prerequisites: at least one course in calculus (e.g., MATH 106, 111, or 191) and a course in linear algebra (e.g., MATH 221 or 294 or BTRY 417); COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421. Offered odd-numbered years; next offered 2007–2008.]

**COM S 322(3220) Introduction to Scientific Computation (also ENGRD 322[3220])**

Spring, summer, 3 credits. Prerequisites: COM S 100 and MATH 221 or 294; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

**[COM S 324(3740) Computational Linguistics (also COGST 424[4240], LING 424[4424])]**

Fall, spring, 4 credits. Prerequisites: LING 203. Recommended: COM S 114. Labs involve work in Unix environment.

For description, see LING 424.]

**COM S 330(3300) Data-Driven Web Applications (also INFO 330[3300])**

Fall, 3 credits. Prerequisite: COM S/ENGRD 211. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

**COM S 381(3810) Introduction to Theory of Computing**

Fall, summer, 3 credits. Prerequisite: COM S 280 or permission of instructor. Credit will not be granted for both COM S 381 and 481; corrective transfers between COM S 381 and 481 (in either direction) encouraged during first few weeks of instruction.

**[COM S 400(4150) The Science of Programming]**

Fall, 3 credits. Prerequisite: COM S 211.]

**COM S 411(4110) Programming Languages and Logics**

Fall, 4 credits. Prerequisite: COM S 312 or permission of instructor.

**COM S 412(4120) Introduction to Compilers**

Spring, 3 credits. Prerequisites: COM S 312 or permission of instructor and COM S 314 or 316. Corequisite: COM S 413.

**COM S 413(4121) Practicum in Compilers**

Spring, 2 credits. Corequisite: COM S 412.

**COM S 414(4410) Operating Systems**

Fall, spring, summer. 3 credits.  
Prerequisite: COM S 314 or 316.  
Corequisite: COM S 415 in spring only.

**COM S 415(4411) Practicum in Operating Systems**

Fall, spring. 2 credits. Corequisite: COM S 414.

**COM S 416(4420) Computer Architecture (also ECE 475[4750])**

Fall. 4 credits. Prerequisites: ENGRD 230 and COM S/ECE 314.  
For description, see ECE 475.

**COM S 419(4450) Computer Networks**

Spring. 4 credits. Pre- or corequisite: COM S 414 or permission of instructor.

**COM S 421(4210) Numerical Analysis**

Fall. 4 credits. Prerequisites: MATH 221 or 294 or equivalent, one additional mathematics course numbered 300 or above, and knowledge of programming. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

**COM S 426(4520) Introduction to Bioinformatics**

Spring. 4 credits. Prerequisites: COM S/ENGRD 211, COM S 280.

**COM S 428(4510) Introduction to Computational Biophysics**

Fall. 3 credits. Prerequisite: COM S 100, CHEM 211 or equivalent, MATH 221, 293 or 294, PHYS 112 or 213, or permission of instructor. Recommended: BIOBM 330.

**COM S 430(4300) Information Retrieval (also INFO 430[4300])**

Fall. 3 credits. Prerequisite: COM S 211 or equivalent.

**COM S 431(4302) Web Information Systems (also INFO 431[4302])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

**COM S 432(4320) Introduction to Database Systems**

Fall. 3 credits. Prerequisites: COM S 312 (or COM S 211, 212 and permission of instructor).

**COM S 433(4321) Practicum in Database Systems**

Fall. 2 credits. Prerequisite: COM S 432 or coregistration in COM S 432. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

**COM S 465(4620) Computer Graphics I (also ARCH 374[3740])**

Fall. 4 credits. Prerequisite: COM S/ENGRD 211. May not be taken after COM S 417.

**COM S 467(4630) Computer Graphics II**

Spring. 3 credits. Prerequisite: COM S 465.

**COM S 468(4631) Computer Graphics Practicum**

Spring. 2 credits. Prerequisite: COM S 465. Corequisite: COM S 467.

**COM S 472(4700) Foundations of Artificial Intelligence**

Fall. 3 credits. Prerequisites: COM S/ENGRD 211 and COM S 280 or equivalent.

**COM S 473(4701) Practicum in Artificial Intelligence**

Fall. 2 credits. Corequisite: COM S 472.

**COM S 474(4740) Introduction to Natural Language Processing (also COGST 474[4740], LING 474[4474])**

Fall or spring. 4 credits. Prerequisite: COM S 211.

**COM S 475(4702) Artificial Intelligence: Uncertainty and Multi-Agent Systems**

Spring. 4 credits. Prerequisites: COM S/ENGRD 211 and COM S 280 or equivalent.

**COM S 478(4780) Machine Learning**

Spring. 4 credits. Prerequisites: COM S 280, 312, and basic knowledge of linear algebra and probability theory.

**COM S 480(4870) Introduction to Cryptology (also MATH 335[3350])**

Fall, spring. 3 credits. Prerequisites: COM S 100 and MATH 222 or 294. Students who take this course may not also receive credit for MATH 336.

For description, see MATH 335.

**COM S 482(4820) Introduction to Analysis of Algorithms**

Spring, summer. 4 credits. Prerequisites: COM S 280 and 312.

**[COM S 483(4812) Quantum Computation (also PHYS 481/681[4481/7681])]**

Spring. 2 credits. Prerequisite: familiarity with theory of vector spaces over complex numbers. Not offered every year; next offered 2007–2008.

For description, see PHYS 481.]

**COM S 485(4850) Mathematical Foundations for the Information Age**

Spring. 4 credits. Prerequisites: COM S 381 or 481.

**COM S 486(4860) Applied Logic (also MATH 486[4860])**

Fall or spring. 4 credits. Prerequisites: MATH 222 or 294, COM S 280 or equivalent (e.g., MATH 332, 432, 434, 481), and some additional course in mathematics or theoretical computer science.

**COM S 490(4999) Independent Reading and Research**

Fall, spring. 1–4 credits.

**COM S 501(5150) Software Engineering**

Spring. 4 credits. Prerequisite: COM S 211 or equivalent experience programming in Java or C++.

**COM S 513(5430) System Security**

Fall. 4 credits. Prerequisites: COM S 414 or 419 and familiarity with Java, C, or C# programming languages.

**COM S 514(5410) Intermediate Computer Systems**

Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

**[COM S 516(5420) Parallel Computer Architecture (also ECE 572[5720])]**

Spring. 4 credits. Prerequisite: ECE 475. For description, see ECE 572.]

**COM S 530(5300) The Architecture of Large-Scale Information Systems (also INFO 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or 432.

**COM S 565(5640) Computer Animation (also ART 273[2703], CIS 565[5640])**

Fall. 4 credits. Prerequisite: none. For description, see ART 273.

**COM S 566(5642) Advanced Animation (also ART 372, CIS 566[5642])**

Spring. 4 credits. Prerequisite: none. For description, see ART 372.

**COM S 572(5722) Heuristic Methods for Optimization (also CEE 509[5090], CIS 572[5722], OR&IE 533[5340])**

Fall. 3 or 4 credits. Prerequisites: COM S/ENGRD 211 or 322 or CEE/ENGRD 241, or graduate standing, or permission of instructor.

For description, see CEE 509.

**COM S 578(5780) Empirical Methods in Machine Learning and Data Mining**

Fall. 4 credits. Prerequisites: COM S 280 and 312 or equivalent.

**COM S 611(6110) Advanced Programming Languages**

Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.

**COM S 612(6120) Compiler Design for High-Performance Architectures**

Spring. 4 credits. Prerequisites: COM S 314 and 412 or permission of instructor.

**COM S 614(6410) Advanced Systems**

Fall or spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

**COM S 615(6460) Peer-to-Peer Systems**

Spring. 4 credits. Recommended: COM S 614.

**COM S 619(6450) Advanced Computer Networks**

Fall. 4 credits. Prerequisite: COM S 419 or permission of instructor.

**COM S 621(6210) Matrix Computations**

Fall. 4 credits. Prerequisites: MATH 411 and 431 or permission of instructor.

**COM S 622(6220) Numerical Optimization and Nonlinear Algebraic Equations**

Spring. 4 credits. Prerequisite: COM S 621.

**[COM S 624(6240) Numerical Solution of Differential Equations]**

Spring. 4 credits. Prerequisites: exposure to numerical analysis (e.g., COM S 421 or 621), differential equations, and knowledge of MATLAB. Offered even-numbered years; next offered 2007–2008.]

**COM S 626(6510) Computational Molecular Biology**

Spring. 4 credits. Prerequisites: familiarity with linear programming, numerical solutions of ordinary differential equations, and nonlinear optimization methods.

**COM S 628(6522) Biological Sequence Analysis**

Fall. 4 credits. Prerequisite: none.

**COM S 630(6300) Human Language Technology (also INFO 630[6300])**

Spring. 4 credits. Prerequisites: basic knowledge of linear algebra and probability theory; basic programming skills.

**COM S 632(6320) Database Systems**

Spring. 4 credits. Prerequisite: COM S 432–433 or permission of instructor.

**COM S 633(6322) Advanced Database Systems**

Spring. 4 credits.

**[COM S 664(6670) Machine Vision]**

Fall. 4 credits. Prerequisites: undergraduate-level understanding of algorithms and MATH 221 or equivalent.]

**COM S 665(6620) Advanced Interactive Graphics**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, probability and statistics, vector calculus, and programming.

**[COM S 667(6630) Physically Based Rendering]**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, programming, and vector calculus.]

**COM S 671(6762) Introduction to Automated Reasoning**

Fall or spring. 4 credits. Prerequisite: COM S 611 and graduate standing or permission of instructor.

**COM S 672(6700) Advanced Artificial Intelligence**

Spring. 4 credits. Prerequisites: COM S 472 or permission of instructor.

**[COM S 673(6724) Integration of Artificial Intelligence and Operations Research (also CIS 673[6724])]**

Spring. 3 credits.]

**COM S 674(6740) Natural Language Processing**

Spring. 3 credits. Prerequisite: COM S 472 or permission of instructor. COM S 474 is *not* a prerequisite.

**[COM S 676(6764) Reasoning about Knowledge]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.]

**[COM S 677(6766) Reasoning about Uncertainty]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.]

**COM S 678(6780) Advanced Topics in Machine Learning**

Spring. 4 credits. Prerequisites: COM S 478 or equivalent, or COM S 578 or equivalent, or permission of instructor. Not offered every year.

**COM S 681(6820) Analysis of Algorithms**

Fall. 4 credits. Prerequisite: COM S 482 or graduate standing.

**[COM S 682(6810) Theory of Computing]**

Spring. 4 credits. Prerequisite: COM S 381 or 481 and COM S 482 or 681 or permission of instructor. Not offered every year; next offered 2007-2008.]

**COM S 683(6822) Advanced Design and Analysis of Algorithms**

Spring. 4 credits. Prerequisite: COM S 681 or permission of instructor.

**[COM S 684(6840) Algorithmic Game Theory]**

Fall or spring. 4 credits. Prerequisite: background in algorithms and graphs at level of COM S 482. No prior knowledge of game theory or economics assumed.]

**[COM S 685(6850) The Structure of Information Networks (also INFO 685[6850])]**

Fall or spring. 4 credits. Prerequisite: COM S 482.]

**COM S 686(6860) Logics of Programs**

Spring. 4 credits. Prerequisites: COM S 481, 682, and MATH 481 or MATH/COM S 486.]

**COM S 709(7090) Computer Science Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in computer science. S-U grades only.

**COM S 711(7191) Seminar in Advanced Programming Languages**

Fall, spring. 3 credits.

**COM S 713(7491) Seminar in Systems and Methodology**

Fall, spring. 4 credits. Prerequisites: graduate course employing formal reasoning (e.g., COM S 611, 613, 671), logic course, or permission of instructor. Not offered every year.

**COM S 714(7410) Topics in Systems**

Fall or spring. 3 credits. Prerequisite: permission of instructor.

**COM S 715(7192) Seminar in Programming Refinement Logics**

Fall, spring. 4 credits. Prerequisite: permission of instructor.

**COM S 717(7430) Topics in Parallel Architectures**

Fall. 4 credits. Prerequisite: COM S 612 or permission of instructor. Not offered every year.

**COM S 718(7690) Computer Graphics Seminar**

Fall, spring. 3 credits.

**COM S 719(7190) Seminar in Programming Languages**

Fall, spring. 4 credits. Prerequisite: COM S 611 or permission of instructor. S-U grades only.

**COM S 721(7210) Topics in Numerical Analysis**

Fall, spring. 4 credits. Prerequisite: COM S 621 or 622 or permission of instructor. Not offered every year.

**COM S 726(7590) Problems and Perspectives in Computational Molecular Biology**

Fall, spring. 1 credit. Open to all from life sciences, computational sciences, and physical sciences. S-U grades only.

**COM S 732(7320) Topics in Database Systems**

Fall, spring. 4 credits. S-U grades only.

**COM S 733(7390) Database Seminar**

Spring. 1 credit. S-U grades only. Prerequisite: COM S 633 or permission of instructor.

**COM S 750(7726) Evolutionary Computation and Design Automation (also CIS 750[7726], M&AE 650[6500])**

Fall. 4 credits. Prerequisite: programming experience or permission of instructor.

**COM S 754(7490) Systems Research Seminar**

Fall, spring. 1 credit. S-U grades only.

**COM S 764(7670) Visual Object Recognition**

Spring. 3 credits. Prerequisite: none.

**COM S 772(7790) Seminar in Artificial Intelligence**

Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 775(7794) Seminar in Natural Language Understanding**

Fall, spring. 2 credits

**COM S 785(7850) Seminar on Information Networks**

Fall. 4 credits. Prerequisite: COM S 485 or 685 or permission of instructor.

**COM S 786(7860) Introduction to Kleene Algebra**

Spring. 4 credits. Prerequisite: COM S 481. Recommended: COM S 482 or 681, COM S 682, elementary logic (MATH 481 or 681), algebra (MATH 432).

**COM S 789(7890) Seminar in Theory of Algorithms and Computing**

Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 790(7999) Independent Research**

Fall, spring. Prerequisite: permission of computer science advisor.

Independent research or master of engineering project.

**COM S 990(9999) Thesis Research**

Fall, spring. Prerequisite: permission of computer science advisor. S-U grades only. Doctoral research.

**EARTH AND ATMOSPHERIC SCIENCES**

T. E. Jordan, chair; S. J. Colucci, co-chair (CALS); B. L. Isacks, director of undergraduate studies (Geological Sciences); R. W. Allmendinger, W. D. Allmon, C. Andronikos, M. Barazangi, L. D. Brown, L. M. Cathles, J. L. Cisne, K. H. Cook, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, M. Goman, C. H. Greene, D. L. Hysell, R. W. Kay, S. Mahlburg Kay, M. C. Kelley, B. Monger, A. Moore, A. J. Pershing, J. Phipps Morgan, M. Pritchard, S. J. Riha, W. M. White, D. S. Wilks, M. W. Wysocki

For complete course descriptions, see the Earth and Atmospheric Sciences listing in the College of Arts and Sciences or College of Agriculture and Life Sciences section.

**EAS 101(1101) Introductory Geological Sciences (To Know Earth)**

Fall. 3 credits. Staff.

**EAS 102(1102) Evolution of the Earth and Life (also BIO G 170[1700])**

Spring. 3 credits. J. L. Cisne.

**EAS 108(1108) Earth in the News**

Summer. 3 credits. S. L. Losh.

**EAS 109(1109) Dinosaurs**

Fall. 1 credit. J. L. Cisne.

**EAS 121(1121) Introduction to MATLAB (also CIS 121[1121], COM S 100M[1112])**

Fall, spring. 2 credits. Prerequisites: MATH 111, 191, or equivalent. D. Schwartz.

**EAS 122(1220) Earthquake! (also ENGRI 122[1120])**

Spring. 3 credits. Staff. Course in Introduction to Engineering series. For description, see ENGRI 122.

**EAS 131(1310) Basic Principles of Meteorology**

Fall. 3 credits. 1-credit lab is EAS 133.  
M. W. Wysocki.

**EAS 133(1330) Basic Meteorology Lab**

Fall. 1 credit. Requirement for atmospheric science majors; optional for other students taking EAS 131. Prerequisite: EAS majors. Corequisite: EAS 131. M. W. Wysocki.  
Covers topics presented in EAS 131.

**EAS 150(1500) Fortran Applications in Earth Science (also CIS 122[1122])**

Spring. 2 credits. Prerequisite: CIS/EAS 121 or equivalent. Letter grades only.  
A. J. Pershing.

**EAS 154(1540) Introductory Oceanography (also BIOEE 154[1540])**

Fall, summer. 3 credits. Lec. Optional 1-credit lab is EAS/BIOEE 155. B. Monger and C. Greene.

**EAS 155(1550) Introductory Oceanography Lab (also BIOEE 155[1500])**

Fall. 1 credit. Lab. Corequisite: EAS 154. B. Monger and C. Greene.  
Covers topics presented in EAS/BIOEE 154.

**EAS 201(2010) Introduction to the Physics and Chemistry of the Earth (also ENGRD 201[2010])**

Fall. 3 credits. Prerequisites: PHYS 112 or 207. J. Phipps Morgan.

**EAS 213(2130) Marine and Coastal Geology**

Summer. 4 credits. Prerequisite: introductory geology or ecology or permission of instructor. Staff.

**EAS 220(2200) The Earth System**

Spring. 4 credits. Letter grades only. Staff.

**EAS 222(2220) Seminar—Hawaii's Environment**

Fall. 1 credit. S-U grades only. A. Moore and C. Greene.

**EAS 240(2400) Field Study of the Earth System**

Spring. 5 credits. Prerequisites: enrollment in Earth and Environmental Sciences Semester in Hawaii; one semester of calculus (MATH 190, 191, 192, or 111, 112) and two semesters of any of the following: PHYS 207/208 or 112/213; CHEM 207/208; BIO G 101/103–102/104 or 105/106 or 109/110; or equivalent course work. A. Moore.

**EAS 250(2500) Meteorological Observations and Instruments**

Fall. 4 credits. Prerequisite: EAS 131. M. W. Wysocki and B. Monger.

**EAS 268(2680) Climate and Global Warming**

Spring. 3 credits. Prerequisite: basic college math. S-U grades optional.  
A. T. DeGaetano.

**EAS 296(2960) Forecast Competition**

Fall and spring. 1 credit. Prerequisite: sophomore standing in atmospheric science or permission of instructor. S-U grades only. D. S. Wilks.

**EAS 301(3010) Evolution of the Earth System**

Fall. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent. T. Jordan, S. Riha, and W. D. Allmon. Four Saturday field trips.

**EAS 303(3030) Introduction to Biogeochemistry (also NTRES 321[3210])**

Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, plus a biology and/or geology course. L. A. Derry and J. Yavitt.

**EAS 304(3040) Interior of the Earth**

Spring. 3 credits. C. Andronicos.

**EAS 305(3050) Climate Dynamics (also ASTRO 331[3331])**

Fall. 3 credits. Prerequisite: two semesters of calculus and one semester of physics. K. H. Cook.

**EAS 315(3150) Geomorphology**

Fall. 3 credits. Prerequisite: geology, hydrology, or soil science course. Two S field trips. B. L. Isacks.

**EAS 322(3220) Biogeochemistry of the Hawaiian Islands**

Spring. 4 credits. Prerequisite: enrollment in EES semester in Hawaii, EAS 220, EAS 303, or permission of instructor. L. Derry.

**[EAS 326(3260) Structural Geology**

Spring. 4 credits. Prerequisite: one semester of calculus plus an introductory geology course or permission of instructor. One weekend field trip. Offered alternate years, next offered 2007–2008. R. W. Allmendinger.)

**[EAS 334(3340) Microclimatology**

Spring. 3 credits. Prerequisite: physics course. Offered alternate years; next offered 2007–2008. D. S. Wilks.)

**EAS 341(3410) Atmospheric Thermodynamics and Hydrostatics**

Fall. 3 credits. Prerequisites: one year of calculus and one semester of physics. A. T. DeGaetano.

**EAS 342(3420) Atmospheric Dynamics (also ASTRO 342[3342])**

Spring. 3 credits. Prerequisites: MATH 192, 213 or equivalent; one year physics. K. H. Cook.

**[EAS 350(3500) Dynamics of Marine Ecosystems (also BIOEE 350[3500])**

Fall. 3 credits. Prerequisites: one year of calculus and a semester of oceanography (e.g., EAS 154), or permission of instructor. Offered alternate years; next offered 2007–2008. C. H. Greene and R. W. Howarth.)

**EAS 351(3510) Marine Ecosystems Field Course (BIOEE 351[3510])**

Spring. 4 credits. Recommended: EAS 240. C. H. Greene, C. D. Harvell, and B. Monger.

**EAS 352(3520) Synoptic Meteorology I**

Spring. 3 credits. Prerequisite: EAS 341. Corequisite: EAS 342. M. W. Wysocki.

**EAS 353(3530) Physical Oceanography**

Fall. 3 credits. Prerequisites: MATH 112 or 192, or one year of physics, or permission of instructor. B. C. Monger.

**EAS 355(3550) Mineralogy**

Fall. 4 credits. Prerequisites: EAS 101 or 201 or 220 and CHEM 207/211 or permission of instructor. S. Mahlburg Kay.

**EAS 356(3560) Petrology and Geochemistry**

Spring. 4 credits. Prerequisite: EAS 355. R. W. Kay.

**[EAS 388(3880) Geophysics and Geotectonics**

Spring. 3 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. Offered alternate years, next offered 2007–2008. M. Pritchard.)

**[EAS 401(4010) Fundamentals of Energy and Mineral Resources**

Spring. 3 credits. L. Cathles.)

**EAS 404(4040) Geodynamics**

Spring. 3 credits. Prerequisite: calculus and calculus-based physics course or permission of instructor. Offered alternate years. J. Phipps Morgan.

**EAS 405(4050) Active Tectonics**

Spring. 3 credits. Recommended: mechanical background equivalent to EAS 326/388. Grading optional. Offered alternate years. M. Pritchard.

**EAS 417(4170) Field Mapping in Argentina**

Summer. 3 credits. Prerequisites: introductory EAS course and EAS 326. S. Mahlburg Kay.

**EAS 420 (4200) The Linux Supercomputing Environment**

Fall, spring. 3 credits. Prerequisite: EAS 150 or introductory programming. M. Wysocki and V. Manakkal.

**[EAS 425(4250) European Discovery of Impacts and Explosive Volcanism**

2 credits. Prerequisite: junior, senior, or graduate students with background in geology and permission of instructor. One two-hour meeting per week plus field trip during spring break. Offered alternate years; next offered 2007–2008. J. Phipps Morgan.)

**EAS 434(4340) Reflection Seismology**

Fall. 3 credits. Prerequisites: MATH 192 and PHYS 208, 213, or equivalent. Offered alternate years. L. D. Brown.

**EAS 435(4350) Statistical Methods in Meteorology and Climatology**

Fall. 3 credits. Prerequisites: introductory statistics (e.g., AEM 210) and calculus course. D. S. Wilks.

**[EAS 437(4370) Geophysical Field Methods (also ARKEO 437[4370])**

Fall. 3 credits. Prerequisite: PHYS 213 or 208 or permission of instructor. Offered alternate years; next offered 2007–2008. L. D. Brown.)

**[EAS 447(4470) Physical Meteorology**

Fall. 3 credits. Prerequisites: one year each of calculus and physics. Offered alternate years; next offered 2007–2008. A. T. DeGaetano.)

**EAS 451(4510) Synoptic Meteorology II**

Fall. 3 credits. Prerequisites: EAS 341 and 342. S. J. Colucci.

**[EAS 453(4530) Advanced Petrology**

Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years; next offered 2007–2008. R. W. Kay.)

**EAS 454(4540) Advanced Mineralogy**

Spring. 3 credits. Prerequisite: EAS 355 or permission of instructor. Offered alternate years. S. M. Kay.

**[EAS 455(4550) Geochemistry]**

Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years; next offered 2007-2008. W. M. White.]

**[EAS 456(4560) Mesoscale Meteorology]**

Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Next offered 2007-2008. S. J. Colucci.]

**[EAS 457(4570) Atmospheric Air Pollution]**

Fall. 3 credits. Prerequisites: EAS 341 or thermodynamics course, and one semester of chemistry, or permission of instructor. M. W. Wysocki.

**[EAS 458(4580) Volcanology]**

Fall. 3 credits. Prerequisite: EAS 356 or equivalent. Offered alternate years. R. W. Kay.

**[EAS 460(4600) Late Quaternary Paleocology]**

Fall. 4 credits. M. Goman.

**[EAS 462(4620) Marine Ecology (also BIOEE 462[4620])]**

Fall. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Offered alternate years. C. D. Harvell and C. H. Greene.]

**[EAS 470(4700) Weather Forecasting and Analysis]**

Spring. 3 credits. Prerequisites: EAS 352 and 451. M. W. Wysocki.

**[EAS 471(4710) Introduction to Groundwater Hydrology (also BEE 471[4710])]**

Spring. 3 credits. Prerequisites: MATH 294 and ENGRD 202. Next offered 2007-2008. L. Cathles.]

**[EAS 475(4750) Special Topics in Oceanography]**

Fall, spring, summer. 2-6 credits, variable. Prerequisites: one semester of oceanography and permission of instructor. Fall, spring: C. H. Greene; summer: B. C. Monger.

**[EAS 476(4760) Sedimentary Basins: Tectonics and Mechanics]**

Fall. 3 credits. Prerequisite: EAS 301 or permission of instructor. Offered alternate years; next offered 2007-2008. T. E. Jordan.]

**[EAS 478(4780) Advanced Stratigraphy]**

Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.

**[EAS 479(4790) Paleobiology (also BIOEE 479[4790])]**

Fall. 4 credits. Prerequisites: one year introductory biology and either BIOEE 274 or 373 or EAS 375, or permission of instructor. Offered alternate years; next offered 2007-2008. W. Allmon.]

**[EAS 481(4810) Senior Survey of Earth Systems]**

Spring. 2 credits. R. Kay. Fall. 2 credits. J. Cisne.

**[EAS 483(4830) Environmental Biophysics]**

Spring. 3 credits. Offered alternate years; next offered 2007-2008. S. J. Riha.]

**[EAS 484(4840) Inverse Methods in the Natural Sciences]**

Spring. 3 credits. Prerequisite: MATH 294. D. Hysell.

**[EAS 487(4870) Introduction to Radar and Remote Sensing (also ECE 487[4870])]**

Fall. 3 credits. Prerequisites: PHYS 208 or 213 or equivalent or permission of instructor. D. L. Hysell.

**[EAS 491-492(4910-4920) Undergraduate Research]**

Fall, spring. 1-4 credits. Students must complete form at 2124 Snee Hall. Staff.

**[EAS 494(4940) Special Topics in Atmospheric Science]**

Fall, spring. 8 credits max. Undergraduate level. S-U grades optional. Staff.

**[EAS 496(4960) Internship Experience]**

Fall, spring. 1-2 credits. Prerequisite: EAS 240. S-U grades only. Staff.

**[EAS 497(4970) Individual Study in Atmospheric Science]**

Fall, spring. 1-6 credits. Students must register using independent study form. S-U grades optional. Staff.

**[EAS 498(4980) Teaching Experience in Earth and Atmospheric Sciences]**

Fall, spring. 1-4 credits. Students must register using independent study form. S-U grades only. Staff.

**[EAS 499(4990) Undergraduate Research in Atmospheric Science]**

Fall, spring. Credit TBA. Students must register using independent study form. S-U grades only. Staff.

**[EAS 500(5000) Design Project in Geohydrology]**

Fall, spring. 3-12 credits. Alternative to industrial project for M.Eng. students choosing geohydrology option. May continue over two or more semesters. Not offered 2006-2007. L. M. Cathles.]

**[EAS 502(5020) Case Histories in Groundwater Analysis]**

Spring. 4 credits. Not offered 2006-2007. L. M. Cathles.]

**[EAS 505(5050) Fluid Dynamics in the Earth Sciences]**

Spring. 3 credits. Prerequisites: MATH through 294, PHYS through 208/214 or permission of instructor. Next offered 2007-2008. L. Cathles, D. Hysell, J. Phipps Morgan, M. Pritchard, and M. Wysocki.]

**[EAS 575(5750) Planetary Atmospheres (also ASTRO 575[5750])]**

Fall. 4 credits. P. Gierasch.

**[EAS 577(5770) Planetary Surface Processes (also ASTRO 577[5770])]**

Spring. 3 or 4 credits. J. Bell.

**[EAS 578(5780) Planet Formation and Evolution (also ASTRO 578[5780])]**

Fall. 4 credits. Prerequisites: familiarity with elementary physics and math or consent of instructor. Offered alternate years. J-L. Margot and M. Pritchard.

**[EAS 584(5840) Inverse Methods in the Natural Sciences]**

Spring. 3 credits. Prerequisite: MATH 294. Complete substantial class project. D. Hysell.

**[EAS 620(6200) The Linux Supercomputing Environment]**

Fall, spring. 3 credits. Prerequisite: EAS 150 or introductory programming. M. Wysocki, V. Manakkal.

**[EAS 622(6220) Advanced Structural Geology I]**

Fall. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years; next offered 2007-2008. R. W. Allmendinger and C. Andronicos.]

**[EAS 624(6240) Advanced Structural Geology II]**

Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years; next offered 2007-2008. R. W. Allmendinger.]

**[EAS 628(6280) Geology of Orogenic Belts]**

Spring. 3 credits. Prerequisite: permission of instructor. Next offered 2007-2008. S. M. Kay.]

**[EAS 641(6410) Analysis of Biogeochemical Systems]**

Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. L. A. Derry.

**[EAS 652(6520) Advanced Atmospheric Dynamics (also ASTRO 652[6520])]**

Spring. 3 credits. Prerequisites: EAS 341 and 342 or equivalent. Offered alternate years. Next offered 2007-2008. S. J. Colucci.]

**[EAS 656(6560) Isotope Geochemistry]**

Fall. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.

**[EAS 666(6660) Applied Multivariate Statistics]**

Spring. 3 credits. Prerequisites: multivariate calculus, matrix algebra, and two statistics courses. Offered alternate years; next offered 2007-2008. D. S. Wilks.]

**[EAS 675(6750) Modeling the Soil-Plant-Atmosphere System (also CSS 675[6750])]**

Spring. 3 credits. Prerequisite: EAS/CSS 483 or equivalent. Next offered 2008-2009. S. J. Riha.]

**[EAS 692(6920) Special Topics in Atmospheric Science]**

Fall, spring. 1-6 credits. S-U grades optional. Staff.

**[EAS 693(6930) Special Topics in Geological Sciences]**

Fall or spring. 1-3 credits, variable. Grading optional. Staff.

**[EAS 700-799(7000-7990) Seminars and Special Work]**

Fall, spring. 1-3 credits. Prerequisite: permission of instructor. Staff.

**[EAS 701-702(7010-7020) Thesis Research]**

701, fall; 702, spring. 1-15 credits, variable. Grading optional. Staff.

**[EAS 711(7110) Upper Atmospheric and Space Physics]**

Fall or spring. 1-6 credits. D. L. Hysell. Seminar.

**[EAS 722(7220) Advanced Topics in Structural Geology]**

R. W. Allmendinger.

**[EAS 731(7310) Advanced Topics in Remote Sensing and Geophysics]**

M. Pritchard.



**EAS 733(7330) Advanced Topics in Geodynamics**

Spring. J. Phipps Morgan.

**EAS 750(7500) Remote Satellite Sensing in Biological Oceanography**

Summer. 3 credits. B. C. Monger.

**EAS 751(7510) Petrology and Geochemistry**

R. W. Kay.

**EAS 755(7550) Advanced Topics in Tectonics and Geochemistry**

Fall. 3 credits. J. Phipps Morgan.

**EAS 757(7570) Current Research in Petrology and Geochemistry**

S. Mahlburg Kay.

**EAS 762(7620) Advanced Topics in Paleobiology**

W. D. Allmon.

**EAS 771(7710) Advanced Topics in Sedimentology and Stratigraphy**

T. E. Jordan.

**EAS 773(7730) Paleobiology**

J. L. Cisne.

**EAS 775(7750) Advanced Topics in Oceanography**

C. H. Greene.

**EAS 780(7800) Earthquake Record Reading**

Fall. M. Barazangi.

**EAS 781(7810) Exploration Geophysics**

L. D. Brown.

**EAS 783(7830) Advanced Topics in Geophysics**

B. L. Isacks.

**EAS 793(7930) Andes-Himalaya Seminar**

S. Mahlburg Kay, R. W. Allmendinger, B. L. Isacks, and T. E. Jordan.

**EAS 795(7950) Low-Temperature Geochemistry**

1-3 credits. S-U grades only. L. A. Derry.

**EAS 796(7960) Geochemistry of the Solid Earth**

W. M. White.

**EAS 797(7970) Fluid-Rock Interactions**

L. M. Cathles.

**EAS 799(7990) Soil, Water, and Geology Seminar**

Spring. L. M. Cathles and T. S. Steenhuis.

**EAS 850(8500) Master's-Level Thesis Research in Atmospheric Science**

Fall, spring. Credit. S-U grades only. Graduate faculty.

**EAS 950(9500) Graduate-Level Dissertation Research in Atmospheric Science**

Fall, spring. Credit. S-U grades optional. Graduate faculty.

**EAS 951(9510) Doctoral-Level Dissertation Research in Atmospheric Science**

Fall, spring. Credit. S-U grades optional. Graduate faculty.

**ELECTRICAL AND COMPUTER ENGINEERING**

C. R. Pollock, Director; C. E. Seyler, Associate Director; D. F. Delchamps, Advising Coordinator; D. H. Albonese, A. B. Apsel, S. Bhawe, A. W. Bojanczyk, M. Burtcher, H.-D. Chiang, L. F. Eastman, T. L. Fine, W. K. Fuchs, Z. J. Haas, D. A. Hammer, S. S. Hemami, C. R. Johnson, Jr., E. Kan, M. C. Kelley, P. M. Kintner, R. R. Kline, K. T. Kornegay, A. Lal, M. Lipson, R. Manohar, J. F. Martinez, S. A. McKee, T. W. Parks, F. Rana, A. P. Reeves, A. Scaglione, S. Servetto, J. R. Shealy, M. G. Spencer, C. L. Tang, R. J. Thomas, S. Tiwari, L. Tong, A. B. Wagner, S. B. Wicker

**ECE 210(2100) Introduction to Circuits for Electrical and Computer Engineers (also ENGRD 210[2100])**

Fall, spring. 4 credits. Corequisites: MATH 293 and PHYS 213. All students must enroll in a lab and a section. For description, see ENGRD 210.

**ECE 220(2200) Signals and Information**

Fall, spring. 4 credits. Prerequisite: MATH 293. Introduction to signal processing. Topics include frequency-based representations: Fourier series and discrete Fourier transform; discrete time linear systems: input/output relationships, filtering, spectral response; analog-to-digital and digital-to-analog conversion; continuous time signals and linear time invariant systems: frequency response and continuous-time Fourier transform.

**ECE 250(2500) Technology in Society (also ENGRG 250[2500], HIST/S&TS 250[2500])**

Fall. 3 credits. Humanities elective for engineering students. For description, see ENGRG 250.

**ECE 291-292(2910-2920) Sophomore Electrical and Computer Engineering Independent Project**

Fall, 291; spring, 292. 1-8 credits. Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required. Students must make individual arrangements with a faculty sponsor and submit an Independent Project Form to the Student Services Office, 223 Phillips Hall.

**ECE 298(2980) Inventing an Information Society (also AM ST 292[2980], HIST 292[2920], S&TS 292[2921], ENGRG 298[2980], INFO 292[2921])**

Spring. 3 credits. Approved for humanities distribution. For description, see ENGRG 298.

**ECE 303(3030) Electromagnetic Fields and Waves**

Fall. 4 credits. Prerequisites: grade of C or better in: PHYS 213, PHYS 214, MATH 293, MATH 294, and ECE 210.

Covers static, quasi-static, and dynamic electromagnetic fields and waves. Topics include Maxwell's equations (integral and differential forms), fields of charge and current distributions, boundary conditions, fields near conductors, method of images, material polarization and dielectrics; energy, work, and power in electromagnetic systems; wave propagation and polarization, waves in media (dielectrics, conductors, and anisotropic

materials); reflection, transmission, and refraction at media interfaces; guided waves in transmission lines, Smith charts, transients; metallic and dielectric waveguides; radiation and antennas, antenna arrays, electric circuits for transmission and reception, aperture antennas and diffraction.

**ECE 304(3040) Computational Electronics, Electrodynamics, and Devices**

Spring. 3 credits. Prerequisite: ECE 303.

Co-meets with ECE 504.

Methods of computational electromagnetics are introduced in conjunction with and shown to supplement analytic solution methods. Topics include a review of vector calculus and electromagnetic theory, finite difference methods for electrostatics and wave propagation in one or more dimensions, finite difference time domain methods, finite element methods in one and two dimensions, integral formulations of Maxwell's equations, the method of moments, and Green's functions and numerical integration. Applications are drawn from microwave circuits and microwave cavities, magnetostatics and eddy current problems, capacitance calculations, scattering from thin wires, and optical components.

**ECE 306(3060) Fundamentals of Quantum and Solid-State Electronics**

Spring. 4 credits. Prerequisites: PHYS 214 and MATH 294.

Introductory quantum mechanics and solid-state physics necessary for modern solid-state electronic devices. Topics include the formalism and methods of quantum mechanics, the hydrogen atom, the structure of simple solids, energy bands, Fermi-Dirac statistics, and the basic physics of semiconductors. Applications include quantum wells and the p-n junction.

**ECE 310(3100) Introduction to Probability and Random Signals**

Spring. 4 credits. Prerequisite: MATH 294. May be used in place of ENGRD 270 to satisfy engineering distribution requirement.

Introduction to the theory of probability as a basis for modeling random phenomena and signals, calculating the response of systems, and making estimates, inferences, and decisions in the presence of chance and uncertainty. Applications are given in such areas as communications, device modeling, and information theory. Material includes: classical probability, probability measures, countable and uncountable sample spaces, random variables, probability mass function, probability density function, cumulative distribution function, important discrete and continuous distributions, functions of one random variable, functions of two random variables, random multivariate functions, moments, independence and correlation, conditional probability, characteristic functions, special characteristics of Normal distribution, signals and filtering, Central Limit Theorem, Law of Large Numbers, introduction to Decision and Estimation.

**ECE 311(3110) Electrical and Computer Engineering Honors Seminar**

Spring. 1 or 2 credits.

Students are required to attend all the lectures. Honors students must take this seminar for letter grade and 2 credits. Two summary papers are required. Nonhonors students must take the seminar pass/fail and for 1 credit. One summary paper is required.

Summary papers review a topic presented in the seminar.

**ECE 314(3140) Computer Organization (also COM S 314(3420))**

Spring. 4 credits. Prerequisite: COM S/ENGRD 211 or ENGRD 230.

Topics include performance metrics, data formats, instruction sets, addressing modes, computer arithmetic, microcoded and pipelined datapath design, memory hierarchies including caches and virtual memory, I/O devices, bus-based I/O systems. Students learn assembly language programming and design a simple pipelined processor.

**ECE 315(3150) Introduction to Microelectronics**

Fall, spring. 4 credits. Prerequisite: ECE/ENGRD 210.

Design of digital and analog electronic circuits in the context of modern integrated circuit technology. Includes the building blocks of integrated circuits: introductory physics of semiconductors, MOS and junction transistors; digital electronics—inverters, logic circuits, and memory; and analog circuits—multi-stage and differential amplifiers.

**ECE 320(3200) Networks and Systems**

Spring. 4 credits. Prerequisites: ECE 220 and MATH 294.

Students develop a working understanding of the analytical and computational tools used in the design and representation of complex networks and systems. Topics include state-space techniques, finite state machines, graph-theoretic approaches to network design and analysis, complexity, phase transitions in complex systems, and scalability.

**ECE 325(3250) Foundations of ECE Mathematics**

Fall. 3 credits. Prerequisites: MATH 293 and MATH 294.

Course aims to deepen students' working knowledge of mathematical tools relevant to ECE applications. While the course emphasizes fundamentals, it also provides an ECE context for the topics it covers, which include foundational material about sets and functions; linear algebra; inner products and orthogonal representations; basic ideas from multivariable calculus; and elementary convex analysis.

**ECE 391-392(3910-3920) Junior Electrical and Computer Engineering Independent Project**

Fall, 391; spring, 392. 1-8 credits. For description, see ECE 291-292.

**ECE 402(4020) Biomedical System Design (also BME 404(4040))**

Spring. 4 credits. Culminating design experience (CDE) course. Co- or prerequisites: at least one of: ECE 425, 476, 453.

Introduces techniques of measuring and conditioning low-level (biological) signals. Topics include special signal to noise improvement circuits for analog signals, techniques to remove common-mode and correlated noise, and computer-aided techniques for analyzing sampled data. Final six or seven weeks devoted to designing/prototyping a safe and effective "ambulatory microprocessor-controlled blood pressure monitor." Formal design document is required.

**ECE 411(4110) Random Signals in Communications and Signal Processing**

Fall. 4 credits. Prerequisite: ECE 310 or equivalent.

Introduction to models for random signals in discrete and continuous time; Markov chains, Poisson process, queuing processes, power spectral densities, Gaussian random process. Response of linear systems to random signals. Elements of estimation and inference as they arise in communications and digital signal processing systems.

**ECE 413(4130) Introduction to Nuclear Science and Engineering**

Fall. 3 credits. Prerequisites: PHYS 214 and MATH 294.

Designed for juniors or seniors in any engineering field who want to prepare for graduate-level nuclear science and engineering courses at Cornell or elsewhere. Also can serve as a basic course for those who do not intend to continue in the field. Introduces the fundamentals of nuclear reactors. Topics include an overview of the field of nuclear engineering; nuclear structure, radioactivity, and reactions; interaction of radiation and matter; and neutron moderation, neutron diffusion, the steady-state chain reaction, and reactor kinetics.

**ECE 415(4150) GPS: Theory and Design (also M&AE 415(4150))**

Fall. 4 credits. Culminating design experience (CDE) course. Prerequisite: a 300-level engineering course with advanced math content (e.g., ECE 303 or M&AE 326).

Analysis of GPS operating principles and engineering practice with a culminating design exercise. Navigational algorithms, receiver analysis, error investigation, dilution of precision, antennas, differential GPS.

**ECE 425(4250) Digital Signal Processing**

Fall. 4 credits. Prerequisites: ECE 220 and 310.

Introduces statistical signal processing. Signal representation and manipulation are covered via correlation and using the DFT/FFT to estimate other transforms; applications of these topics are then covered, including quantization, quantization effects in digital filters, multirate DSP, filter banks, delta-sigma modulation, power spectrum estimation, and introductions to Wiener and Kalman filtering and image processing.

**ECE 426(4260) Applications of Signal Processing**

Spring. 4 credits. Culminating Design Experience (CDE) course. Prerequisite: ECE 425 or permission of instructor.

Applications of signal processing, including signal analysis, filtering, and signal synthesis. The course is laboratory oriented, emphasizing individual student projects. Design is done with signal-processing hardware and by computer simulation. Topics include filter design, spectral analysis, speech coding, speech processing, digital recording, adaptive noise cancellation, and digital signal synthesis.

**ECE 430(4300) Lasers and Optical Electronics**

Fall. 4 credits. Prerequisite: ECE 303 or equivalent.

Introduction to the operation and application of lasers. Cover diffraction-limited optics, Gaussian beams, optical resonators, interaction of radiation with matter, physics of laser operation, and laser design. Discusses

applications of coherent radiation to nonlinear optics, communication, and research.

**ECE 432(4320) MicroElectro Mechanical Systems (MEMS)**

Fall. 3 credits. Prerequisite: ECE 315 or permission of instructor.

Introduction to MEMS: microsensors, microactuators, and microrobots. Fundamentals of MEMS, including materials, microstructures, devices and simple microelectro-mechanical systems, scaling electronic and mechanical systems to the micrometer/nm-scale, material issues, and the integration of micromechanical structures and actuators with simple electronics. This is an interdisciplinary course drawing content from mechanics, materials, structures, electronic systems, and the disciplines of physics and chemistry.

**[ECE 433(4330) Introduction to Microwave Devices and Circuits**

Fall. 4 credits. Prerequisites: ECE 303 and 306. Next offered 2007-2008.

Introduction to the properties of microwave devices and circuits and the considerations that must be appreciated when the operating frequency approaches or exceeds 1 GHz. Topics include microwave devices, microwave measurement techniques, S-parameters, signal flow diagrams, matching networks, basic circuit design considerations, and computer-aided device and circuit analysis. Labs cover basic measurement techniques for active and passive elements as well as low noise amplifier design.]

**ECE 437(4370) Fiber and Integrated Optics**

Spring. 4 credits. Prerequisite: ECE 303 or equivalent.

Physical principles of optical waveguides. Wave equation solutions to the mode structure in waveguides, numerical analysis, mode coupling, dispersion and bandwidth limitations, optical materials, photonic band gap structures. Project design of planar optical components.

**ECE 446(4460) Digital Communications Over Packet-Switched Networks**

Spring. 4 credits. Culminating design experience (CDE) course. Prerequisites: ECE 314/COM S 314 and probability course.

Basic course in networking covering the design and performance analysis of communication systems operating over packet-switched networks. Aims to bridge the gap between a classical networking course and a classical digital communications course. The course is lab oriented, with a strong emphasis on programming assignments (both C and MATLAB). Topics include data compression, error control in networks, and network algorithms.

**ECE 451(4510) Electric Power Systems I**

Fall. 4 credits. Prerequisite: ECE 320 or equivalent.

Acquaints students with modern electric power system analysis and control. Stresses analysis techniques appropriate for the restructured industry and advanced protection and control systems. Topics include transmission line models, transformers and per unit system, generator models, network matrices, power flow, system protection, computer relaying, and GPS-based measurement and control systems.

**ECE 452(4520) Electric Power Systems II**

Fall. 4 credits. Prerequisite: ECE 320 or permission of instructor.

Acquaints students with modern electric power system operation and control. Explores aspects of the restructuring of the industry and its implications for planning and operation objectives and methods. Topics include unit commitment, economic dispatch, optimal power flow, control of generation, system security and reliability, state-estimation, analysis of system dynamics, and system protection.

**ECE 453(4530) Analog Integrated Circuit Design**

Fall. 4 credits. Culminating design experience (CDE) course. Prerequisite: ECE 315 or equivalent.

Overview of devices available to analog integrated-circuit designers in modern CMOS and BiCMOS processes: resistors, capacitors, MOS transistors, and bipolar transistors. Basic building blocks for linear analog integrated circuits: single-stage amplifiers, current mirrors, and differential pairs. Transistor-level design of linear analog integrated circuits, such as operational amplifiers and operational transconductance amplifiers. Layout techniques for analog integrated circuits. Throughout the course, emphasis is placed on design-oriented analysis techniques.

**ECE 457(4570) Silicon Device Fundamentals**

Spring. 4 credits. Prerequisites: ECE 315 and 306 or MS&E 262 or A&EP 450.

Semiconductor carrier statistics, band diagrams, transport and their applications in diodes, MOSFET, and BJT. Emphasis is put on the CMOS operations for advanced VLSI technology. Six labs cover device measurements and design by simulation. By using the combined simulation and measurement, the course culminates in a comprehensive design project dealing with technical concerns in current VLSI industry as well as its economical, environmental, and social impacts.

**ECE 467(4670) Digital Communication Receiver Design**

Fall. 4 credits. Prerequisite: ECE 220.

Introduction to broadband digital receiver design. Topics include PAM and QAM modulation and down-conversion, pulse-shaping, matched filtering, carrier frequency and phase recovery, baud-timing synchronization, packet marker synchronization, adaptive linear equalization, and coding. Course project: composition and testing of a MATLAB-based software receiver.

**ECE 472(4720) Feedback Control Systems (also CHEME 472[4720], M&AE 478[4780])**

Fall, spring. 4 credits. Prerequisites: CHEME 372, ECE 220, M&AE 326, or permission of instructor.

For description, see M&AE 478.

**ECE 473(4730) Optimizing Compilers**

Fall. 4 credits. Prerequisite: ECE 314/COM S 314.

Covers compiler optimizations for high-performance microprocessors as well as how software interacts with hardware and the operating system. The projects involve implementing, testing, and evaluating an optimizing compiler backend that generates executables for a UNIX workstation. Lecture topics include three-address code, static single

assignment form, many code optimizations, code tuning case studies, feedback optimizations, machine instruction formats, system calls, and executable formats.

**ECE 474(4740) Digital VLSI Design**

Spring. 4 credits. Prerequisites: ENGRD 230, ECE/COM S 314.

Introduction to digital VLSI design. Topics include basic transistor physics, switching networks and transistors, combinational and sequential logic, latches, clocking strategies, domino logic, PLAs, memories, physical design, floor planning, CMOS scaling, and performance and power considerations, etc. Lecture and homework topics emphasize disciplined design, and include: CMOS logic, layout, and timing; computer-aided design and analysis tools; and electrical and performance considerations. The course also includes an introduction to asynchronous design.

**ECE 475(4750) Computer Architecture (also COM S 416[4420])**

Fall. 4 credits. Culminating design experience (CDE) course. Prerequisites: ENGRD 230 and ECE 314/COM S 314.

Topics include instruction set principles, advanced pipelining, data and control hazards, multi-cycle instructions, dynamic scheduling, out-of-order execution, speculation branch prediction, instruction-level parallelism, and high-performance memory hierarchies. Students learn the issues and trade-offs involved in the design of modern microprocessors. Labs involve the design of a processor and cache subsystem at the RTL level.

**ECE 476(4760) Digital Systems Design Using Microcontrollers**

Spring. 4 credits. Culminating design experience (CDE) course. Prerequisite: ECE 314/COM S 314. ECE 315 is highly recommended.

Design of real-time digital systems using microprocessor-based embedded controllers. Students working in pairs design, debug, and construct several small systems that illustrate and employ the techniques of digital system design acquired in previous courses. The content focuses on the laboratory work. The lectures are used primarily for the introduction of examples, description of specific modules to be designed, and instruction in the hardware and high-level design tools to be employed.

**ECE 482(4820) Plasma Processing of Electronic Materials (also MS&E 482[4820])**

Spring. 3 credits. Prerequisites: PHYS 213 and 214 or equivalents. Offered if sufficient demand.

Fundamental principles that govern partially ionized, chemically reactive plasma discharges and their applications to processing electronic materials. Topics include simple models of low pressure, partially ionized plasmas, collision phenomena, diffusive processes, plasma chemistry and surface processes. Examples and their applications to electronic materials processing are discussed in detail.

**ECE 484(4840) Introduction to Controlled Fusion: Principles and Technology (also M&AE 459[4590], NS&E 484[4840])**

Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics.

Intended for seniors and graduate students in engineering and physical sciences.

Introduction to the physical principles and various engineering aspects underlying power generation by controlled fusion. Topics include: fuels and conditions required for fusion power and basic fusion-reactor concepts; fundamental aspects of plasma physics relevant to fusion plasmas and basic engineering problems for a fusion reactor; and an engineering analysis of proposed magnetic and/or inertial confinement fusion-reactor designs.

**ECE 487(4870) Introduction to Radar and Remote Sensing (also EAS 487[4870])**

Fall. 3 credits. Prerequisites: ECE 220 and 486 (or grade of B or better in ECE 303).

For description, see EAS 487 in the College of Arts and Sciences.

**ECE 488(4880) Radio Frequency (RF) Circuits and Systems**

Spring. 4 credits. Prerequisite: ECE 315 or equivalent.

Basic RF circuits and applications. Receivers, transmitters, modulators, filters, detectors, transmission lines, oscillators, frequency synthesizers, low-noise amplifiers. Applications include communication systems, radio and television broadcasting, radar, radio, and radar astronomy. Computer-aided circuit analysis. Six laboratory sessions.

**ECE 491-492(4910-4920) Senior Electrical and Computer Independent Engineering Project**

Fall, 491; spring, 492. 1-8 credits.

For description, see ECE 291-292.

**ECE 493-499(4930-4990) Special Topics in Electrical and Computer Engineering**

Spring, fall. 1-4 credits.

Seminar, reading course, or other special arrangement agreed on by the students and faculty members concerned.

**ECE 504(5040) Advanced Computational Electronics, Electrodynamics, and Devices**

Spring. 3 credits. Prerequisite: ECE 303.

Co-meets with ECE 304.

For description, see ECE 304. Students taking ECE 504 will be expected to complete and present a substantial class project to be negotiated with the instructor.

**ECE 512(5120) Applied Systems Engineering I (also CEE 504[5040], COM S 504[5040], M&AE 591[5910], OR&IE 512[5120], SYSEN 510[5100])**

Fall. 3 credits. Prerequisites: senior or graduate standing in engineering field; concurrent or recent (past two years) enrollment in group-based project with strong system design component approved by course instructor.

For description, see M&AE 591.

**ECE 513(5130) Applied Systems Engineering II (also CEE 505[5050], COM S 505[5050], M&AE 592[5920], OR&IE 513[5130], SYSEN 520[5200])**

Spring. 3 credits. Prerequisite: CEE 504/COM S 504, ECE 512/OR&IE 512, or M&AE 591.

For description, see M&AE 592.

**ECE 521(5210) Theory of Linear Systems (also M&AE 521[5210])**

Fall. 3 credits. Prerequisite: ECE 320 or permission of instructor. Recommended: good background in linear algebra and linear differential equations.  
For description, see M&AE 521.

**ECE 522 Nonlinear System Analysis and Computations**

Spring. 4 credits. Prerequisite: ECE 521 or a solid background in linear algebra. Real analysis strongly recommended.

Rigorous introduction to nonlinear systems. Includes nonlinear differential equations, flows, phase-plane analysis, fundamentals of Lyapunov theory, LaSalle's Theorem, regions of attraction, slowly varying system, advanced stability theory, Lyapunov redesign, applied nonlinear control, describing functions, averaging and singular perturbations, and bifurcation analysis and control and application to physical systems.

**[ECE 526(5260) Signal Representation and Modelling]**

Fall. 4 credits. Prerequisites: ECE 411 and ECE 425. Next offered 2007-2008.

Sampling and signal reconstruction. Approximation theory. Linear inversion theory. Exponential signal modelling. Multirate filter banks, wavelets, and lifting. Laboratory experiments with speech and image signals.]

**ECE 536(5360) Nanofabrication of Semiconductor Devices (also MS&E 541[5410])**

Fall. 4 credits. Prerequisites: ECE 315 and ECE 457 or equivalent.

Introduction to modern nanofabrication technologies used to produce integrated circuits. Students perform a series of fabrication steps including lithography, metallization, plasma etching and annealing to realize working semiconductor devices (Schottky diodes, pn junction diodes, MOS capacitors, and MOSFETs) in the lab. Prior knowledge of the operation of these devices is essential as each will be tested to verify the success (or failure) of the fabrication process.

**ECE 547(5470) Computer Vision**

Fall. 4 credits. Prerequisites: ECE 220 (or COM S 280 and 314) or permission of instructor.

Covers computer acquisition and analysis of image data with emphasis on techniques for robot vision. Concentrates on descriptions of objects at three levels of abstraction: segmented images (images organized into subimages that are likely to correspond to interesting objects), geometric structures (quantitative models of image and world structures), and relational structures (complex symbolic descriptions of images and world structures). The programming of several computer-vision algorithms is required.

**ECE 548(5480) Digital Image Processing**

Spring. 4 credits. Prerequisites: ECE 411, ECE 425, and familiarity with linear algebra.

Introduction to image processing through seven major topics: perception, statistical modeling, transforms, enhancement, analysis, compression, and restoration. Special attention is allocated to compression. Equal emphasis is placed on gaining a mathematical and an intuitive understanding of algorithms through actual image manipulation and viewing.

**ECE 551(5510) Electric Systems Engineering and Economics (Electricity Markets) (also AEM 655[6550])**

Fall. 2 credits. Prerequisites: basic calculus, microeconomics course.

Designed to explore new arrangements in power system planning and operation brought about by the current restructuring of the electric industry. Organized around lectures on (1) how basic economic principles interact with basic engineering principles used to determine the physical and operational makeup of the system; and (2) the principles and techniques of optimization and their applications to emerging institutional arrangements in the power industry. Involves extensive laboratory work designed to test the principles under discussion. A final requires building an intelligent software agent capable of performing in a competitive market with rules similar to those being set up in the electric power business today. The agents are exercised in a class competition.

**ECE 554(5540) Advanced Analog VLSI Circuit Design**

Spring. 4 credits. Prerequisite: ECE 453.

Advanced analog integrated circuit and system design. Topics include integrated continuous-time filter design, translinear circuits and systems, dynamic analog techniques, integrated discrete-time filter design, and Nyquist-rate data converter design.

**[ECE 558(5580) Compound Semiconductor Electronic]**

Spring. 3 or 4 credits; 4 with a project.

Prerequisite: ECE 457 or equivalent. Next offered 2007-2008.

Electronic properties of advanced semiconductor structures using compound semiconductor materials and heterojunctions. Fundamentals of carrier transport and scattering. Properties of direct bandgap semiconductors and quantum wells. Advanced semiconductor devices, including metal-semiconductor transistors (FETs), modulation-doped FETs, and heterojunction bipolar transistors (HBTs). High-frequency operation of compound semiconductor devices. Includes six two-week labs, which include low-temperature carrier transport, optical absorption and emission, and electrical characterization of compound semiconductor devices.]

**[ECE 561(5610) Error Control Codes]**

Fall. 4 credits. Prerequisite: ECE 320 or 521 or equivalent; strong familiarity with linear algebra. Next offered 2007-2008.

Introduction to the theory and practice of error control codes. Topics include algebraic codes, convolutional codes, concatenated codes, and codes on graphs. Considers the construction and decoding of Reed-Solomon (RS) codes in some detail as well as the iterative (turbo) decoding of concatenated codes and codes on graphs. The use of error control in wireless systems is discussed throughout the course.]

**ECE 562(5620) Fundamental Information Theory**

Spring. 4 credits. Prerequisite: ECE 310 or equivalent.

Fundamental results of information theory with application to storage, compression, and transmission of data. Entropy and other information measures. Block and variable-length codes. Channel capacity and rate-distortion functions. Coding theorems

and converses for classical and multiterminal configurations. Gaussian sources and channels.

**[ECE 563(5630) Communication Networks]**

Fall. 4 credits. Prerequisite: ECE 411 or permission of instructor. Next offered 2007-2008.

Classical line-switched communication networks: point-process models for offered traffic; blocking and queuing analyses. Stability, throughput, and delay of distributed algorithms for packet-switched transmission of data over local-area and wide-area nets. Flow control and capacity assignment algorithms, ATM networks.]

**[ECE 564(5640) Detection and Estimation]**

Fall. 4 credits. Prerequisites: ECE 310, 411, or permission of instructor. Next offered 2007-2008.

Graduate-level introduction to fundamentals of signal detection and estimation with applications in communications. Elements of decision theory. Sufficient statistics. Signal detection in discrete and continuous time. Multiuser detection. Parameter estimations. Applications in wireless communications.]

**ECE 566(5660) Fundamentals of Networks**

Fall. 4 credits. Prerequisite: ECE 411. Recommended: ECE 446.

Introductory course on tools and techniques for modeling communication networks, synthesis of network protocols, analysis of network protocols' operation, and performance evaluation of network protocols when deployed in a particular communication network. Analytical tools include advanced probability theory, discrete and continuous-time Markov Chains, queuing theory, and graph theory. Simulation methods and statistical tools for analysis of data obtained from simulation models are studied. The basic mechanisms used in designing communication protocols in wireless and wired networks are illustrated by examples from numerous practical systems. Discussions of some classical papers help students learn about best practices as well as common mistakes occurring in studies of communication networks.

**[ECE 567(5670) Digital Communications]**

Spring 4 credits. Prerequisites: ECE 310, 411, or permission of instructor. Next offered 2007-2008.

Graduate-level introduction to fundamentals of digital communications. Complex random signals. Digital modulations and optimal receiver principles. Baseband and passband transmissions and processing. Interference channels and equalization techniques. Performance analysis including bit error rate calculation and bounds, cutoff rate and channel capacity. Applications in wireless and digital subscriber loops (DSL).]

**ECE 568(5680) Mobile Communication Systems**

Spring. 4 credits. Prerequisites: ECE 411 and 467.

Theory and analysis of mobile communication systems, with an emphasis on understanding the unique characteristics of these systems. Topics include cellular planning, mobile radio propagation and path loss, characterization of multipath and fading channels, modulation and equalization techniques for mobile radio systems, source coding techniques, multiple



access alternatives, CDMA system design, and capacity calculations.

**[ECE 572(5720) Parallel Computer Architecture (also COM S 516[5722])**

Spring, 4 credits. Co- or prerequisite: ECE 475. Next offered 2007–2008.

Principles and trade-offs in the design of parallel architectures. Emphasis is on latency, bandwidth, and synchronization in parallel machines. Case studies illustrate the history and techniques of shared-memory, message-passing, dataflow, and data-parallel machines. Additional topics include memory consistency models, cache coherence protocols, and interconnection network topologies. Architectural studies presented through lecture and some research papers.]

**[ECE 575(5750) High-Performance Microprocessor Architecture**

Spring, 4 credits. Prerequisite: ECE 473 or 475. Next offered 2007–2008.

Provides in-depth coverage of some of the advanced architectural features of current high-performance microprocessors. Lecture topics include trace caches, branch predictors, value predictors, confidence estimators, finite state machines, multi-threading, predication, software speculation, RISC, EPIC, case studies of modern high-end microprocessors, and research ideas. The projects involve writing simulators to evaluate architectural components on large programs that execute billions of instructions.]

**ECE 578(5780) Computer Analysis of Biomed Images**

Spring, 4 credits. Prerequisite: instructor permission. Open to students with engineering, biomedical, or biology background.

Powerful imaging modalities with attending computer image processing methods are evolving for the evaluation of health and the detection of disease. This course focuses on the quantitative analysis of such images and Computer Aided Diagnosis (CAD), i.e., the automatic identification and classification of abnormalities by the computer.

**ECE 581(5810) Introduction to Plasma Physics (also A&EP 606[6060])**

Fall, 4 credits. Prerequisite: ECE 303 or equivalent. First-year graduate-level course; open to exceptional seniors.

Topics include plasma state; motion of charged particles in fields; drift-orbit theory; coulomb scattering, collisions; ambipolar diffusion; elementary transport theory; two-fluid and hydromagnetic equations; plasma oscillations and waves, CMA diagram; hydromagnetic stability; and elementary applications to space physics, plasma technology, and controlled fusion.

**[ECE 582(5820) Advanced Plasma Physics**

Fall, 4 credits. Prerequisite: ECE 581 or A&EP 606. Next offered 2007–2008.

Boltzmann and Vlasov equations; waves in hot-magnetized plasma; Landau and cyclotron damping; micro-instabilities; low-frequency waves and instabilities; Nonlinear phenomena: solitons, nonlinear waves, tearing, and reconnection.]

**ECE 584(5840) Advanced GPS Receiver Design**

Spring, 3 credits. Prerequisite: ECE 415 or M&AE 415.

GPS receiver design from the RF section to the observables is investigated and implemented in MATLAB software. Creation of C/A code, upsampling, down conversion, code correlation, acquisition, tracking, and interpreting the navigation message. Students start with the digitized GPS bandwidth and build a software receiver to create the navigation solution as the final project.

**ECE 585(5850) Upper Atmospheric Physics I**

Fall, 4 credits. Prerequisites: Physics through 214 or equivalent, introductory chemistry, ECE 486 or equivalent.

The structure and dynamics of the ionosphere and upper atmosphere. Charged particle production, loss and transport. Coupling to the neutral atmosphere. Ionospheric instabilities. High-latitude currents and plasma convection and its implications for the ionosphere and upper atmosphere.

**ECE 587(5870) Energy Seminar I (also NS&E 545[5450], M&AE 545[5450])**

Fall, 1 credit.

Energy resources, their conversion to electricity or mechanical work, and the environmental consequences of the energy cycle are discussed by faculty members from several departments in the university and by outside experts. Topics include: energy resources and economics; coal-based electricity generation; nuclear reactors; solar power; energy conservation by users; and air pollution control.

**ECE 588(5880) Energy Seminar II (also M&AE 546[5460])**

Spring, 1 credit.

For description, see ECE 587; however, different speakers and/or topics are discussed in ECE 588.

**ECE 591(5910) Adaptive Feedback Systems**

Fall, 4 credits. Prerequisites: ECE 411, 467, 472, or 521 and MATLAB.

Parameter adaptation algorithm construction and tuning for a variety of applications in which an adapted filter is embedded in a feedback loop: telephony echo cancellation, model-following control, recursive identification of pole-zero models, differential pulse code modulation, duct noise control, and decision feedback equalization.

**ECE 593-599(5930-5990) Advanced Topics in Electrical and Computer Engineering**

Fall, spring, 1–4 credits.

Seminar, reading course, or other special arrangement agreed on by the students and faculty members concerned.

**[ECE 608(6080) Multi-Access Communication Theory**

Spring, 4 credits. Prerequisites: ECE 310, 411 and 567 or 562 or permission of instructor. Next offered 2007–2008.

Graduate-level course on theory and techniques in multi-access wireless communications. Channel division multiple access (TDMA, CDMA, FDMA) techniques. Random access protocols and analysis. Multi-user detection and estimation. Multi-user information theory. Multi-access in ad hoc networks.]

**ECE 610(6100) Graduate Seminar in Medical Instrumentation**

Fall, 1 credit. S-U grades only.

The seminar will provide a format for identifying, investigating, and discussing state-of-the-art developments related to instrumentation, analysis techniques, and simulation sciences as they apply to biomedical problems and solutions.

**ECE 662(6620) Network Information Theory**

Fall, 3 credits. Prerequisite: ECE 562.

Second course in information theory, focusing on multiterminal aspects, as covered in the textbooks of Yeung and Csiszar/Koerner.

**ECE 683(6830) Seminar in GPS and GNSS**

Fall, spring, 1–3 credits. Prerequisite: ECE 415/M&AE 415 or equivalent.

Seminar in GPS (Global Positioning System) and GNSS (Global Navigation Satellite Systems) science and engineering. Current topics in receiver design such as low signal acquisition, ambiguity resolution, and software receivers and topics in GPS science such as space weather effects on GPS and the use of GPS for remote sensing. Students typically make one presentation during the semester.

**ECE 691-692(6910-6920) Electrical and Computer Engineering Colloquium**

Fall, 691; spring, 692. 1 credit each semester.

For students in graduate field of Electrical and Computer Engineering. Lectures by staff, graduate students, and visiting authorities. A weekly meeting for the presentation and discussion of important current topics in the field. Reports required.

**ECE 693-694(6930-6940) Master of Engineering Design**

Fall, 693; spring, 694. 1–8 credits. For students enrolled in M.Eng. (Electrical) degree program.

Uses real engineering situations to present fundamentals of engineering design. Each professor is assigned a section number. To register, see roster for appropriate six-digit course ID numbers.

**ECE 695-699(6950-6990) Graduate Topics in Electrical and Computer Engineering**

Fall, spring, 1–4 credits.

Seminar, reading course, or other special arrangement agreed on by the students and faculty members concerned.

**ECE 791-792(7910-7920) Thesis Research**

791, fall; 792, spring, 1–15 credits. For students enrolled in master's or doctoral program. Each professor is assigned a section number. To register, see roster for appropriate six-digit course ID numbers.

**ECE 793-799(7930-7990) Advanced Graduate Topics in Electrical and Computer Engineering**

Fall, spring 1–4 credits. Staff.

Seminar, reading course, or other special arrangement agreed on by the students and faculty members concerned.



## INFORMATION SCIENCE, SYSTEMS, AND TECHNOLOGY

C. Cardie, director; W. Arms, G. Bailey, K. Bala, R. Caruana, E. Friedman, J. Gehrke, J. Halpern, D. Huttenlocher, P. Jackson, T. Joachims, J. Kleinberg, L. Lee, D. Ruppert, P. Rusmevichientong, B. Selman, D. Shmoys, E. Tardos, C. Van Loan, D. Williamson

For complete descriptions, see the INFO listing in the CIS section.

### **INFO 130(1300) Introductory Design and Programming for the Web (also COM S 130[1300])**

Fall. 3 credits.

### **INFO 172(1700) Computation, Information, and Intelligence (also COGST 172, COM S 172[1700], ENGR 172[1700])**

Fall. 3 credits. Prerequisite: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM 100.

### **INFO 204(2040) Networks (also ECON 204[2040], SOC 204[2120]) (SBA)**

Spring. 4 credits.

For description, see ECON 204.

### **INFO 214(2140) Cognitive Psychology (also COGST 214, PSYCH 214[2140]) (KCM)**

Fall. 3 credits. Limited to 175 students.

Prerequisite: sophomore standing.

Graduate students, see INFO/PSYCH 614 or COGST 501.

### **INFO 230(2300) Intermediate Design and Programming for the Web (also COM S 230[2300])**

Spring. 3 credits. Prerequisite: COM S/INFO 130 or equivalent.

### **INFO 245(2450) Psychology of Social Computing (also COMM 245[2450]) (SBA)**

Fall. 3 credits.

### **INFO 292(2921) Inventing an Information Society (also AM ST 292[2980], ECE/ENGRG 298[2980], HIST 292[2920], S&TS 292[2921])**

Spring. 3 credits. May not be taken for credit after ECE/ENGRG 198.

### **INFO 295(2950) Mathematical Methods for Information Science**

Fall. 4 credits. Corequisite: MATH 231 or equivalent.

### **INFO 330(3300) Data-Driven Web Applications (also COM S 330[3300])**

Fall. 3 credits. Prerequisite: COM S/ENGRD 211.

### **INFO 345(3450) Human-Computer Interaction Design (also COMM 345[3450]) (SBA)**

Spring. 3 credits.

### **INFO 349(3491) Media Technologies (also COMM 349[3490], S&TS 349[3491])**

Spring. 3 credits.

### **INFO 355(3551) Computers: From the 17th Century to the Dot.com Boom (also S&TS 355[3551]) (HA)**

Fall. 4 credits.

### **(INFO 356(3561) Computing Cultures (also ST&S 356[3561])**

Spring. 4 credits. Not offered 2006-2007; next offered 2007-2008.]

### **INFO 372(3720) Explorations in Artificial Intelligence**

Spring. 3 credits. Prerequisites: MATH 111 or equivalent, an information science approved statistics course, and COM S 211 or permission of instructor.

For description, see INFO 372 in CIS section.

### **(INFO 387(3871) The Automatic Lifestyle: Consumer Culture and Technology (also S&TS 387[3871]) (CA)**

Spring. 4 credits. Not offered 2006-2007; next offered 2007-2008.]

### **(INFO 429(4290) Copyright in the Digital Age (also COMM 429[4290])**

Fall. 3 credits. Not offered 2006-2007; next offered 2007-2008.

For description, see COMM 429.]

### **INFO 430(4300) Information Retrieval (also COM S 430[4300])**

Fall. 3 credits. Prerequisite: COM S/ENGRD 211 or equivalent.

### **INFO 431(4302) Web Information Systems (also COM S 431[4302])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

### **INFO 435(4350) Seminar on Applications of Information Science (also INFO 635[6390])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent; experience using information systems. Undergraduate and master's students should register for INFO 435; Ph.D. students should register for INFO 635.

### **INFO 440(4400) Advanced Human-Computer Interaction Design (also COMM 440[4400])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

### **INFO 445(4450) Seminar in Computer-Mediated Communication (also COMM 445[4450])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

### **INFO 447(4470) Social and Economic Data (also ILRLE 447[4470])**

Spring. 4 credits. Prerequisites: one semester of calculus, IS statistics requirement, one upper-level social science course, or permission of instructor.

### **INFO 450(4500) Language and Technology (also COMM 450[4500])**

Spring. 3 credits. Prerequisite: COMM 240 or COMM 245 or permission of instructor.

### **INFO 490(4900) Independent Reading and Research**

Fall, spring. 1-4 credits.

### **INFO 491(4910) Teaching in Information Science, Systems, and Technology**

Fall, spring. Variable credit.

### **INFO 515(5150) Culture, Law, and Politics of the Internet**

Fall. 4 credits.

### **INFO 530(5300) The Architecture of Large-Scale Information Systems (also COM S 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or COM S 432.

### **INFO 614(6140) Cognitive Psychology (also COGST 614[6140], PSYCH 614[6140])**

Fall. 5 credits. Consists of two components: PSYCH 214 (3 credits) and COGST 501 (2 credits). Intended for graduate students; undergraduates opting for 5 credits should enroll simultaneously in PSYCH 214 and COGST 501.

### **INFO 630(6300) Human Language Technology (also COM S 630[6300])**

Spring. 4 credits. Prerequisite: basic knowledge of linear algebra and probability theory; basic programming skills.

### **INFO 634(6341) Information Technology in Sociocultural Context (also S&TS 634[6341])**

Spring. 4 credits. Prerequisite: permission of instructor.

### **INFO 635(6390) Seminar on Applications of Information Science (also INFO 435[4350])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent; experience in using information systems. Undergraduates and master's students should register for INFO 435; Ph.D. students should register for INFO 635.

### **INFO 640(6400) Human-Computer Interaction Design (also COMM 640[6400])**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor.

### **INFO 645(6450) Seminar in Computer-Mediated Communication (also COMM 645[6450])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

### **INFO 648(6448) Speech Synthesis by Rule (also LING 648[6648])**

Spring. 4 credits. Prerequisite: LING 401, 419, or permission of instructor.

### **INFO 650(6500) Language and Technology (also COMM 650[6500])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 650.

### **INFO 651(7002) Critical Technical Practices**

Fall or spring. 4 credits. Prerequisites: graduate-level training in human-computer interaction, science and technology studies, visual studies, communication, or equivalent, or permission of instructor.

### **INFO 685(6850) The Structure of Information Networks (also COM S 685[6850])**

Fall or spring. 4 credits. Prerequisite: COM S 482.

### **INFO 709(7090) IS Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in information science.

**INFO 747(7400) Social and Economic Data (GR-RDC) (also ILRLE 740[7400])**

Spring. 4 credits. Prerequisite: Ph.D. and research master's students.

**INFO 790(7900) Independent Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Independent research for M.Eng. students and pre-A exam Ph.D. students.

**INFO 990(9900) Thesis Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Thesis research for post-A exam Ph.D. students.

**MATERIALS SCIENCE AND ENGINEERING**

E. P. Giannelis, director; D. G. Ast, S. P. Baker, J. M. Blakeley, R. Dieckmann, D. T. Grubb, C. Liddell, G. G. Malliaras, C. K. Ober, A. L. Ruoff, S. L. Sass, M. O. Thompson, C. C. Umbach, R. B. van Dover, U. B. Wiesner

**Undergraduate Courses****MS&E 111(1110) Nanotechnology (also ENGRI 111[1110])**

Fall. 3 credits. E. Giannelis.

Course in Introduction to Engineering series. For description, see ENGRI 111.

**MS&E 119(1190) Biomaterials for the Skeletal Systems (also ENGRI 119[1190])**

Fall. 3 credits. D. Grubb.

Course in Introduction to Engineering series. For description, see ENGRI 119.

**MS&E 206(2060) Atomic and Molecular Structure of Matter (also MS&E 581[5810], M&AE 312[3120])**

Spring. 4 credits. C. Liddell.

Discusses the basic elements of structure; order and disorder; ideal gas; crystals; liquids; amorphous materials; polymers; liquid crystals; composites; crystal structure; x-ray diffraction.

**MS&E 261(2610) Mechanical Properties of Materials: From Nanodevices to Superstructures (also ENGRD 261[2610])**

Fall. 3 credits. S. L. Sass.

For description, see ENGRD 261.

**MS&E 262(2620) Electronic Materials for the Information Age (also ENGRD 262[2620])**

Spring. 3 credits. Prerequisite: MATH 192.

Corequisite: PHYS 213 or permission of instructor. Staff.

For description, see ENGRD 262.

**MS&E 269(2690) Technologies for Making the Small**

Spring. 3 credits. Prerequisites: CHEM 207/211, MATH 192. M. Thompson.

This course provides an introduction to principles and practice of nanofabrication techniques, combining lectures with hands-on laboratory fabrication. A range of nano-systems is explored from microelectronic circuits to MEMS sensors and/or microfluids. Fundamentals common to all fabrication including lithography, deposition, and etch-

ing processes are explored in lectures and lab exercises. New developments in "soft" micro-stamp lithography and self-assembly methods are discussed. In the final project students build one of several nanosystems depending on their interests.

**MS&E 291-292(2910-2920) Research Involvement Ila and I Ib**

291, fall; 292, spring. 3 credits each

semester. Prerequisite: approval of department. Staff.

Supervised independent research project in association with faculty members and faculty research groups of the department. Students design experiments, set up the necessary equipment, and evaluate the results. Creativity and synthesis are emphasized. Each semester may be taken as a continuation of a previous project or as a one-semester affiliation with a research group.

**MS&E 301(3010) Materials Chemistry**

Fall. 4 credits. L. Estroff.

Provides a molecular understanding of materials properties: quantum chemistry, symmetry aspects of chemical bonding, solid state reactions, and electrochemistry. Materials include polymers, organic semiconductors, organic-inorganic hybrids, and biomaterials.

**MS&E 303(3030) Thermodynamics of Condensed Systems (also MS&E 583[5830])**

Fall. 4 credits. Prerequisites: PHYS 214 and MATH 294. M. O. Thompson.

Introduces the three laws of thermodynamics as the fundamental basis for thermal and chemical equilibrium, coupled with statistical mechanical interpretations for entropy and specific heat capacities. Applies these principles to understanding phase equilibria and phase diagrams, heterogeneous reactions, solutions, surfaces, and defects. Introduces electrochemistry and fuel/power cells.

**MS&E 304(3040) Kinetics, Diffusion, and Phase Transformation (also MS&E 584[5840])**

Spring. 4 credits. Prerequisite: MS&E 303 or permission of instructor. Staff.

Topics include phenomenological and atomistic theories of diffusion; diffusion in metals, alloys, and nonmetals, including polymers; diffusion in the presence of driving forces; fast diffusion paths; thermo- and electrotransport; interfaces and microstructure; nucleation and growth; growth of product layers (parabolic and linear kinetics); solidification of alloys; diffusional and diffusionless transformations in solids; glass transition.

**MS&E 305(3050) Electronic, Magnetic and Dielectric Properties of Materials (also MS&E 585[5850])**

Spring. 4 credits. Prerequisite: MS&E 206 or permission of instructor. R. B. van Dover.

Electronic structure of materials and connection to transport, magnetic, and dielectric properties. Wave and particle nature of electrons, wave packets, potential wells, barriers, tunneling. Valence electron behavior in crystals, density of states for metals, Fermi level, field and thermionic emission, Schottky barriers. Periodic potentials and band structure of crystals. Intrinsic and doped semiconductors, junction electronic and optical devices. Physical origin of magnetic behavior, ferromagnetic domains, magneto-resistance. Materials for data

storage and manipulation. Polarization in dielectric materials; frequency dependence of dielectric constants and refractive indices. Ferroelectric domains. Dielectric components in devices. The close connection between fundamental concepts and current technology is emphasized.

**MS&E 307(3070) Materials Design Concept I**

Fall. 2 credits. C. Umbach.

For description, see MS&E 407.

**MS&E 311(3110) Junior Laboratory I**

Fall. 1 credit. D. Ast.

Practical laboratory covering the analysis and characterization of materials and processing. Labs are based on materials from courses in thermodynamics of condensed systems and electronic, magnetic, and dielectric properties of materials.

**MS&E 312(3120) Junior Laboratory II**

Spring. 1 credit. C. C. Umbach.

Practical laboratory covering the analysis and characterization of materials and processing. Labs are based on course material in kinetics, diffusion, and phase transformation and mechanical properties of materials, processing, and design.

**MS&E 391-392(3910-3920) Research Involvement IIIa and IIIb**

391, fall; 392, spring. 3 credits each

semester. Prerequisite: departmental approval. Staff.

For description, see MS&E 291. May be continuation or a one-semester affiliation with a research group.

**MS&E 402(4020) Mechanical Properties of Materials, Processing, and Design (also M&AE 312)**

Fall. 4 credits. Prerequisite: MS&E 206.

Corequisite: MS&E 304 or permission of instructor. S. Baker.

Relationship between microscopic mechanisms and macroscopic mechanical behavior of engineering materials, how mechanical properties can be modified, and criteria for selection and use of materials in design. Stress, strain and elastic constants as tensor quantities, viscoelasticity and damping, plastic deformation, creep deformation, fracture, and fatigue.

**MS&E 403-404(4030-4040) Senior Materials Laboratory I and II**

403, fall, 3 credits; 404, spring, 2 credits. D. Grubb.

Practical laboratory covering the analysis and characterization of materials and processing. Emphasis is on design of experiments for evaluation of materials' properties and performance as related to processing history and microstructure. Projects available in areas such as plasticity, mechanical and chemical processing, phase transformations, electrical properties, magnetic properties, and electron microscopy.

**MS&E 405-406(4050-4060) Senior Thesis I and II**

405, fall; 406 spring. 4 credits each semester. Requirement for graduation with honors. Open to advanced undergraduates in lieu of senior materials laboratory. J. Blakeley.

Proposals for thesis topics should be approved by the supervising faculty member before beginning the senior year. Approved thesis topics normally involve original

experimental research in direct collaboration with an ongoing research program. Periodic oral and written presentations and a final written thesis are required. Students must take both semesters to complete the laboratory requirement.

**MS&E 407(4070) Materials Design Concepts II**

Fall. 2 credits. C. Umbach.

Introduces materials design in the context of real world materials design projects carried out in industry. In the first portion of the course, the process of engineering design is studied in light of economic, environmental, regulatory, and safety issues. Patent searching and communication skills are addressed. In the second portion, speakers from industry lecture on case studies of materials design problems. Students give oral presentations and write technical reports based on case studies.

**[MS&E 410(4100) Physical Metallurgy and Applications (also MS&E 610(6100))]**

Spring. 3 credits. Prerequisites: MS&E 206, 303, 304 or permission of instructor. Next offered 2007-2008. S. Baker.

Microstructure and properties of metals and alloys: processing, structure, defects, phase stability, diffusion, deformation, fracture, corrosion, conductivity, optical properties. Applications of metallurgical principles to high performance metallic materials include: thin films and patterned structures for use in microelectromechanical systems, superalloys for high temperature engine applications, shape memory alloys for biomedical applications, and others.]

**[MS&E 433(4330) Materials for Energy Production, Storage, and Conversion (also MS&E 533(5330))]**

Fall. 3 credits. Next offered 2007-2008. Concerned with materials and technologies related to energy production, storage, and conversion as well as to sensors used for monitoring the emission of pollutants. The devices discussed include solar cells, fuel cells, batteries, and electrochemical sensors. Thermodynamic, kinetic, and electrochemical concepts and materials properties critical for such devices are the central part of this course.]

**MS&E 461(4610) Biomedical Materials and Their Applications**

Spring. 3 credits. D. Grubb.

Many types of materials are used in biomedical engineering to replace or supplement natural biological systems. Interaction with blood and tissues is always of primary importance, but depending on the use of the biomedical material, mechanical, optical, and transport properties may also be vital. After a general introduction to biomedical materials, case studies involving physiological systems are considered, and design of artificial parts and materials are investigated. Constraints such as methods of production, economics, regulatory approval, and legal liabilities are included. Examples may include dialysis, contact and intra-ocular lenses, heart valves, and the artificial pancreas. Every student is involved in a presentation about a case study.

**MS&E 481(4810) Technology Management (also MS&E 587(5870))**

Spring. 3 credits. E. P. Giannelis.

Designed to provide students in engineering and the sciences with the knowledge and analytical skills to manage RD for a strategic competitive advantage. Most organizations recognize the critical importance of RD management in becoming and remaining world-class competitors. The course uses a combination of case studies, readings, discussions, and outside lectures. Topics include technology evaluation, RD portfolio, intellectual property portfolio and management, technology transfer, and technology, policy, and society.

**[MS&E 487(4870) Ethics and Technology]**

Spring. 1 credit. Next offered 2007-2008. Staff.

Ethics influences all decisions made by a technologist. This course discusses those factors that must be considered in reaching a decision involving technology, ranging from legal impact to consideration of community expectations.]

**MS&E 489(4890) Colloids and Colloid Assemblies for Advanced Materials Applications (also MS&E 589(5890))**

Fall. 3 credits. C. Liddell.

Recent global developments in the synthesis, modification, organization, and utilization of fine particles in nanotechnology and biotechnology fields. Underlying principles for control of particle characteristics such as mean size, shape, composition, internal homogeneous structure, layered, hollow, porous, and heterojunction structures. Methods for the formation of ordered and patterned particle arrays employed in advanced materials based on latex, ceramic colloids, metal nanoparticles, semiconductor quantum dots, nanocapsules, and miniemulsions. Applications in photonics, biolabeling, biological screening, drug delivery, catalysis, and magnetic recording.

**MS&E 491-492(4910-4920) Research Involvement IVa and IVb**

491, fall; 492, spring. 3 credits each semester. Prerequisite: departmental approval. Staff.

For description, see MS&E 291. May be continuation or a one-semester affiliation with a research group.

**MS&E 495(4950) Undergraduate Teaching Involvement**

Fall, spring. Variable credit. Staff.

Gives credit to students who help in the laboratory portions of select MS&E courses. The number of credits earned is determined by the teaching load and is typically 1-3.

**MS&E 501-502(5010-5020) Special Project**

Fall, spring. 6 credits.

Master of Engineering research project.

**MS&E 512(5120) Mechanical Properties of Thin Films (also MS&E 513(5130))**

Spring. 3 credits. S. P. Baker.

Stresses, elastic and plastic deformation, creep and anelasticity, and fracture and delamination of thin films and patterned structures. How mechanical behavior at the nanoscale deviates from the predictions of scaling laws derived for bulk materials. Applications in microelectronics, optics, microelectromechanical systems, coatings, etc.

**[MS&E 521(5210) Properties of Solid Polymers]**

Fall. 3 credits. Prerequisite: ENGRD 261.

Corequisite: MS&E 303 or permission of instructor. Next offered 2007-2008.

Synthetic and natural polymers for engineering applications. Production and characterization of long-chain molecules. Thermodynamics of polymer mixtures. Polymer molecular weight. Gelation and networks, rubber elasticity, elastomers, and thermosetting resins. Amorphous and crystalline thermoplastics and their structure. Time- and temperature-dependent elastic properties of polymers. Glass transition and secondary relaxations. Plastic deformation and molecular orientation.]

**[MS&E 523(5230) Physics of Soft Materials]**

Fall. 3 credits. Next offered 2007-2008.]

**[MS&E 524(5240) Materials Chemistry of Synthetic Polymeric Materials]**

Fall. 3 credits. Prerequisite: MS&E 521 or permission of instructor. Offered alternate years. Staff.]

**MS&E 525(5250) Organic Optoelectronics**

Fall. 3 credits. G. G. Malliaras.

The course begins with an overview of relevant materials, from small aromatic molecules to conjugated polymers. We then discuss their optoelectronic properties, including topics from photophysics (absorption, emission, photogeneration, recombination), charge transport and injection (doping, hopping, disorder) and nonlinear optics. Molecular conduction mechanisms are reviewed. Their applications in electrophotography, light emitting diodes, lasers, photovoltaic cells, thin film transistors are then discussed.

**MS&E 531(5310) Introduction to Ceramics**

Spring. 3 credits. R. Dieckmann.

Covers ceramic processes and products, structure of ceramic crystals, structure of glasses, structural defects (point defects, dislocations), surfaces, interfaces and grain boundaries, diffusion in ionic materials (atomistic and phenomenological approach, relationships between diffusion and point defect structure), ceramic phase diagrams, phase transformations. Emphasizes physicochemical aspects of the different topics.

**[MS&E 533(5330) Materials for Energy Production, Storage, and Conversion (also MS&E 433(5330))]**

Fall. 3 credits. Next offered 2007-2008.

R. Dieckmann.

For description, see MS&E 433.]

**MS&E 541(5410) Nanofabrication of Semiconductor Devices (also ECE 536(5360))**

Fall. 4 credits. Prerequisites: ECE 315 and ECE 457 or equivalent.

For description, see ECE 536.

**[MS&E 542(5420) Flexible Electronics]**

Spring. 3 credits. Next offered 2007-2008. C. Ober.

Flexible electronics holds the promise of transformative developments in: (1) flat panel lighting (low cost, low energy), (2) energy production systems (solar), and (3) infrastructure control and monitoring (sensing, energy control, hazard monitoring). Practical realization of flexible circuits will require

dramatic progress in new materials that are compatible with flexible media and amenable to facile and low temperature processing as well as major advances in manufacturing technologies such as roll-to-roll processing. This course will discuss these and other developments.]

**[MS&E 543(5430) Thin-Film Material Science]**

Fall. 3 credits. Next offered 2007–2008.  
R. B. van Dover.

Provides fundamental information on the deposition, properties, reaction, and evaluation of thin films. Topics include deposition techniques, surface energies, stress in thin films, surface kinetics, homoepitaxy, heteroepitaxy and superlattices, electrical and optical properties, Schottky barriers, solid phase regrowth, interdiffusion, thin film reactions, and electromigration. The recommended textbook is *Electronic Thin Film Science for Electrical Engineers and Material Scientists* by Tu, Mayer, and Feldman.]

**[MS&E 545(5450) Magnetic and Ferroelectric Materials]**

Fall. 3 credits. Prerequisites: PHYS 213 and 214 or equivalent. Next offered 2007–2008.  
R. B. van Dover.]

**MS&E 555(5550) Introduction to Composite Materials (also CEE/M&AE/T&AM 455(4550))**

Spring. 3 credits.

For description, see T&AM 455.

**MS&E 563(5630) Nanobiotechnology (also A&EP/BIO G 663(6630))**

Spring. 3 credits.

For description, see A&EP 663.

**MS&E 571(5710) Analytical Techniques for Material Science**

Spring. 3 credits. D. Ast.

Survey of modern analytical techniques used to determine composition and structure of near-surface and bulk materials. Interaction of ions, electrons, and photons with solids; characteristics of the emergent radiation. Techniques covered include ion scattering, Auger electron spectroscopy, nuclear activation, secondary ion mass spectroscopy, UV and X-ray photoelectron spectroscopies, and X-ray techniques. Selection and design of experiments.

**MS&E 572(5720) Computational Materials Science**

Spring. 3 credits. Prerequisite: MS&E 303/601 or equivalent. M. O. Thompson.

Computational methods for predicting the behavior of condensed matter systems, including Monte Carlo, molecular dynamics, and phase field approaches. Extraction of physical parameters from simulation results and limitations of computational methods. Survey of interatomic potential development and quantum-mechanical ab-initio techniques. Examples drawn from surface and condensed phase systems.

**MS&E 581(5810) Atomic and Molecular Structure of Matter (also MS&E 206(2060), M&AE 312(3120))**

Spring. 4 credits. C. Liddell.

For description, see MS&E 206.

**MS&E 582(5820) Mechanical Properties of Materials, Processing, and Design (also MS&E 402(4020), M&AE 312(3120))**

Fall. 4 credits. Corequisite: MS&E 584 or permission of instructor. S. Baker.

For description, see MS&E 302.

**MS&E 583(5830) Thermodynamics of Condensed Systems (also MS&E 303(3030))**

Fall. 4 credits. M. O. Thompson.

For description, see MS&E 303.

**MS&E 584(5840) Kinetics, Diffusion, and Phase Transformation (also MS&E 304(3040))**

Spring. 4 credits. Prerequisite: MS&E 583 or permission of instructor. J. Blakely.

For description, see MS&E 304.

**MS&E 585(5850) Electronic, Magnetic, and Dielectric Properties of Materials (also MS&E 305(3050))**

Spring. 4 credits. R. B. van Dover.

For description, see MS&E 305.

**MS&E 587(5870) Technology Management**

Spring. 3 credits. E. P. Giannelis.

For description, see MS&E 481.

**MS&E 589(5890) Colloids and Colloid Assemblies for Advanced Materials Applications (also MS&E 489(4890))**

Fall. 3 credits. C. Liddell.

For description, see MS&E 489.

**Graduate Core Courses**

**[MS&E 601(6010) Chemistry of Materials]**

Fall. 3 credits. Prerequisite: thermodynamics course at level of MS&E 303. Next offered 2007–2008. J. M. Blakely.

Topics include basic statistical thermodynamics, partition functions and thermodynamic state functions, distributions, laws of thermodynamics, free-energy functions and conditions of equilibrium, chemical reactions, statistics of electrons in crystals, heat capacity, heterogeneous systems and phase transitions, and lattice models of 1-, 2-, and 3-dimensional interacting systems. Also covers: statistical thermodynamics of alloys, free-energy and phase diagrams, order-disorder phenomena, point defects in crystals, and statistical thermodynamics of interfaces.]

**MS&E 602(6020) Elasticity, Plasticity, and Fracture**

Spring. 3 credits.

**MS&E 603(6030) Thermodynamics of Materials**

Spring. 3 credits. Offered alternate years.  
J. Blakely.

**[MS&E 604(6040) Kinetics of Reactions in Condensed Matter]**

Spring. 3 credits. Next offered 2007–2008.  
A. L. Ruoff.]

**MS&E 606(6060) Condensed Matter Structure**

Spring. 4 credits. Prerequisite: course at level of MS&E 206. J. Blakely.

Focuses on ways to characterize structure. Includes lectures by several faculty on structural determination on a wide range of materials. Elements of structure at length scales ranging from sub-nanometer to millimeter. Descriptions of structure in crystals, liquids, amorphous solids/glasses. Short- and long-range order, microstructures, cellular structures, domains, domain boundaries, 2-

phase and composite structures. Techniques to probe structure: "direct" microscopy, real space imaging, including probe microscopies, optical, electron and X-ray methods. Indirect methods based on analysis of diffraction fields, Fourier/reciprocal space. Examples of application may include polymer structure, metal grain textures, dislocation arrays, cellular structure, structure of biological membranes, nano-composite structures, surfaces, interfaces and grain boundaries in semiconductors, structure of photonic materials, domain structures in ferroelectrics and ferromagnetics, biological materials.

**Related Course in Another Department**

Introductory Solid-State Physics (PHYS 454, A&EP 450)

**Further Graduate Courses**

**[MS&E 610(6100) Physical Metallurgy and Applications (also MS&E 410(4100))]**

Spring. 3 credits. Prerequisites: MS&E 206, 303, 304 or permission of instructor. Next offered 2007–2008. S. Baker.

For description, see MS&E 410.]

**MS&E 621(6210) Advanced Inorganic Chemistry III: Solid-State Chemistry (also CHEM 607(6070))**

Fall. 4 credits. Prerequisite: CHEM 605 or permission of instructor. S. Lee.

For description, see CHEM 607.

**MS&E 622(6220) Synthetic Polymer Chemistry (also CHEM 675(6750), CHEM 671(6710))**

Spring. 4 credits. Prerequisites: CHEM 359–360 or equivalent or permission of instructor. Staff.

For description, see CHEM 671.

**[MS&E 631(6310) Solid-State Reactions]**

Fall. 3 credits. Offered alternate years; next offered 2007–2008. R. Dieckmann.]

**[MS&E 632(6320) Solid-State Electrochemistry]**

Fall. 3 credits. Prerequisite: MS&E 631 or permission of instructor. Next offered 2007–2008. R. Dieckmann.]

**MS&E 655(6550) Composite Materials (also M&AE/T&AM 655(6550))**

Spring. 4 credits. Staff.  
For description, see T&AM 655.

**MS&E 665(6650) Principles of Tissue Engineering (also M&AE/BME 665(6650))**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.  
For description, see BME 665.

**MS&E 671(6710) Principles of Diffraction (also A&EP 711(7110))**

Fall. 3 credits. Letter grades only. Assumes some knowledge of statistical thermodynamics, crystallography, elementary quantum mechanics, and theory of rate processes. J. D. Brock.

For description, see A&EP 711.

**[MS&E 681(6810) Surfaces and Interfaces in Materials]**

Spring. 3 credits. Next offered 2007–2008.  
J. Blakely.

Deals with special topics in surface and interface science. The main topics are: statistical thermodynamics of interfaces, morphological stability, atomic structure,

energetics and structure determination, electronic structure of interfaces, charge and potential distributions, surface steps, adsorption and segregation, atomic transport and growth processes at surfaces, oxidation, and other surface reactions.]

### Specialty Courses

#### **MS&E 800(8000) Research in Materials Science**

Fall, spring. Credit TBA. Staff.  
Independent research in materials science under the guidance of a member of the staff.

#### **MS&E 801(8010) Materials Science and Engineering Colloquium**

Fall and spring. 1 credit each semester.  
Enrollment limited to MS&E Ph.D. students. Staff.

Lectures by visiting scientists, Cornell staff members, and graduate students on subjects of interest in materials sciences, especially in connection with new research.

#### **MS&E 802(8020) Materials Science Research Seminars**

Fall, spring. 2 credits each semester.  
Prerequisite: graduate students involved in research projects. Staff.  
Short presentations on research in progress by students and staff.

## MECHANICAL AND AEROSPACE ENGINEERING

P. L. Auer, C. T. Avedisian, D. L. Bartel, L. J. Bonassar, J. F. Booker, J. R. Callister, M. E. Campbell, D. A. Caughey, L. R. Collins, R. D'Andrea, P. R. Dawson, P. C. T. deBoer, D. C. Erickson, E. M. Fisher, E. Garcia, A. R. George, F. C. Gouldin, C. Hui, B. J. Kirby, S. Leibovich, H. Lipson, M. Y. Louge, J. L. Lumley, M. P. Miller, F. C. Moon, F. K. Moore, S. Mukherjee, M. A. Peck, R. M. Phelan, S. L. Phoenix, S. B. Pope, M. L. Psiaki, E. L. Resler, Jr., A. Ruina, W. Sachse, S. E. Shen, K. E. Torrance, F. Valero-Cuevas, M. C. H. van der Meulen, H. B. Voelcker, K. K. Wang, Z. Warhaft, C. H. K. Williamson, N. Zabaras, A. Zehnder

#### **M&AE 103(1030) Introduction to Computer-Aided Manufacture (CAM)**

Fall, spring, approx. eight weeks (total 15 hrs. of instruction and 15 hrs. of lab). 1 credit. Limited enrollment. Prerequisites: M&AE 225 or equivalent experience and completion of Emerson Lab Product Realization Facility's CNC seminars: An Introduction to CNC Machining and CNC Programming; or permission of instructor.  
Completes the introduction to the fundamentals of computer-aided manufacture (CAM) seminars through the use of computer numerical control (CNC) programming. The course is the hands-on component of the three-part series on CAM. Provides practical applications of the use of G codes and solid modeling software, CNC mill and/or lathe setup, tool selection, and operation. The course is required for students wishing to use the CNC equipment in the Emerson Lab's Product Realization Facility for team or research projects. May not be used to fulfill any M&AE requirement.

#### **M&AE 111(1110) Naval Ship Systems (also NAV S 202[2020])**

Fall. 3 credits.  
For description, see NAV S 202.

#### **M&AE 117(1170) Introduction to Mechanical Engineering (also ENGRI 117[1170])**

Fall. 3 credits. 2 lec and 1 lab per week.  
Course in Introduction to Engineering series.  
For description, see ENGRI 117.

#### **M&AE 127(1270) Introduction to Entrepreneurship and Enterprise Engineering (also ENGRI 127[1270])**

Spring. 3 credits. Open to all Cornell students regardless of major. Prerequisites: none.  
For description, see ENGRI 127.

#### **M&AE 212(2120) Mechanical Properties and Selection of Engineering Materials**

Spring. 3 credits. Prerequisites: ENGRD/T&AM 202 (Statics) with minimum of C- (strictly enforced). Software fee.  
Mechanics of deformable bodies and a reinforcement of the concept of "simple engineering elements" for mechanical analysis associated with design. Introduction to the broad range of properties and behaviors of engineering materials as they relate to mechanical performance. Emphasis is placed on general states of stress and strain, on elasticity and combined loading effects. Failure criteria including yielding, buckling, fracture, fatigue and environmental effects are developed. A general introduction to the function/constraints/objectives approach to material selection associated with mechanical design is provided with candidate material systems coming from metals, polymers, ceramics and/or composites. A general overview of material processing is presented within this context of material selection.

#### **M&AE 221(2210) Thermodynamics (also ENGRD 221[2210])**

Fall, spring, may be offered in summer. 3 credits. Prerequisites: MATH 192 and PHYS 112 or permission of instructor.  
For description, see ENGRD 221.

#### **M&AE 225(2250) Mechanical Synthesis**

Spring. 4 credits. Prerequisite: ENGRD 202. Pre- or corequisites: ENGRD 203 and 221. Lab fee.

Hands-on introduction to the product design process, from conceptualization through prototype construction and testing. Design projects provide experience in basic prototyping skills using machine tools. Mechanical dissection used to demonstrate successful product design and function. Basic instruction on CAD and technical sketching.

#### **M&AE 305(3050) Introduction to Aeronautics**

Fall. 3 credits. Prerequisite: T&AM/ENGRD 203; upper-class engineers or permission of instructor.

Introduction to aerodynamic design of aircraft. Principles of incompressible and compressible aerodynamics, boundary layers, and wing theory. Calculation of lift and drag for aircraft. Analysis of aerodynamic performance, stability, and control.

#### **M&AE 306(3060) Spacecraft Engineering**

Spring. 3 credits. Prerequisite: junior or senior M&AE or ECE students or permission of instructor.

Introduction to spacecraft engineering from satellite design through launch to orbital operation. Topics covered include space missions, space environment, orbital mechanics, systems engineering, and satellite design. Most spacecraft subsystems are introduced including rocket theory, attitude determination and control, thermal design, and communications. Earth-orbiting and interplanetary satellites are considered. Discussions of current problems and trends in spacecraft operation and development.

#### **M&AE 312(3120) Mechanical Properties of Materials, Processing, and Design (also MS&E 402[4020], 582[5820])**

Fall. 4 credits.  
For description, see MS&E 402.

#### **M&AE 313(3130) Atomic and Molecular Structure of Matter (also MS&E 206[2060], MS&E 581[5810])**

Spring. 4 credits.  
For description, see MS&E 206.

#### **M&AE 323(3230) Introductory Fluid Mechanics**

Fall; usually offered in summer through Engineering Cooperative Program. 4 credits. Prerequisites: ENGRD 202 and ENGRD 203 and pre- or co-registration in ENGRD 221, or permission of instructor. Limited to ME majors and those officially registered for the ME minor.  
Topics include physical properties of fluids, hydrostatics, conservation laws using control volume analysis and using differential analysis, Bernoulli's equation, potential flows, simple viscous flows (solved with Navier-Stokes equations), dimensional analysis, pipe flows, boundary layers. Introduction to compressible flow.

#### **M&AE 324(3240) Heat Transfer**

Spring; usually offered in summer through Engineering Cooperative Program. 3 credits. Prerequisite: M&AE 323 or permission of instructor.  
Topics include discussion of steady and unsteady heat conduction; forced and free convection; external and internal flows; radiation heat exchange; and heat exchangers and boiling.

#### **M&AE 325(3250) Analysis of Mechanical and Aerospace Structures**

Fall; usually offered in summer through Engineering Cooperative Program. 3 credits. Prerequisites: ENGRD 202 and M&AE 212.  
Topics in mechanics of materials applied to analysis and design of structural components encountered in mechanical and aerospace systems, including multiaxial stress states, statically indeterminate structures, torsion and bending of nonsymmetric or curved members, stability and stress concentrations. Solution strategies include both analytical and finite element methods.

#### **M&AE 326(3260) System Dynamics**

Spring; usually offered in summer through Engineering Cooperative Program. 4 credits. Prerequisite: MATH 294, ENGRD 203. Junior standing required.  
Dynamic behavior of mechanical systems: modeling, analysis techniques, and applications; vibrations of single- and multi-degree-of-freedom systems; feedback control systems. Computer simulation and experimental studies of vibration and control systems.



**M&AE 327(3272) Mechanical Property and Performance Laboratory**

Spring. 2 credits. Prerequisites: M&AE 212, 325.

This course provides an introduction to the experimental methods, instrumentation, and data analyses associated with material property determination and mechanical performance of materials. Emphasis is placed on integration of theory and analysis with experimental methods.

**M&AE 378(3780) Mechatronics**

Fall. 4 credits. Prerequisite: MATH 294, PHYS 213, or permission of instructor.

At the intersection of mechanical and electrical engineering, Mechatronics involves technologies necessary to create automated systems. This course introduces students to the functional elements of modern controlled dynamic systems. Topics include analog circuits (both passive and active components); filter design; diodes; transistors, MOSFETs and power amplification; pulse width modulation; transduction; mechanical and electro-mechanical devices such as electromagnetic systems; piezoelectric and shape memory material transduction; gear trains; optical encoders; discretization; aliasing; and microprocessors and programming. Lab experiments culminate in the design, fabrication, and programming of a microprocessor-controlled robotic vehicle, which laboratory groups enter into a class-wide competition.

**M&AE 400(4001) Components and Systems: Engineering in a Social Context (also S&TS 400[4001])**

Spring. 3 credits. Prerequisites: upper-class standing, two years of college physics. Offered alternate years.

Addresses, at a technical level, broader questions than are normally posed in the traditional engineering or physics curriculum. Through the study of individual cases such as the Strategic Defense Initiative (SDI), the National Missile Defense, supersonic transport, and the automobile and its effect on the environment, the course investigates interactions between the scientific, technical, political, economic, and social forces that are involved in the development of engineering systems. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429. Co-meets with M&AE 500.

**[M&AE 409(4090) Data Structures and Algorithms for Computational Science (also CIS 409[4090])**

Fall. 4 credits. Prerequisite: COM S 100 or programming experience in any language. Not offered 2006–2007.

For description, see CIS 409.]

**M&AE 415(4150) GPS: Theory and Design (also ECE 415[4150])**

Fall. 4 credits. Prerequisites: 300-level engineering course with advanced math content (e.g., ECE 303 or M&AE 326).

For description, see ECE 415.

**M&AE 417(4170) Introduction to Robotics: Dynamics, Control, Design**

Spring. 3 credits. Prerequisites: engineering math at level of MATH 293 and MATH 294 (Engineering Mathematics); some course in dynamics at level of T&AM/ENGRD 203 (Dynamics); familiarity with control concepts typical of M&AE 326 (System Dynamics).

Introductory course in the analysis and control of mechanical manipulators and related robotic machines. Topics include spatial descriptions and transformations, manipulator kinematics and inverse kinematics, differential relationships and static forces, manipulator dynamics, trajectory generation, sensors and actuators, trajectory control, and compliant motion control. Simulation and design using MATLAB and multi-body codes are used. Co-meets with M&AE 517.

**M&AE 423(4231) Intermediate Fluid Dynamics**

Spring. 3 credits. Prerequisite: M&AE 323 (Introductory Fluid Mechanics).

This course builds on the foundation of M&AE 323. Emphasis is placed on both the fundamental principles and numerical calculation of real flows (both engineering and environmental) using a computational fluid dynamics package. Topics covered include some exact solutions to the Navier-Stokes equations, boundary layers, wakes and jets, separation, convection, stratified and rotating flows, fluid instabilities, and turbulence. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429. Co-meets with M&AE 523.

**M&AE 425(4251) FSAE Automotive Design Project**

Fall, spring. Usually 3 credits: 3 for team members or 4 for team leaders.

Prerequisite: M&AE or ECE juniors and seniors or permission of instructor.

Project course to research, design, build, develop, and compete with a Formula SAE car for intercollegiate competition. Students work in interdisciplinary teams using concurrent engineering and systems engineering principles applied to complex mechanical, electromechanical, and electronic systems. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429.

**M&AE 427(4272) Fluids/Heat Transfer Laboratory**

Fall. 3 credits. Fulfills technical-writing requirement. Prerequisites: M&AE 323, 324.

Laboratory exercises in fluid mechanics and the thermal sciences. Measurements of flame temperature, pressure, heat transfer, viscosity, lift and drag, fluid-flow rate, effects of turbulence, air foil stall, flow visualization, and spark ignition engine performance. Instrumentation, techniques and analysis, and interpretation of results. Biweekly written assignments with extensive feedback.

**M&AE 428(4280) Seminar on Engineering Design**

Fall. 2 credits. Prerequisite: senior standing or permission of instructor.

This course is offered to illustrate and practice the design "process." It consists of formal lectures and invited seminars by industrial and academic practitioners of design. Case studies are presented in weekly invited lectures from a wide range of disciplines, including thermo-fluid processes, manufacturing, energy, mechanical design, aerospace, and biological sciences. The invited lectures are supplemented by one or more design "projects" in the semester.

**M&AE 429(4291) Supervised Senior Design Experience**

Fall, spring. Minimum of 1 or 3 credits depending on section chosen. Prerequisite: senior standing or permission of instructor; taken concurrently or after M&AE 428. Letter grades only.

Substantial design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. Sections of this course satisfy the BS ME senior design requirement. They are offered in conjunction with a course designated as "Senior Design Elective" (M&AE 400, 423, 425, 470, 479, 486) or are directed by a faculty member as an individual or a team design exercise. Consult [www.mae.cornell.edu](http://www.mae.cornell.edu) for enrollment details.

**M&AE 449(4490) Combustion Engines and Fuel Cells**

Spring. 3 credits. Prerequisites: ENGRD 221 and M&AE 323.

Introduction to reciprocating combustion engines and fuel cells, with emphasis on the application of thermodynamic and fluid-dynamic principles affecting their performance. Chemical equilibrium and kinetics, electrochemistry, thermodynamic limits on performance, deviations from ideal processes, engine breathing, combustion, knock. Formation and control of undesirable exhaust emissions.

**M&AE 453(4530) Computer-Aided Engineering: Applications to Biomedical Processes (also BEE 453[4530])**

Spring. 3 credits. Fulfills technical elective requirement for M&AE students.

Prerequisite: Heat and Mass Transfer (BEE 350, Biological and Environmental Transport Processes, or CHEM 324, Heat and Mass Transfer, or M&AE 324, Heat Transfer, or equivalent.

For description, see BEE 453.

**M&AE 455(4550) Introduction to Composite Materials (also CEE 477[4770], MS&E 555[5550], T&AM 455[4550])**

Fall. 4 credits.

For description, see T&AM 455.

**M&AE 459(4590) Introduction to Controlled Fusion: Principles and Technology (also ECE 484[4840], A&EP 484[4840])**

Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics. Intended for seniors and graduate students in engineering and the physical sciences. Offered alternate years.

For description, see ECE 484.

**M&AE 461(4610) Entrepreneurship for Engineers (also ENGRG 461[4610], OR&IE 452[4520])**

Fall. 3 credits. Limited enrollment.

Prerequisite: enrollment open to upper-class engineers or permission of instructor. Develops skills necessary to identify, evaluate, and begin new business ventures. Topics include intellectual property, competition, strategy, business plans, technology forecasting, finance and accounting, and sources of capital. A rigorous, quantitative approach is stressed throughout, and students create financial documents and plans, analyze human resource models, and work with sophisticated valuation methods, complicated equity structures, and legal and business documents. As such, this course represents the "red meat" of entrepreneurship, and the soft

skills are left for other courses. Course work consists of discussions, assignments, and the preparation and presentation of a complete business plan.

**M&AE 463(4630) Neuromuscular Biomechanics (also BME 463[4630])**

Spring. 3 credits. Prerequisites: ENGRD 202 and ENGRD 203 or permission of instructor. Offered alternate years.

Modeling and simulation of biomechanical systems using mechanics, dynamics, and control principles. Physiology of neurons and muscles introduced and related to the production of force and movement in biological systems. Representation of neuromuscular systems as simultaneous equations. Exploration of the muscular redundancy problem using optimization methods and general-purpose languages (such as *Mathematica* or *MATLAB*). Selected clinical applications.

**[M&AE 464(4640) Orthopaedic Tissue Mechanics]**

Spring. 3 credits. Prerequisites: ENGRD 202 Mechanics of Solids and M&AE 325 Mechanical Design and Analysis or permission of instructor. Offered alternate years; not offered 2006-2007.

Applications of mechanics and materials principles to orthopaedic tissues. Physiology of bone, cartilage, ligament, and tendon and how these properties relate to mechanical function. Mechanical behavior of skeletal tissues in the laboratory. Functional adaptation of these tissues to their mechanical environment. Tissue engineering of replacement structures.]

**M&AE 466(4660) Biomedical Engineering Analysis of Metabolic and Structural Systems (also BME 401[4010])**

Fall. 3 credits. Prerequisites: ENGRD 202 Mechanics of Solids and previous course work in biology or permission of instructor.

For description, see BME 401.

**M&AE 470(4701) Finite Element Analysis for Mechanical and Aerospace Design**

Spring. 3 credits. Fulfills senior design requirement for M&AE students. Limited enrollment. Prerequisite: senior standing or permission of instructor. Evening exams. Term project.

Introduction to linear finite element static and dynamic analysis for discrete and distributed mechanical and aerospace structures. Prediction of load, deflection, stress, strain, and temperature distributions. Major emphasis on underlying mechanics and numerical methods. Introduction to computational aspects via educational and commercial software (such as *MATLAB* and *ANSYS*). Selected mechanical and aerospace applications in the areas of trusses, beams, frames, heat transfer (steady state and transient), and elasticity (static and dynamic). Term project. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429. Co-meets with M&AE 570.

**M&AE 477(4770) Engineering Vibrations**

Spring. 3 credits. Pre- or corequisite: M&AE 326 or permission of instructor.

Lumped element, distributed parameter, and mixed structural vibratory systems are examined. Equations of motion are derived from Newton's law and Lagrange's equations. Eigenanalysis, free and forced responses,

and frequency/time domain solutions are considered. Vibration absorbers, isolators, and vibration suppression control systems using feedback approaches also are investigated. Co-meets with M&AE 577.

**M&AE 478(4780) Feedback Control Systems (also CHEME 472[4720], ECE 472[4720])**

Fall. 4 credits. Prerequisites: CHEM E 372 or M&AE 326 or permission of instructor.

Analysis techniques, performance specifications, and analog-feedback-compensation methods for single-input, single-output, linear, time-invariant systems. Laplace transforms and transfer functions are the principal mathematical tools. Design techniques include root-locus and frequency response methods. Includes laboratory that examines modeling and control of representative dynamic processes. Co-meets with M&AE 578.

**M&AE 479(4791) Modeling and Simulation of Mechanical and Aerospace Systems**

Fall. 4 credits, variable. Limited enrollment. Prerequisite: seniors in engineering or permission of instructor. Evening exams. F. Valero-Cuevas.

Analysis and simulation of linear and nonlinear systems. Representation of discrete and distributed dynamical systems by state-variable models. Time- and frequency-domain simulation via general-purpose languages (such as *MATLAB* or *Mathematica*) and special-purpose simulation software (such as *Simulink*). Selected applications from diverse fields. Term project. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429. Co-meets with M&AE 579.

**M&AE 486(4861) Automotive Engineering**

Fall. 3 credits. Prerequisites: ENGRD 202 or permission of instructor.

Selected topics in the analysis and design of vehicle components and vehicle systems. Emphasis on automobiles. Engines, transmissions, suspension, brakes, and aerodynamics will be discussed. The course uses first principles and applies them to specific systems. The course is highly quantitative, using empirical and analytical approaches. "Senior Design Elective" if students sign up for the corresponding section of M&AE 429.

**M&AE 490(4900) Special Investigations in Mechanical and Aerospace Engineering**

Fall, spring. 4 variable credits. Prerequisite: undergraduate standing and permission of instructor.

Intended for an individual student or a small group of students who want to pursue a particular analytical or experimental investigation outside of regular courses or for informal instruction supplementing that given in regular courses.

**M&AE 498(4980) Teaching Experience in Mechanical Engineering**

Fall, spring. 3 credits. Prerequisite: permission of instructor.

Students serve as teaching assistants in Cornell mechanical engineering classes or in local middle school technology classes. Cannot be used to fulfill M.E. technical elective requirement but may be approved as advisor-approved elective. May not be used toward satisfying M.E. minor.

**M&AE 500(5000) Components and Systems: Engineering in a Social Context**

Spring. 3 credits. Prerequisites: graduate standing or permission of instructor, two years of college physics. Offered alternate years.

Co-meets with M&AE 400. For description, see M&AE 400.

**M&AE 501(5010) Future Energy Systems**

Spring. 3 credits. Prerequisites: ENGRD 221 (Thermodynamics) or equivalent. Recommended: M&AE 323 (Introductory Fluid Mechanics), M&AE 324 (Heat Transfer), or equivalents; open to graduate or senior standing or permission of instructor.

Critically examines the technology of energy systems that will be acceptable in a world faced with global climate change, local pollution, and declining supplies of oil. The focus is on renewable energy sources (wind, solar, biomass), but other non-carbon-emitting sources (nuclear) and lowered-carbon sources (co-generative gas turbine plants, fuel cells) also are studied. Both the devices and the overall systems are analyzed.

**[M&AE 506(5060) Aerospace Propulsion Systems]**

Spring. 3 credits. Prerequisite: M&AE 323 (Introductory Fluid Mechanics) and 305 (Introduction to Aeronautics) or permission of instructor. Offered alternate years; not offered 2006-2007.

Application of thermodynamic and fluid-mechanical principles to design and performance analysis of aerospace propulsion systems. Jet propulsion principles, including gas turbine engines and rockets. Electric propulsion. Future possibilities for improved performance of aerospace propulsion systems.]

**M&AE 507(5070) Dynamics of Flight Vehicles**

Spring. 3 credits. Prerequisites: M&AE 305 (Introduction to Aeronautics) and M&AE 323 (Introductory Fluid Dynamics) and M&AE 326 (System Dynamics), concurrently or permission of instructor. Offered alternate years.

Introduction to stability and control of atmospheric-flight vehicles. Review of aerodynamic forces and methods for analysis of linear systems. Static stability and control. Small disturbance equations of unsteady motion. Dynamic stability of longitudinal and lateral-directional motions; transient response. At the level of *Flight: Stability and Automatic Control* by Nelson.

**M&AE 513(5130) Mechanical Properties of Thin Films (also MS&E 512[5120])**

Spring. 3 credits. For description, see MS&E 512.

**[M&AE 514(5140) Design for Manufacture and Assembly]**

Fall or spring. 3 credits. Prerequisites: two and a half years of engineering mathematics through probability and statistics; some knowledge of mechanical design and manufacturing processes; good visualization and sketching skills; some experience with *MATLAB* and a CAD system, or permission of instructor. Not offered 2006-2007.

Nominal DFMA (design for manufacture and assembly) and variational DFMA are covered in two parallel streams. The nominal

stream is based on readings in a popular text that surveys the role of manufacturing and assembly processes in part and product design. The second stream, covered mainly through lectures, addresses dimensional variability and its control through parametric and geometric tolerances, dimensional metrology, and statistical quality and process control.]

**M&AE 517(5170) Introduction to Robotics: Dynamics, Control, Design**

Spring. 3 credits. Graduate version of M&AE 417. Co-meets with M&AE 417. For description, see M&AE 417.

**M&AE 520 (5200) Dimensional Tolerancing in Mechanical Design**

Fall, spring. 2 credits. Seven-week half term. Prerequisites: M&AE 225 or an equivalent CAD-based design course, plus 2.5 years of engineering mathematics through probability and statistics. Designers use dimensional tolerances to limit variations in the spatial properties of mechanical parts and assemblies; the primary constraints are interchangeability in assembly, performance, and cost. The course covers traditional limit and statistical tolerances and contemporary geometric tolerances. Students learn how to interpret modern tolerances, assign tolerance values in simple applications, and assess the limitations and probable future directions of tolerancing technology.

**M&AE 521(5210) Theory of Linear Systems (also ECE 521[5210])**

Fall. 3 credits. Prerequisites: M&AE 326, ECE 320 (may be taken as a corequisite), or permission of instructor; a strong background in linear algebra at the level of MATH 294, and differential equations at the level of MATH 293 is required. For description, see ECE 521.

**M&AE 523(5230) Intermediate Fluid Dynamics**

Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Intended for M.Eng. students who wish to take a single fluid dynamics course. Students desiring more intensive treatment should consider M&AE 601 and one or more of M&AE 636, 736, and 737. In addition to the normal requirements for M&AE 423, this course includes a 1-credit CFD design project due at the end of the semester. Co-meets with M&AE 423. For description, see M&AE 423.

**M&AE 524(5240) Physics of Micro-and Nanoscale Fluid Mechanics (also CHEME 524[5240])**

Fall. 3 credits. Prerequisite: undergraduate fluid or continuum mechanics (e.g., M&AE 323) or permission of instructor. Offered every year. Co-meets with M&AE 624. Introduction to fluid mechanics and heat transfer in micro- and nanofabricated devices. Physicochemical hydrodynamics, electrokinetic effects, capillarity, continuum breakdown, micro- and nanofluidic applications in chemistry and life sciences.

**M&AE 543(5430) Combustion Processes**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor. An introduction to combustion and flame processes, with emphasis on fundamental fluid dynamics, heat and mass transport, and reaction-kinetic processes that govern combustion rates. Topics covered include thermochemistry, kinetics, vessel explosions, laminar premixed and diffusion flames,

and droplet combustion. Optional topics may include complex combustion systems, turbulent flames, fuel cells, or combustion of solids.

**M&AE 545(5459) Energy Seminar I (also ECE 587[5870], NS&E 545[5450])**

Fall. 1 credit. For description, see ECE 587.

**M&AE 546(5469) Energy Seminar II (also ECE 588[5880])**

Spring. 1 credit. For description, see ECE 588.

**M&AE 565(5650) Biomechanical Systems—Analysis and Design (also BME 565[5650])**

Spring. 3 or 4 credits. Prerequisites: undergraduate courses in dynamics and strength of materials (e.g., ENGRD 202 and ENGRD 203); senior or graduate standing or permission of instructor.

Mechanics and design in musculoskeletal systems. Emphasizes the modeling and analysis of bones and joints and the analysis and design of bone-implant systems for fracture fixation and joint replacement. Selected topics from the study of the human musculoskeletal system as a mechanical system. Emphasizes the modeling and analysis of bones and joints, and the analysis and design of biomechanical systems frequently encountered in orthopaedic engineering, including bone-implant systems.

**M&AE 570(5700) Finite Element Analysis for Mechanical and Aerospace Design**

Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Evening exams. Term project. Graduate version of M&AE 470. Co-meets with M&AE 470.

For description, see M&AE 470.

**M&AE 571(5710) Applied Dynamics**

Fall. 3 credits. Prerequisites: graduate standing, seniors with ENGRD/T&AM 203, M&AE 326 or permission of instructor. Introduces multibody dynamics; dynamics of rigid bodies; Newton-Euler methods, Lagrangian dynamics, principle of virtual power (Kane-Jourdain methods); and applications to robotics, space dynamics of satellites, electro-mechanical systems. Introduction to multibody simulation using Working Model.

**M&AE 577(5770) Engineering Vibrations**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor. Graduate version of M&AE 477. Co-meets with M&AE 477.

For description, see M&AE 477.

**M&AE 578(5780) Feedback Control Systems**

Fall. 4 credits. Graduate version of M&AE 478. Co-meets with M&AE 478.

For description, see M&AE 478.

**M&AE 579(5790) Modeling and Simulation of Mechanical and Aerospace Systems**

Fall. 4 credits. Limited enrollment. Prerequisite: graduate standing or permission of instructor. Evening exams. Graduate version of M&AE 479. Term project. Co-meets with M&AE 479.

For description, see M&AE 479.

**M&AE 591(5910) Applied Systems Engineering (also CEE 504[5040], CIS 504[5040], ECE 512[5120], OR&IE 512[5120], SYSEN 510[5100])**

Fall. 3 credits. Prerequisites: senior or graduate standing in engineering field; concurrent or recent (past two years) enrollment in a group-based project with a strong system design component that is approved by course instructor. For description, see SYSEN 510.

**M&AE 592(5920) System Architecture, Behavior, and Optimization (also CEE 505[5050], COM S 505[5050], ECE 513[5130], OR&IE 513[5142], SYSEN 520[5200])**

Spring. 3 credits. Prerequisites: senior or graduate standing and completion of Applied Systems Engineering 1 (CEE 504, CIS 504, ECE 512, OR&IE 512, M&AE 591, or SYSEN 510) or permission of instructor. For description, see SYSEN 520.

**M&AE 593(5930) Systems Engineering for the Design and Operation of Reliable Systems**

Spring. 3 credits. Prerequisites: M&AE 591 and either OR&IE 270 or CEE 304. For description, see SYSEN 530.

**M&AE 594(5949) Enterprise Engineering Colloquium (also OR&IE 893-894[8930-8940])**

Fall, spring. 1 credit each semester. Usually S-U grades. For description, see OR&IE 893-894.

**M&AE 601(6010) Foundations of Fluid Dynamics and Aerodynamics**

Fall. 4 credits. Prerequisite: graduate standing or permission of instructor. Foundations of fluid mechanics from an advanced viewpoint, including formulation of continuum fluid dynamics; surface phenomena and boundary conditions at interfaces; fundamental kinematic descriptions of fluid flow, tensor analysis, derivation of the Navier-Stokes equations and energy equation for compressible fluids; and sound waves, viscous flows, boundary layers, and potential flows.

**M&AE 602(6020) Fluid Dynamics at High Reynolds Numbers**

Spring. 4 credits. Prerequisite: M&AE 601. Analysis and discussion of a wide range of specific flows and flow regimes characterized by high Reynolds number are provided. Potential flows, conformal transformations, slender-body theory, and Kelvin's impulse are included. Laminar viscous flows are studied, including fully diffused flows, "exact" solutions, and boundary layers. Compressible flows are treated, including propagation and viscous decay of sound and shock waves and their decay, and the method of characteristics for analysis of such problems. Stratified flows, especially gravity and capillary waves, are analyzed. Various stability problems associated with high Reynolds number flows are discussed. Finally, certain low Reynolds number flows associated with creeping motions or with ultra-small scale are described.

**M&AE 606(6060) Spacecraft Dynamics and Mission Design**

Spring. 3 credits. Prerequisites: graduate standing or permission of instructor; background in linear algebra at level of MATH 294 is required; some experience with MATLAB is expected.

The focus is on spacecraft dynamics and its application in core space-systems areas: mission design, operations, and autonomy. Also introduces the problem of attitude estimation and treats aspects of guidance, navigation, and control unique to the context of space mission design. Readings and lectures include examples based on flight data. Students will evolve their own MATLAB models of spacecraft linear and nonlinear dynamics.

**[M&AE 608(6080) Physics of Fluids]**

Spring, 4 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years; not offered 2006-2007.

Behavior of an ideal gas is considered at the microscopic level. Introduction to kinetic theory—the velocity distribution function, molecular collisions, and Boltzmann equation; to quantum theory—postulates of quantum mechanics, rigid rotator, harmonic oscillator, one-electron and multi-electron atoms and molecular structure; and to statistical mechanics—the partition function, relation to thermodynamics, calculations of thermodynamic properties.]

**[M&AE 624(6240) Physics of Micro- and Nanoscale Fluid Mechanics and Heat Transfer]**

Fall, 4 credits. Pre- or corequisite: undergraduate fluid or continuum mechanics (e.g., M&AE 323) or permission of instructor. Graduate version of M&AE 524. Co-meets with M&AE 524.

For description, see M&AE 524.

**[M&AE 627(6270) Experimental Methods in Fluid Dynamics (also CEE 637[6370])]**

Spring, 4 credits. E. A. Cowen.

For description, see CEE 637.

**[M&AE 631(6310) Turbulence and Turbulent Flows]**

Fall, 4 credits. Prerequisite: M&AE 601 (Foundations of Fluid Dynamics and Aerodynamics), graduate standing, or permission of instructor. Not offered 2006-2007.

Topics include the dynamics of buoyancy and shear-driven turbulence, boundary-free and bounded shear flows, second-order modeling, the statistical description of turbulence, turbulent transport, and spectral dynamics.]

**[M&AE 632(6320) Multiphase Turbulence: Particulates, Drops, and Polymer Suspensions]**

Spring, 4 credits. Prerequisites: M&AE 601 (Foundations of Fluid Dynamics and Aerodynamics), graduate standing, or permission of instructor. Not offered 2006-2007.

Covers turbulent transport of suspensions of microstructures: (1) particulates; (2) drops; and (3) polymer molecules. Topics include transport properties of individual microstructures, statistical averaging and the closure problem, Euler/Lagrangian methods, multiphase transport equations, direct numerical simulation and large eddy simulation. This course emphasizes fundamental questions concerning modeling of discrete phases by continuum means.]

**[M&AE 636(6360) Elements of Computational Aerodynamics]**

Fall, 4 credits. Prerequisites: graduate standing and graduate-level course in fluid mechanics. Not offered 2006-2007.

Topics relevant to numerical solution of problems in aerodynamics and fluid mechanics. Analysis and application of computational techniques appropriate for solution of inviscid or high Reynolds number fluid flow problems. Course has common lectures with M&AE 736 but is more applications oriented and uses commercial software for all computational exercises.]

**[M&AE 643(6430) Computational Combustion]**

Spring, 4 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years; not offered 2006-2007. S. B. Pope.

Examines laminar and turbulent flames and the fundamental chemical and transport processes involved. Emphasis is on using computational tools (Chemkin and Fluent) to calculate flame properties, which are compared to experimental data. Topics covered include thermodynamic equilibrium, chemical kinetics, reactor studies, conservation equations, transport properties, laminar premixed and non-premixed flames, turbulent jets, turbulence modeling, and PDF models of non-premixed turbulent combustion. A knowledge of combustion at the level of M&AE 543, Combustion Processes, is useful but not required.]

**[M&AE 645(6450) Turbulent Reactive Flow]**

Spring, 4 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years.

Large turbulent reactive flows occur in combustion devices, the chemical process industry, the atmosphere, oceans, and elsewhere. In the last decade, substantial progress has been made in the understanding of these flows, through both experimental and computational approaches. This course focuses on turbulent combustion and describes the different phenomena involved, the basic processes and governing equations, experimental techniques and observations, and a range of modeling approaches. Class meets, on average, twice per week.

**[M&AE 650(6500) Evolutionary Computation and Design Automation (also COM S/CIS 750[7500])]**

Fall, 4 credits. Not offered every year.

For description, see COM S 750.

**[M&AE 651(6510) Conduction and Radiation Heat Transfer]**

Fall, weeks 1-7. 2 credits. Prerequisite: graduate standing; undergraduates by permission of instructor.

An intermediate treatment of heat conduction and thermal radiation. The conductive transport equation; steady, transient, and some multidimensional conduction; the radiative transport equation; view factors and radiant exchange between surfaces and volumes. At the level of, but extends beyond, *Heat Transfer* by Bejan.

**[M&AE 652(6520) Convection Heat Transfer]**

Fall, weeks 8-14. 2 credits. Prerequisite: graduate standing; undergraduates by permission of instructor.

An intermediate treatment of convection heat transfer. Governing equations developed in integral and differential forms. Boundary layers. Laminar and turbulent flows. Internal and external, forced and free convection. Entropy and system arguments for optimal design. Parameter identification. At the level of, but extends beyond, *Heat Transfer* by Bejan.

**[M&AE 655(6550) Composite Materials (also T&AM 655[6550], MS&E 655[6550])]**

Spring, 4 credits.

For description, see T&AM 655.

**[M&AE 656(6560) Nanoscale Energy Transport and Conversion]**

Spring, 4 credits. Prerequisites: undergraduate heat transfer recommended (e.g., M&AE 324) or permission of instructor. Offered alternate years.

This course aims to provide a detailed look at thermal, electrical, and optical energy transport and conversion mechanisms at the nanoscale. Topics to be covered include: a brief review of macroscopic heat transfer with emphasis on limits of macroscopic models, microscopic picture of energy carriers, material waves, energy quantization and energy states in solids, statistical thermodynamics and probability distribution functions as related to thermal energy storage, energy transport by waves and classical particle descriptions of transport processes and energy conversion and exchange processes between carriers. Emphasis will be put on practical applications and nanoengineering principals including heat transfer in nanoelectronics, nanophotonic and nanofluidic devices and nanostructured energy conversion devices.

**[M&AE 663(6630) Neural Control (also BME 663[6630])]**

Spring, 3 credits. Prerequisite: permission of instructor. Offered alternate years; not offered 2006-2007. F. Valero-Cuevas.

Advanced topics in modeling and simulation of biomechanical systems using mechanics, dynamics, and control principles. Review of current literature on neuromuscular principles of control of vertebrate, posture, locomotion, and manipulation. Mathematical representation of the functional interactions among neurons, muscles, and skeletal structures. Numerical prediction of force and movement in biological systems, and projects exploring muscle coordination using numerical and optimization methods. Project-based investigation of basic science and clinically relevant topics.]

**[M&AE 664(6640) Mechanics of Bone (also BME 664[6640])]**

Spring, 3 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years; not offered 2006-2007.

Covers current methods and results in skeletal research, focusing on bone. Topics include skeletal anatomy and physiology, experimental and analytical methods for determination of skeletal behavior, mechanical behavior of bone tissue, and skeletal functional adaptation to mechanics.]



**M&AE 665(6650) Principles of Tissue Engineering (also BME 665[6650], MS&E 665[6650])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor. L. Bogassar.

For description, see BME 665.

**[M&AE 675(6750) System Identification and Control]**

Fall. 2 credits. Prerequisites: (M&AE 478, ECE 471, CHEME 472), (M&AE 521, ECE 521), or equivalent. Not offered 2006–2007.

Identification of linear uncertain and nonlinear models, and their connections to control. Primary topics include black box methods, such as subspace methods, and model tuning approaches, such as recursive parameter estimation. Connections to control include the development of model uncertainties and bounds. Discussion of current trends in model identification for control.]

**[M&AE 676(6760) Model-Based Estimation]**

Fall. 4 credits. Prerequisites: linear algebra, differential equations, and MATLAB programming. Open to M.S./Ph.D. students or permission of instructor. Offered alternate years; not offered 2006–2007.

Covers a variety of ways in which models and experimental data can be used to estimate model quantities that are not directly measured. The two main estimation methods that are presented are least-squares estimation for general problems and Kalman filtering for dynamic systems problems. Techniques for linear models are taught as are techniques for nonlinear models. Both theory and application are presented.]

**M&AE 678(6780) Multivariable Control Theory**

Spring. 4 credits. Prerequisites: M&AE 478 or 578 or ECE 472 (Feedback Control Systems) and M&AE 521 (Theory of Linear Systems), or permission of instructor. A strong background in classical control, linear algebra, and state space models is required.

Introduction to multivariable feedback control theory in both time and frequency domain. Primary topics include state space methods, model based compensators, performance and robustness of multivariable systems, model reduction, Linear Quadratic and H-infinity optimal control, and random processes and Kalman filtering for control. Additional topics at the discretion of the instructor include uncertainty management and robust control, discrete time control, optimal control, and nonlinear control.

**M&AE 690(6901) Special Investigations in Mechanical and Aerospace Engineering**

Fall, spring. Variable credit. Prerequisite: candidacy for the M.Eng. degree in mechanical or aerospace engineering or approval of faculty member offering project.

Project-based course in the area of mechanical or aerospace engineering under the guidance of a faculty member.

**M&AE 695(6950) Special Topics in Mechanical and Aerospace Engineering**

Fall, spring. Credit TBA. Prerequisites: graduate standing and permission of instructor.

Special lectures by faculty members on topics of current research.

**M&AE 711(7110) X-Ray Diffraction Methods for Engineering Materials**

Fall. 4 credits. Prerequisites: graduate standing or permission of instructor.

We develop a general understanding of diffraction methods employed for understanding the state of crystalline materials. The focus will be on x-ray diffraction and the determination of crystal orientation and lattice strains. We conduct diffraction experiments at the CCMR x-ray facility and examine synchrotron x-ray data. We develop MATLAB-based methods for reducing diffraction data and extracting distributions of orientation and lattice strain.

**M&AE 712(7120) Mechanics of Materials with Oriented Microstructures**

Spring. 4 credits. Prerequisites: T&AM 663 or equivalents. Offered alternate years.

The focus of this course is the evaluation of mechanical properties from knowledge of the material microstructure, with attention to anisotropic elastic and plastic behaviors. Topics include mathematical and mechanics preliminaries; mathematical foundations of orientations, including parameterizations, symmetries, and fibers; construction and sampling of orientation distributions; hypotheses used to link macro and micro length scales; methods for evaluation of effective elastic and plastic moduli; evolution of orientations and orientation distributions with deformation. Applications to polycrystalline solids (metal alloys and minerals), composite materials, biomaterials (soft tissues), and polymers.

**[M&AE 714(7140) Computational Sensorics: Information Technologies for Complex Continuum Systems]**

Fall. 4 credits. Prerequisite: exposure to computational mathematics. Not offered 2006–2007.

Examples of industrial control of continuum systems; mathematical preliminaries; data-driven inverse problems; data mining and knowledge discovery in continuum systems; Bayesian computation; optimal and robust control; model reduction; uncertainty modeling and stochastic optimization; Sensors and sensor-networks.]

**M&AE 715(7150) Atomistic Modeling of Materials**

Spring. 4 credits. Prerequisite: graduate standing or permission of instructor.

Intended for engineering students with interests in the simulation of materials at the atomic scale using academic and commercial software. Emphasis is given to models of interatomic forces from Lennard-Jones models to self-consistent all-electron solution of the quantum mechanical problem. Specific topics include: energy models, density functional theory and the total-energy pseudopotential method, Monte Carlo and molecular dynamics simulations, free energy and phase transitions, fluctuations and transport properties, first-principles MD, Ab-initio thermodynamics and structure prediction, coarse-graining methods and mesoscale models. The course includes advanced applications of materials to nanotechnology. The material covered is self-contained, but an earlier exposure to an undergraduate quantum mechanics, physical chemistry or modern physics course is desirable.

**[M&AE 733(7330) Stability of Fluid Flow]**

Fall, on demand. 4 credits. Prerequisite: graduate standing or permission of instructor. S-U grades only. Not offered 2006–2007.

Basic stability and bifurcation theory in fluid systems. The initial boundary value problem. "Open" flow systems: inviscid Kelvin-Helmholtz and Rayleigh-Taylor instability. Stability of nearly parallel shear flows and boundary layers. Spatial development of linearly unstable motion: "absolute" and "convective" instability. Thermal, double-diffusive, and related instabilities. Post-bifurcation behavior: the Ginzburg-Landau (Stewartson-Stuart) and Davey-Hocking-Stewartson amplitude equations. Phase dynamics and pattern formation. Additional topics chosen from the following possibilities. Stability of periodic motion: Floquet theory. Secondary instabilities; Eckhaus instability, Busse "balloons." Energy stability theory. Effects of symmetry. Taylor-Couette instability. Instability of concentrated vortex flows. Transient growth. Boundary layer receptivity.]

**M&AE 734(7340) Analysis of Turbulent Flows**

Spring. 4 credits. Prerequisite: M&AE 601 Foundations of Fluid Dynamics and Aerodynamics or permission of instructor. Offered alternate years.

Study of methods for calculating the properties of turbulent flows. Characteristics of turbulent flows. Direct numerical simulations and the closure problem. Reynolds-stress equation: effects of dissipation, anisotropy, deformation. Transported scalars. Probability density functions (pdfs): transport equations, relationship to second-order closures, stochastic modeling, and the Langevin equation. Large-eddy simulations: filtered and residual motions, Smagorinsky, and dynamic models. This course emphasizes comparison of theory with experiment.

**[M&AE 736(7360) Theory of Computational Aerodynamics]**

Fall. 4 credits. Prerequisites: graduate standing, advanced course in continuum mechanics or fluid mechanics, and some higher-level (e.g., FORTRAN, MATLAB) programming experience. Not offered 2006–2007.

Numerical methods to solve inviscid and high-Reynolds-number fluid-dynamics problems, including finite-difference, finite-volume, and surface-singularity methods. Accuracy, convergence, and stability; treatment of boundary conditions and grid generation. Focus on hyperbolic (unsteady flow with shock waves) and mixed hyperbolic-elliptic (steady transonic flow) problems. Assignments require programming a digital computer.]

**M&AE 737(7370) Computational Fluid Mechanics and Heat Transfer**

Fall. 4 credits. Prerequisites: graduate standing; advanced course in continuum mechanics, heat transfer, or fluid mechanics; and some MATLAB, C++, or other programming experience.

Numerical methods are developed for the elliptic and parabolic partial differential equations that arise in fluid flow and heat transfer when convection and diffusion are present. Finite-difference, finite-volume, and some spectral methods are considered, together with issues of accuracy, stability, convergence, and conservation. Current methods are reviewed. Emphasis is on steady



and unsteady essentially incompressible flows. Assigned problems are solved on a digital computer.

**M&AE 791(7910) Mechanical and Aerospace Research Conference**

Fall, spring, 1 credit each semester. For graduate students involved in research projects. S-U grades only.

Presentations on research in progress by faculty and students.

**M&AE 799(7999) Mechanical and Aerospace Engineering Colloquium**

Fall, spring, 1 credit each semester; credit limited to graduate students. All students and staff are invited to attend.

Lectures by visiting scientists and Cornell faculty and staff members on research topics of current interest in mechanical and aerospace science, especially in connection with new research.

**M&AE 890(8900) Research in Mechanical and Aerospace Engineering**

Credit TBA. Prerequisite: candidacy for M.S. degree in mechanical or aerospace engineering or approval from director.

Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

**M&AE 990(9900) Research in Mechanical and Aerospace Engineering**

Credit TBA. Prerequisite: candidacy for Ph.D. degree in mechanical or aerospace engineering or approval from director.

Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

## NUCLEAR SCIENCE AND ENGINEERING

Faculty members in the graduate field of nuclear science and engineering who are most directly concerned with the curriculum include K. B. Cady, D. A. Hammer, R. W. Kay, and V. O. Kostroun.

**NS&E 484(4840) Introduction to Controlled Fusion: Principles and Technology (also A&EP/ECE 484[4840], M&AE 459[4590])**

Spring, 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students.

D. A. Hammer.

Introduction to the physical principles and various engineering aspects underlying power generation by controlled fusion. Topics include fuels and conditions required for fusion power, and basic fusion-reactor concepts; fundamental aspects of plasma physics relevant to fusion plasmas, and basic engineering problems for a fusion reactor; and an engineering analysis of proposed magnetic and/or inertial confinement fusion-reactor designs.

**NS&E 545(5450) Energy Seminar (also ECE 587[5870], M&AE 545[5450])**

Fall, spring, 1 credit; may be taken for credit both semesters. D. A. Hammer.

For description, see ECE 587.

**NS&E 590(5900) Independent Study**

Fall, spring, 1-4 credits. Letter or S-U grades. Staff.

Independent study or project under guidance of a faculty member.

**NS&E 591(5910) Project**

Fall, spring, 1-6 credits. Staff.

Master of engineering or other project under guidance of a faculty member.

## OPERATIONS RESEARCH AND INDUSTRIAL ENGINEERING

J. Renegar, director; T. Apanasovich, L. J. Billera, R. G. Bland, J. R. Callister, M. J. Eisner, E. Friedman, X. Guo, S. Henderson, P. L. Jackson, R. A. Jarrow, A. Lewis, M. Lewis, W. L. Maxwell, J. A. Muckstadt, N. Prabhu, P. Protter, S. I. Resnick, R. Roundy, D. Ruppert, P. Rusmevichientong, G. Samorodnitsky, D. Shmoys, E. Tardos, M. J. Todd, H. Topaloglu, L. E. Trotter, Jr., B. W. Turnbull, S. Weber, D. P. Williamson

**OR&IE 311(3800) Information Systems and Analysis**

Spring, 4 credits. 3 lec plus rec.

A systematic and hierarchical approach to the development of information systems, featuring business case justification, requirements analysis, use case analysis, functional analysis, structural design, object-oriented modeling, database design, verification and validation, and project schedule estimation. Graphical tools of analysis (e.g., the Unified Modeling Language) are emphasized. Examples are drawn from business and industrial processes. An integrative design project resulting in a detailed information system design specification (but not necessarily implementation) is required.

**OR&IE 312(3120) Industrial Data and Systems Analysis**

Spring, 4 credits. Prerequisite: ENGRD 270.

Database and statistical techniques for data mining, graphical display, and predictive analysis in the context of industrial systems (manufacturing and distribution). Database techniques include structured query language (SQL), procedural event-based programming (Visual Basic), and geographical information systems. Statistical techniques include multiple linear regression, classification, logistic regression, and time series forecasting. Industrial systems analysis includes factory scheduling and simulation, materials planning, cost estimation, inventory planning, and quality engineering.

**OR&IE 320(3300) Optimization I**

Fall, 4 credits. Prerequisite: MATH 221 or 294.

Formulation of linear programming problems and solutions by the simplex method. Related topics such as sensitivity analysis, duality, and network programming. Applications include such models as resource allocation and production planning. Introduction to interior-point methods for linear programming.

**OR&IE 321(3310) Optimization II**

Spring, 4 credits. Prerequisite: OR&IE 320 or equivalent.

A variety of optimization methods stressing extensions of linear programming and its applications but also including topics drawn from integer programming, dynamic programming, and network optimization. Formulation and modeling are stressed as well as numerous applications.

**OR&IE 350(3150) Financial and Managerial Accounting**

Fall and spring, 4 credits.

Covers principles of accounting, financial reports, financial-transactions analysis, financial-statement analysis, budgeting, job-order and process-cost systems, standard costing and variance analysis, and economic analysis of short-term decisions.

**OR&IE 360(3500) Engineering Probability and Statistics II**

Fall, 4 credits. Prerequisite: ENGRD 270 or equivalent.

A rigorous foundation in theory combined with the methods for modeling, analyzing, and controlling randomness in engineering problems. Probabilistic ideas are used to construct models for engineering problems, and statistical methods are used to test and estimate parameters for these models. Specific topics include random variables, probability distributions, density functions, expectation and variance, multidimensional random variables, and important distributions including normal, Poisson, exponential, hypothesis testing, confidence intervals, and point estimation using maximum likelihood and the method of moments.

**OR&IE 361(3510) Introductory Engineering Stochastic Processes I**

Spring, 4 credits. Prerequisite: OR&IE 360 or equivalent.

Uses basic concepts and techniques of random processes to construct models for a variety of problems of practical interest. Topics include the Poisson process, Markov chains, renewal theory, models for queuing, and reliability.

**OR&IE 416(4100) Design of Manufacturing Systems**

Fall, 4 credits. Prerequisite: senior OR&IE students or permission of instructor.

Project course in which students, working in teams, design a manufacturing logistics system and conduct capacity, material flow, and cost analysis of their design. Meetings between project teams and faculty advisors are substituted for some lectures. Analytical methods for controlling inventories, planning production, and evaluating system performance are presented in lectures.

**[OR&IE 431(4330) Discrete Models**

Fall, 4 credits. Prerequisites: OR&IE 320 and COM S 211 or permission of instructor. Not offered 2006-2007.

Covers basic concepts of graphs, networks, and discrete optimization. Fundamental models and applications, and algorithmic techniques for their analysis. Specific optimization models studied include flows in networks, the traveling salesman problem, and network design.]

**OR&IE 432(4320) Nonlinear Optimization**

Spring, 4 credits. Prerequisite: OR&IE 320.

Introduction to the practical and theoretical aspects of nonlinear optimization. Gives attention to the computational efficiency of algorithms and the application of nonlinear techniques to linear programming; e.g., interior-point methods. Introduces methods of numerical linear algebra as needed.

**[OR&IE 434(4300) Optimization Modeling**

Spring, 3 credits. Prerequisite: at least B- in OR&IE 321/521. Not offered 2006-2007.

Emphasizes modeling complicated decision problems as linear programs, integer programs, or highly structured nonlinear programs. Besides modeling, students are

required to assimilate articles from the professional literature and to master relevant software.]

**OR&IE 435(4350) Introduction to Game Theory**

Fall. 4 credits.

Broad survey of the mathematical theory of games, including such topics as two-person matrix and bimatrix games; cooperative and noncooperative n-person games; and games in extensive, normal, and characteristic function form. Economic market games. Applications to weighted voting and cost allocation.

**[OR&IE 436(4360) A Mathematical Examination of Fair Representation]**

Spring. 3 credits. Prerequisite: MATH 222 or 294 or permission of instructor. Not offered 2006–2007.

Covers the mathematical aspects of the political problem of fair apportionment. The most recognizable form (in the United States) of apportionment is the determination of the number of seats in the U.S. House of Representatives awarded to each state. The constitution indicates that the apportionment should reflect the relative populations, but it does not prescribe a specific method. Indivisibility of seats leads us to interesting mathematical questions and a long, rich, and fractious political history involving many famous figures. The basic ideas extend beyond apportionment of legislatures (in both federal systems and proportional representation systems) to other realms where indivisible resources are to be allocated among competing constituencies.]

**OR&IE 451(4150) Economic Analysis of Engineering Systems**

Spring. 4 credits. Prerequisites: OR&IE 320 and 350.

Topics include financial planning, including cash-flow analysis and inventory flow models; engineering economic analysis, including discounted cash flows and taxation effects; application of optimization techniques, as in equipment replacement or capacity expansion models, and issues in designing manufacturing systems. Includes a student group project.

**OR&IE 452(4152) Entrepreneurship for Engineers (also M&AE/ENGRG 461[4610])**

Fall. 3 credits. Prerequisite: upper-class engineers or permission of instructor.

For description see M&AE 461.

**OR&IE 453(4154) Revenue Management**

Fall. 3 credits. Prerequisites: OR&IE 320 and 360, or permission of instructor.

Covers revenue management concepts, models used in practice, and possible extensions; forecasting techniques, including time series methods, booking curves, and customer preference models; demand uncensoring; overbooking and optimization with emphasis on stochastic models of demand, benefit measurement; computational and technological issues; bid-prices and dynamic programming techniques; examples from the airlines, hotels, car-rental agencies, restaurants, and other industries.

**[OR&IE 462(4520) Introductory Engineering Stochastic Processes II]**

Spring. 4 credits. Prerequisite: OR&IE 361 or equivalent. Not offered 2006–2007.

Topics include stationary processes, martingales, random walks, and gambler's ruin problems, processes with stationary

independent increments, Brownian motion and other cases, branching processes, renewal and Markov-renewal processes, reliability theory, Markov decision processes, optimal stopping, statistical inference from stochastic models, and stochastic comparison methods for probability models. Applications to population growth, spread of epidemics, and other models.]

**[OR&IE 464(4540) Extreme Value Analysis with Applications to Finance and Data Communications]**

Spring. 3 credits. Prerequisites: undergraduate and M.Eng. students; stochastic processes course at level of OR&IE 361; statistics course. Not offered 2006–2007.

Covers the basic models of extreme events used in hydrology, finance, insurance, environmental science (pollution controls), reliability, risk management. The course material intersects the related field of heavy tailed modeling and the implications of heavy tails in insurance and data networks.]

**OR&IE 473(4630) Operations Research Tools for Financial Engineering.**

Spring. 3 credits. Prerequisites: engineering math through MATH 294 and ENGRD 270 and OR&IE 360. No previous knowledge of finance required.

Introduction to the applications of OR techniques, e.g., probability, statistics, and optimization, to finance and financial engineering. First reviews probability and statistics and then surveys assets returns, ARIMA time series models, portfolio selection, regression, CAPM, option pricing, GARCH models, fixed-income securities, resampling techniques, and behavioral finance. Also covers the use of MATLAB, MINITAB, and SAS for computation.

**OR&IE 474(4740) Statistical Data Mining I**

Fall. 4 credits. Prerequisites: OR&IE 360 and MATH 294 or equivalent; or permission of instructor.

Examines the statistical aspects of data mining, the effective analysis of large data sets. The first half of the course covers the process of building and interpreting statistical models in a variety of settings including multiple regression and logistic regression. The second half connects these ideas to techniques being developed to handle the large data sets that are now routinely encountered in scientific and business applications. Assignments are done using one or more statistical computing packages.

**[OR&IE 476(4710) Applied Linear Statistical Models]**

Spring, weeks 1–7. 2 credits. Prerequisite: ENGRD 270. Not offered 2006–2007.

Topics include multiple linear regression, diagnostics, model selection, inference, one and two factor analysis of variance. Theory and applications both treated. Use of MINITAB stressed.]

**OR&IE 480(4800) Information Technology**

Fall. 4 credits. Pre- or corequisites: COM S/ENGRD 211, plus either OR&IE 311 or 312.

This course covers a variety of fundamental aspects of information technology. Topics may include: information transmission, storage, encryption and security; the value of information and the economics of information goods; databases, the Internet, World Wide Web, wireless and cellular networks, and peer-to-peer networks.

**OR&IE 481(4810) Delivering OR Solutions with Information Technology**

Spring. 3 credits. Prerequisite: OR&IE 480. Study of ways information technology is used to deliver operations research methodology in real applications, including decision support systems, embedded operations research techniques, packaged software, and web-based techniques. Several actual applications are investigated. Labs introduce Visual Basic for Applications (VBA) for decision support.

**[OR&IE 483(4850) Applications of Operations Research and Game Theory to Information Technology]**

Spring. 3 credits. Prerequisites: OR&IE 321, 361, or permission of instructor. Not offered 2006–2007.

Covers a variety of operations research and game theoretic problems arising in information technology. Examples include web searching, network routing and congestion control, online auctions, and trust and reputations in electronic interactions.]

**OR&IE 490(4990) Teaching in OR&IE**

Fall, spring. Variable credit. Prerequisite: permission of instructor.

Involves working as a TA in an OR&IE course. The instructor assigns credits (the guideline is 1 credit per four hours per week of work with a limit of 3 credits).

**OR&IE 499(4999) OR&IE Project**

Fall, spring. Variable credit. Prerequisite: permission of instructor.

Project-type work, under faculty supervision, on a real problem existing in some firm or institution. Opportunities in the course may be discussed with the associate director.

**OR&IE 512(5140) Applied Systems Engineering (also CEE/CIS 504[5040], ECE 512[5120], M&AE 591[5910])**

Fall. 3 credits. Prerequisite: permission of instructor.

For description, see SYSEN 510.

**OR&IE 513(5142) Systems Analysis Architecture, Behavior, and Optimization (also CEE/CIS 505[5050], ECE 513[5130], M&AE 592[5920])**

Spring. 3 credits. Prerequisite: CEE/CIS 504, ECE/OR&IE 512, or M&AE 592.

For description, see SYSEN 520.

**OR&IE 515(5100) Design of Manufacturing Systems**

Fall. 4 credits. Prerequisite: graduate students in engineering and business school; permission of instructor.

For description, see OR&IE 416.

**OR&IE 516(5110) Case Studies**

Fall. 1 credit. Prerequisite: M.Eng. students in OR&IE.

Presents students with an unstructured problem that resembles a real-world situation. Students work in project groups to formulate mathematical models, perform computer analyses of the data and models, and present oral and written reports.

**OR&IE 518(5126) Supply Chain Management**

Spring. 3 credits. Prerequisites: one of the following: OR&IE 312, 416, or 562.

A supply chain is the scope of activities that convert raw materials (e.g., wheat) to finished products delivered to the end consumer (e.g., a box of cereal at the local P&C), usually spanning several corporations. Supply chain management focuses on the flow of products, information, and money through the supply chain. An overview of issues, opportunities, tools, and approaches. Emphasis is on business processes, system dynamics, control, design, re-engineering. Covers the relationship between the supply chain and the company's strategic position relative to its clients and its competition. Considers dimensions of inter-corporate relationships with partners, including decision-making, incentives, and risk.

**OR&IE 519(5130) Service System Modeling and Design**

Spring. 3 credits. Prerequisites: OR&IE 320, 321, 360 361; ability to program simple algorithms in some appropriate environment (e.g., VisualBasic or MATLAB). Recommended: OR&IE 580. No instruction in programming given.

Today's economy is dominated by service industries. These systems differ from manufacturing industries in many ways, but primarily in the level of interaction with the customer. Examples of service systems include contact centers (aka call centers), airlines, and hospitals. This course covers various techniques that are useful in the analysis and design of such systems. It is structured around a number of cases that drive the need for the theory. The emphasis is on modeling and solving the models. Both operational and strategic decisions are covered through appropriate examples.

**OR&IE 520(5300) Operations Research I: Optimization I**

For description, see OR&IE 320.

**OR&IE 521(5310) Optimization II**

For description, see OR&IE 321.

**OR&IE 522(5311) Operations Research I: Topics in Linear Optimization**

Spring. 1 credit. Pre- or corequisite: M.Eng. students in OR&IE; OR&IE 520. Not open to students who have already taken OR&IE 321 or 521.

Extension of OR&IE 520 that deals with applications and methodologies of dynamic programming, integer programming, and large-scale linear programming.

**OR&IE 523(5510) Operations Research II: Introduction to Stochastic Processes I**

For description, see OR&IE 361.

**[OR&IE 525(5120) Production Planning and Scheduling Theory and Practice**

Fall. 4 credits. Corequisites: OR&IE 320, 360. Not offered 2006-2007.

Topics include production planning, including MRP, linear programming, and related concepts. Scheduling and sequencing work in manufacturing systems. Job release strategies and control of work in process inventories. Focus is on setup time as a determinant of plans and schedules.]

**OR&IE 528-529(5190-5191) Selected Topics in Applied Operations Research**

Fall, spring. Variable credit. Prerequisite: permission of instructor.

Current topics dealing with applications of operations research.

**OR&IE 533(5340) Heuristic Methods for Optimization (also CEE 509[5090], COM S/CIS 572[5720])**

Fall. 3 or 4 credits. Prerequisite: graduate standing or COM S/ENGRD 211, 321 or CEE/ENGRD 241 or permission of instructors.

For description, see CEE 509.

**OR&IE 551(5150) Economic Analysis of Engineering Systems**

Spring. 4 credits. Prerequisites: OR&IE 320 and 350. Lectures concurrent with OR&IE 451.

For description, see OR&IE 451.

**OR&IE 559(5630) Computational Methods in Finance**

Spring. 3 credits. Prerequisite: OR&IE M.Eng. students.

This course covers computational techniques such as binomial trees, solution of PDEs, and Monte Carlo simulation for pricing financial instruments such as European and American options, path-dependent options, and bonds. Other computational topics such as delta and gamma hedging, Value at Risk, and portfolio problems will also be covered. The emphasis will be on implementation.

**OR&IE 560(5500) Engineering Probability and Statistics II**

For description, see OR&IE 360.

**OR&IE 561(5560) Queueing Systems: Theory and Applications**

Fall. 3 credits. Prerequisite: OR&IE 361 or permission of instructor.

Covers basic queueing models; delay and loss systems; finite source, finite capacity, balking, reneging; systems in series and in parallel; FCFS versus LCFS; busy period problems; output; design and control problems; priority systems; queueing networks; the product formula; time sharing; server vacations; and applications to equipment maintenance, computer operations and flexible manufacturing systems.

**[OR&IE 562(5122) Inventory Management**

Fall. 3 credits. Prerequisite: OR&IE 321, 361, or permission of instructor. Not offered 2006-2007.

The first portion of this course is devoted to the analysis of several deterministic and probabilistic models for the control of single and multiple items at one of many locations. The second portion is presented in an experiential learning format. The focus is on analyzing and designing an integrated production and distribution system for a global company. Applications are stressed throughout.]

**OR&IE 563(5550) Applied Time-Series Analysis**

Fall. 3 credits. Prerequisites: OR&IE 361 and ENGRD 270 or permission of instructor.

The first part of this course treats regression methods to model seasonal and nonseasonal data. After that, Box-Jenkins models, which are versatile, widely used, and applicable to nonstationary and seasonal time series,

are covered in detail. The various stages of model identification, estimation, diagnostic checking, and forecasting are treated. Analysis of real data is carried out. Assignments require computer work with a time-series package.

**[OR&IE 564(5520) Introductory Engineering Stochastic Processes II**

Spring. 4 credits. Prerequisite: OR&IE 361 or equivalent.

Lectures concurrent with OR&IE 462. For description, see OR&IE 462.]

**OR&IE 565(5960) Applied Financial Engineering**

Spring. 4 credits. Project satisfies M.Eng. project requirement. Prerequisite: M.Eng. students.

This course has two components: a sequence of lectures and a project. The lectures are given by the faculty for the course and by invited speakers from the financial industry.

**[OR&IE 566(5540) Extreme Value Analysis with Applications to Finance and Data Communications**

Spring. 3 credits.

For description, see OR&IE 464.]

**OR&IE 567(5620) Credit Risk: Modeling, Valuation, and Management**

Spring. 4 credits. Prerequisite: OR&IE 361.

Credit risk refers to losses due to changes in the credit quality of a counter party in a financial contract. This course is an introduction to the modeling and valuation of credit risks. Emphasis is on credit derivative instruments used for hedging credit risks, including credit swaps, spread options, and collateralized debt obligations.

**OR&IE 568(5600) Financial Engineering with Stochastic Calculus I**

Fall. 4 credits. Prerequisite: knowledge of probability at level of OR&IE 360.

Introduction to continuous-time models of financial engineering and the mathematical tools required to use them, starting with the Black-Scholes model. Driven by the problem of derivative security pricing and hedging in this model, the course develops a practical knowledge of stochastic calculus from an elementary standpoint, covering topics including Brownian motion, martingales, the Ito formula, the Feynman-Kac formula, and Girsanov transformations.

**[OR&IE 569(5610) Financial Engineering with Stochastic Calculus II**

Spring. 4 credits. Prerequisite: OR&IE 568. Not offered 2006-2007.

Building on the foundation established in OR&IE 568, this course presents no-arbitrage theories of complete markets, including models for equities, foreign exchange, and fixed-income securities, in relation to the main problems of financial engineering: pricing and hedging of derivative securities, portfolio optimization, and risk management. Other topics include model calibration and incomplete markets.]

**[OR&IE 575(4711) Experimental Design**

Spring; weeks 8-14 (alternates with 576). 2 credits. Prerequisite: OR&IE 476. Not offered 2006-2007.

Covers randomization, blocking, sample size determination, factorial designs, 2<sup>p</sup> full and fractional factorials, response surfaces, Latin squares, split plots, and Taguchi designs. Engineering applications. Computing in MINITAB or SAS.]

**[OR&IE 576(4712) Regression]**

Spring; weeks 8–14 (alternates with 575).  
2 credits. Prerequisite: OR&IE 476. Not  
offered 2006–2007.

Covers nonlinear regression, advanced  
diagnostics for multiple linear regression,  
collinearity, ridge regression, logistic  
regression, nonparametric estimation including  
spline and kernel methods, and regression  
with correlated errors. Computing in MINITAB  
or SAS.]

**[OR&IE 577(5770) Quality Control]**

Fall. 3 credits. Prerequisite: ENGRD 270.  
Not offered 2006–2007.

Covers concepts and methods for process and  
acceptance control; control charts for variables  
and attributes; process capability analysis;  
acceptance sampling; continuous sampling  
plans; life tests; and use of experimental  
design and Taguchi methods for off-line  
control.]

**[OR&IE 580(4580) Simulation Modeling  
and Analysis]**

Fall. 4 credits. Prerequisite: OR&IE  
360 (may be taken concurrently) and  
computing experience, or permission of  
instructor.

Introduction to Monte Carlo and discrete-  
event simulation. Emphasizes tools and  
techniques needed in practice. Random  
variate generation, input and output analysis,  
modeling using a discrete-event simulation  
package.

**[OR&IE 597(5940) Systems Engineering  
Project]**

Fall; R grade only; spring, 8 credits.  
Prerequisite: M.Eng. students enrolled in  
systems engineering option.

Substantial, group-based design project that  
has a strong systems design component.  
The project must be approved by an ASE  
1 instructor before the student enrolls in  
the course. (The following projects are pre-  
approved: FSAE, HEV, Robocup, Brain.) A  
formal report is required.

**[OR&IE 598(5910) Master of Engineering  
Manufacturing Project]**

Fall, R grade only; spring, 5 credits.  
Prerequisite: M.Eng. students enrolled in  
manufacturing option.

Project course coordinated by Center for  
Manufacturing Enterprise.

**[OR&IE 599(5980) Project]**

Fall, R grade only; spring, 5 credits.  
Prerequisite: M.Eng. students.

Identification, analysis, design, and evaluation  
of feasible solutions to some applied problem  
in the OR&IE field. A formal report and oral  
defense of the approach and solution are  
required.

**[OR&IE 625(6335) Scheduling Theory]**

Fall. 3 credits. Not offered 2006–2007.

Scheduling and sequencing problems,  
including single-machine problems, parallel-  
machine scheduling, and shop scheduling.  
The emphasis is on the design and analysis  
of polynomial time optimization and  
approximation algorithms and on related  
complexity issues.]

**[OR&IE 626(6122) Advanced Production  
and Inventory Planning]**

Spring. 4 credits. Not offered 2006–2007.

Introduction to a variety of production  
and inventory control planning problems,  
the development of mathematical models

corresponding to these problems, and a study  
of approaches for finding solutions.]

**[OR&IE 627(6127) Computational Issues  
in Large Scale Data-Driven Models]**

Fall. 3 credits. Pre- or corequisites: OR&IE  
630, 650 and 670. Not offered 2006–2007.

Availability of massive datasets such as web  
logs and point-of-sale transactions raises  
new modeling and computational issues.  
This course provides an introduction to this  
emerging research area. Topics include data-  
driven models in operation management,  
asymptotic statistics, uniform convergence of  
empirical process, and efficient computational  
methods. There is discussion of applications  
in engineering, economics, and marketing,  
along with current open research problems.]

**[OR&IE 629(6350) Foundations of Game  
Theory and Mechanism Design for  
Engineering Applications]**

Spring. 3 credits. Prerequisite: basic  
knowledge of operations research at  
level of OR&IE 630 and 650. No prior  
knowledge of game theory or computer  
networks assumed. Not offered 2006–2007.

Provides a rigorous foundation for the  
applications of mechanism design and game  
theory to problems in engineering such as  
data networks and computer science. The goal  
is to develop a deep understanding of the  
fundamental issues that are important in many  
applications while presenting many current  
open research problems.]

**[OR&IE 630(6300) Mathematical  
Programming I]**

Fall. 4 credits. Prerequisites: advanced  
calculus and elementary linear algebra.

Rigorous treatment of the theory and  
computational techniques of linear  
programming and its extensions, including  
formulation, duality theory, algorithms;  
sensitivity analysis; network flow problems  
and algorithms; theory of polyhedral  
convex sets, systems of linear equations and  
inequalities, Farkas' Lemma; and exploiting  
special structure in the simplex method and  
computational implementation.

**[OR&IE 631(6310) Mathematical  
Programming II]**

Spring. 4 credits. Prerequisite: OR&IE 630.  
Not offered 2006–2007.

Continuation of OR&IE 630. Introduces  
nonlinear programming, interior-point  
methods for linear programming, complexity  
theory, and integer programming. Includes  
some discussion of dynamic programming and  
elementary polyhedral theory.]

**[OR&IE 632(6320) Nonlinear Programming]**

Spring. 3 credits. Prerequisite: OR&IE 630.

Necessary and sufficient conditions for  
unconstrained and constrained optima. Topics  
include the duality theory, computational  
methods for unconstrained problems (e.g.,  
quasi-Newton algorithms), linearly constrained  
problems (e.g., active set methods), and  
nonlinearly constrained problems (e.g.,  
successive quadratic programming, penalty,  
and barrier methods).

**[OR&IE 633(6330) Graph Theory and  
Network Flows]**

Spring. 3 credits. Prerequisite: permission  
of instructor. Not offered 2006–2007.

Topics include directed and undirected  
graphs; bipartite graphs; Hamilton cycles  
and Euler tours; connectedness, matching,  
and coloring; flows in capacity-constrained

networks; and maximum flow and minimum  
cost flow problems.]

**[OR&IE 634(6334) Combinatorial  
Optimization]**

Fall. 3 credits.

Topics in combinatorics, graphs, and  
networks, including matching, matroids,  
polyhedral combinatorics, and optimization  
algorithms.

**[OR&IE 635(6325) Interior-Point Methods  
for Mathematical Programming]**

Fall. 3 credits. Prerequisites: MATH  
411 and OR&IE 630, or permission of  
instructor. Not offered 2006–2007.

Interior-point methods for linear, quadratic,  
and semidefinite programming and, more  
generally, for convex programming. Discusses  
the basic ingredients—barrier functions,  
central paths, and potential functions—that  
go into the construction of polynomial-time  
algorithms and various ways of combining  
them. Emphasizes recent mathematical theory  
and the most modern viewpoints.]

**[OR&IE 636(6336) Integer Programming]**

Fall. 3 credits. Prerequisite: OR&IE 630.  
Not offered 2006–2007.

Topics include discrete optimization; linear  
programming in which the variables must  
assume integral values; theory, algorithms,  
and applications; and cutting-plane and  
enumerative methods, with additional topics  
drawn from recent research in this area.]

**[OR&IE 637(6327) Semidefinite  
Programming]**

Spring. 2 credits. Pre- or corequisite:  
OR&IE 635. Not offered 2006–2007.

Covers linear optimization over the cone of  
positive semidefinite symmetric matrices;  
applications to control theory, eigenvalue  
optimization, and strong relaxations of  
combinatorial optimization problems; duality;  
computational methods, particularly interior-  
point algorithms.]

**[OR&IE 639(6328) Convex Analysis]**

Spring. 3 credits. Prerequisite: OR&IE 630  
or permission of instructor. Not offered  
2006–2007.

Self-contained development of convex analysis  
and optimization. Convex sets and functions,  
subgradients, continuity, Fenchel, conic, and  
Lagrangian duality. Nonsmooth analysis:  
Clarke and limiting subgradients. Self-  
concordance and smooth convex optimization.  
Bundle methods for nonsmooth convex  
optimization.]

**[OR&IE 650(6500) Applied Stochastic  
Processes]**

Fall. 4 credits. Prerequisite: one-semester  
calculus-based probability course.

Introduction to stochastic processes that  
presents the basic theory together with a  
variety of applications. Topics include Markov  
processes, renewal theory, random walks,  
branching processes, Brownian motion,  
stationary processes, martingales, and point  
processes.

**[OR&IE 651(6510) Probability]**

Spring. 4 credits. Prerequisite: real analysis  
at level of MATH 413; one-semester  
calculus-based probability course.

Covers sample spaces, events, sigma  
fields, probability measures, set induction,  
independence, random variables, expectation,  
review of important distributions and  
transformation techniques, convergence



concepts, laws of large numbers and asymptotic normality, and conditioning.

**OR&IE 662(6540) Advanced Stochastic Processes**

Fall. 3 credits. Prerequisite: OR&IE 651 or equivalent.

Topics include Brownian motion, martingales, Markov processes, and topics selected from: diffusions, stationary processes, point processes, weak convergence for stochastic processes and applications to diffusion approximations, Lévy processes, regenerative phenomena, random walks, and stochastic integrals.

**[OR&IE 665(6560) Storage and Data Communication Models**

Fall. 3 credits. Not offered 2006-2007.

Covers a selection of topics including queues, storage, insurance risk, dams, and data communication. The basic assumptions of the underlying models are discussed with emphasis on their common features. The overall objective is the study of the stochastic processes that arise from these models. The approach is based on the fluctuation theory of random walks, Lévy processes, and Markov-additive processes. Further topics for discussion include stochastic comparisons and statistical inference from the models with particular emphasis on data communication models. Current research on network models with discrete and fluid inputs is discussed.]

**OR&IE 670(6700) Statistical Principles**

Fall. 4 credits. Corequisite: OR&IE 650 or equivalent.

Topics include review of distribution theory of special interest in statistics: normal, chi-square, binomial, Poisson,  $t$ , and  $F$ ; introduction to statistical decision theory; sufficient statistics; theory of minimum variance unbiased point estimation; maximum likelihood and Bayes estimation; basic principles of hypothesis testing, including Neyman-Pearson Lemma and likelihood ratio principle; confidence interval construction; and introduction to linear models.

**OR&IE 671(6710) Intermediate Applied Statistics**

Spring. 3 credits. Prerequisite: OR&IE 670 or equivalent.

Topics include statistical inference based on the general linear model; least-squares estimators and their optimality properties; likelihood ratio tests and corresponding confidence regions; and simultaneous inference. Applications in regression analysis and ANOVA models. Covers variance components and mixed models. Use of the computer as a tool for statistics is stressed.

**[OR&IE 673(6630) Empirical and Computational Issues in Finance**

Spring. 3 credits. Prerequisites: stochastic processes course at level of OR&IE 650; statistics course at level of OR&IE 670, or permission of instructor. Not offered 2006-2007.

Designed to introduce students to existing empirical work in finance and to demonstrate the use of statistical, econometric, and numerical methods in the analysis of financial data. Topics include linear and nonlinear time series analysis, high-frequency data and market microstructure, continuous-time models, extreme values and quantile estimation, volatility models, and MCMC methods. Numerous applications using market

data are presented. MATLAB programming skills are useful.]

**OR&IE 674(6740) Statistical Learning Theory for Data Mining**

Fall. 3 credits. Prerequisites: probability course at level of OR&IE 651; statistics course at level of OR&IE 670.

Provides a thorough grounding in probabilistic and computational methods for statistical data mining. Covers a subset of the following topics from supervised and unsupervised data mining: the framework of learning. Performance measures and model selection. Methodology, theoretical properties and computing algorithms used in parametric and nonparametric methods for regression and classification. Frequentist and Bayesian methods.

**[OR&IE 677(6720) Sequential Methods in Statistics**

Spring. 3 credits. S-U grades only. Not offered 2006-2007.

The statistical theory of sequential design and analysis of experiments has many applications; including monitoring data from clinical trials in medical studies and quality control in manufacturing operations. This course covers classical sequential hypothesis tests, Wald's SPRT, stopping rules, Kiefer-Weiss test, optimality, group sequential methods, estimation, repeated confidence intervals, stochastic curtailment, adaptive designs, and Bayesian and decision theoretic approaches.]

**[OR&IE 678(6780) Bayesian Statistics and Data Analysis**

Spring. 3 credits. Prerequisites: OR&IE 670 and some knowledge of measure theoretic probability (e.g., co-registration in OR&IE 650). Not offered 2006-2007.

Priors, posteriors, Bayes estimators, Bayes factors, credible regions, hierarchical models, computational methods (especially MCMC), empirical Bayes methods, Bayesian robustness. Includes data analysis and MCMC computation in WinBUGS and possibly other languages such as MATLAB.]

**[OR&IE 680(6580) Simulation**

Fall. 4 credits. Prerequisite: computing experience and OR&IE 650 or equivalent, or permission of instructor. Not offered 2006-2007.

Introduction to Monte Carlo and discrete-event simulation. Emphasizes underlying theory. Random variate generation, input and output analysis, variance reduction, selection of current research topics.]

**OR&IE 728-729(7190-7191) Selected Topics in Applied Operations Research**

Fall, spring. Credit TBA.

Current research topics dealing with applications of operations research.

**OR&IE 738-739(7390-7391) Selected Topics in Mathematical Programming**

Fall, spring. Credit TBA.

Current research topics in mathematical programming.

**OR&IE 768-769(7590-7591) Selected Topics in Applied Probability**

Fall, spring. Credit TBA.

Topics are chosen from current literature and research areas of the staff.

**OR&IE 778-779(7790-7791) Selected Topics in Applied Statistics**

Fall, spring. Credit TBA.

Topics are chosen from current literature and research of the staff.

**OR&IE 790(7900) Special Investigations**

Fall, spring. Credit TBA.

For individuals or small groups. Study of special topics or problems.

**OR&IE 799(9999) Thesis Research**

Fall, spring. Credit TBA.

For individuals doing thesis research for master's or doctoral degrees.

**OR&IE 891(9000) Operations Research Graduate Colloquium**

Fall, spring. 1 credit.

Weekly one and one-half hour meeting devoted to presentations by distinguished visitors, by faculty members, and by advanced graduate students on topics of current research in the field of operations research.

**OR&IE 893-894(9100-9101) Enterprise Engineering Colloquium (also M&AE 594[5940])**

893, fall; 894, spring. 1 credit each semester. S-U grades.

Weekly meeting for master of engineering students. Discussion with industry speakers and faculty members on the uses of engineering in the economic design, manufacturing, marketing, and distribution and goods and services.

## SYSTEMS ENGINEERING

P. L. Jackson, director; A. R. George, assoc. director; L. K. Nozick, director of graduate studies; M. Campbell, R. D'Andrea, R. A. Davidson, E. Garcia, H. O. Gao, A. S. Lewis, J. A. Muckstadt, A. F. Myers, M. Peck, R. O. Roundy, F. B. Schneider, B. Selman, C. A. Shoemaker, J. R. Stedinger, R. J. Thomas, H. Topaloglu, M. A. Turnquist

**SYSEN 510(5100) Applied Systems Engineering (also CEE/COM S 504[5040], ECE/OR&IE 512[5120], M&AE 591[5910])**

Fall. 3 credits. Prerequisites: senior or graduate standing in an engineering field; concurrent or recent (past two years) enrollment in group-based project with strong system design component approved by course instructor. A. R. George, M. Peck, and R. Roundy.

Fundamental ideas of systems engineering, and their application to design and development of various types of engineered systems. Defining system requirements, creating effective project teams, mathematical tools for system analysis and control, testing and evaluation, economic considerations, and the system life cycle. Students majoring in Systems Engineering enroll in SYSEN 510. Students taking the Option in Systems Engineering enroll in CEE/COM S 504, ECE/OR&IE 512, or M&AE 591. Students in Continuing Education enroll in SYSEN 511. Lectures are identical for all versions.

**SYSEN 511(5110) Applied Systems Engineering**

Fall. 3 credits. Intended for off-campus students. Prerequisites: senior or graduate standing in engineering field; concurrent or recent (past two years) enrollment in group-based project with strong system design component approved by course instructor. Staff.

For description, see SYSEN 510.



**SYSEN 520(5200) Systems Architecture, Behavior, and Optimization (M&AE 592[5920], CEE/CIS 505[5050], ECE 513[5130], OR&IE 513[5142])**

Spring. 3 credits. Prerequisite: Applied System Engineering M&AE 591, CEE/CIS 504, ECE/OR&IE 512, SYSEN 520 or 521, or permission of instructor.

This is an advanced course in the application of the systems engineering process to the architecture design and operation of complex systems. Topics include techniques for design, simulation, optimization, and control of complex systems. Case studies and system simulations in diverse areas provide context for the application of these techniques.

Students majoring in Systems Engineering enroll in SYSEN 520. Students taking the Option in Systems Engineering enroll in M&AE 592, CEE 505, CIS 505, ECE 513, or OR&IE 513. Students in Continuing Education enroll in SYSEN 521. Lectures are identical for all versions.

**SYSEN 521(5210) Systems Analysis Architecture, Behavior, and Optimization**

Spring. 3 credits. Intended for off-campus students. Prerequisites: Applied Systems Engineering or permission of instructor. Staff.

For description, see SYSEN 520.

**SYSEN 530(5300) Systems Engineering For the Design and Operation of Reliable Systems (M&AE 593[5930])**

Spring. 3 credits. Prerequisites: SYSEN 510 and either OR&IE 270 or CEE 304 or permission of instructors. L. K. Nozick and H. O. Gao.

Develops skills in the design, operation and control of systems for reliable performance. Focuses on four key themes; risk analysis (with a particular emphasis on risk assessment and risk characterization), modeling system reliability (including the development of statistical models based on accelerated life testing), quality control techniques and the optimization of system design for reliability.

**SYSEN 570(5700) Special Topics in Systems Engineering**

On demand. 1–4 credits. Staff.

Supervised study by individuals or small groups of one or more specialized topics not covered in regular courses.

**SYSEN 571(5710) Practicum in Systems Engineering**

On demand. 3 credits. Staff.

Supervised study by individuals or small groups of one or more specialized topics not covered in regular courses.

**SYSEN 590(5900) Systems Engineering Design Project**

Fall. 6–8 credits. Prerequisite: permission of instructor. Staff.

A design project that incorporates the principles of systems engineering for a complex system. Projects are performed by teams of students working together to meet the requirements of the project.

**SYSEN 680(6800) Topics in Systems Engineering Research**

Spring. 1.5 credits. Staff.

Advanced topics in systems engineering research.

**THEORETICAL AND APPLIED MECHANICS**

T. J. Healey, chair; J. A. Burns, K. B. Cady, J. M. Guckenheimer, C. Y. Hui, J. T. Jenkins, S. Mukherjee, S. L. Phoenix, R. H. Rand, A. L. Ruina, W. H. Sachse, S. Strogatz, Z. J. Wang, A. Zehnder. Emeritus: H. D. Conway, E. Cranch, R. H. Lance.

**Basics in Engineering Mathematics and Mechanics****[T&AM 118(1180) Design Integration: DVDs and iPods (also ENGR 118(1180))]**

Spring. 3 credits. Not offered 2006–2007. Course in Introduction to Engineering series. For description, see ENGR 118.]

**T&AM 202(2020) Mechanics of Solids (also ENGR 202(2020))**

Fall, spring. 4 credits. Prerequisite: PHYS 112, co-registration in MATH 192, or permission of instructor. For description, see ENGR 202.

**T&AM 203(2030) Dynamics (also ENGR 203(2030))**

Fall, spring. 3 credits. Prerequisite: T&AM 202, co-registration in MATH 293, or permission of instructor. For description, see ENGR 203.

**Engineering Mathematics****T&AM 191(1910) Calculus for Engineers (also MATH 191(1910))**

Fall. 4 credits. Prerequisite: three years high school mathematics, including trigonometry. For description, see MATH 191.

**T&AM 192(1920) Calculus for Engineers (also MATH 192(1920))**

Fall, spring, or summer. 4 credits. Corequisite: MATH/T&AM 191. For description, see MATH 192.

**T&AM 293(2930) Engineering Mathematics (also MATH 293(2930))**

Fall, spring. 4 credits. Prerequisite: MATH/T&AM 192 plus knowledge of computer programming equivalent to that taught in COM S 100.

For description, see MATH 293.

**T&AM 294(2940) Engineering Mathematics (also MATH 294(2940))**

Fall, spring. 4 credits. Prerequisite: MATH/T&AM 293.

For description, see MATH 294.

**T&AM 310(3100) Introduction to Applied Mathematics I**

Fall, spring. 3 credits. Prerequisites: MATH/T&AM 293 and 294.

Covers initial value, boundary value, and eigenvalue problems in linear ordinary differential equations. Also covers special functions, linear partial differential equations. This is an introduction to probability and statistics. Use of computers to solve problems is emphasized.

**[T&AM 311(511) Introduction to Applied Mathematics II]**

Spring. 3 credits. Prerequisite: MATH/T&AM 294 or equivalent (T&AM 311 can be taken independently of T&AM 310). Not offered 2006–2007; next offered 2007–2008. Introduction to complex variable theory, including Cauchy's integral theorem, Method of

Residues, conformal mapping. Applications to inversion of transforms.]

**[T&AM 312(512)(3120/5120) Introduction to Mathematical Modeling]**

Spring. 3 credits. Prerequisite: MATH/T&AM 294 or equivalent (T&AM 311 can be taken independently of 310). Next offered 2007–2008.

Mathematical modeling of physical and biological systems.]

**T&AM 610(6100) Methods of Applied Mathematics I**

Fall. 3 credits. Intended for beginning graduate students in engineering and science. Intensive course requiring more time than normally available to undergraduates (see T&AM 310–311) but open to exceptional undergraduates by permission of instructor.

Emphasis is on applications. Course covers linear algebra, calculus of several variables, vector analysis, series, ordinary differential equations, and complex variables.

**T&AM 611(6110) Methods of Applied Mathematics II**

Spring. 3 credits. Prerequisite: T&AM 610 or equivalent.

Emphasis is on applications. Course covers partial differential equations, transform techniques, tensor analysis, and calculus of variations.

**[T&AM 612(6120) Methods of Applied Mathematics III]**

Spring. 3 credits. Prerequisite: T&AM 610 and 611 or equivalent. Not offered 2006–2007.

Course topics include: integral transform, methods, Wiener-Hopf technique, solutions of integral equations and partial differential equations.]

**T&AM 613(6130) Asymptotics and Perturbation Methods**

Spring. 3 credits. Prerequisites: T&AM 610 and 611 or equivalent.

Topics include asymptotic behavior of solutions of linear and nonlinear ODE (e.g., the WKB boundary layer and multiple-scale methods) and asymptotic expansion of integrals (method of steepest descent, stationary phase, and Laplace methods). Also covers regular and singular perturbation methods for PDE (e.g., method of composite expansions). Other topics (depending on instructor) may include normal forms, center manifolds, Liapunov-Schmidt reducers, and Stokes phenomenon. The course may also include computer exercises at the option of the instructor.

**T&AM 617(6170) Advanced Mathematical Modeling—Biological and Fluid Dynamics**

Spring. 3 credits.

Covers the fundamentals of fluid dynamics that rises in biological fluid dynamics such as the motion of the microscopic cells in low Reynolds number flows and unsteady aerodynamics of flapping flight and free falling objects. The topics in fluid dynamics include Stokes flow, propulsion of a beating flagellum and swimming sheets, potential flow, unsteady airfoil theory, reduced model of unsteady forces on a fluttering and tumbling object, and computational methods. The current research in biofluids will be discussed in some depth.

**[T&AM 718(7180) Topics in Applied Mathematics]**

Spring. 3 credits. Not offered 2006-2007.]

**Continuum Mechanics****T&AM 455(4550) Introduction to Composite Materials (also CEE 477[4770], M&AE 455[4550], MS&E 555[5550])**

Fall. 3 credits. Prerequisite: ENGRD 202. Topics include introduction to composite materials; varieties and properties of fiber reinforcements and matrix materials; micromechanics of stiffness and stress transfer in discontinuous fiber/matrix arrays; orthotropic elasticity as applied to parallel fibers in a matrix and lamina; theory of stiffness (tension, bending, torsion) and failure of laminates and composite plates, including computer software for design; and manufacturing methods and applications for composites. There is a group component design and manufacturing paper required, and a group laboratory on laminated component fabrication.

**T&AM 591(5910) Master of Engineering Design Project I**

Fall. 3-12 credits, variable. M. Eng. (mechanics) project related to the master of engineering in mechanics.

**T&AM 592(5920) Master of Engineering Design Project II**

Spring. 3-12 credits, variable. M. Eng. (mechanics) project related to the master of engineering in mechanics.

**T&AM 655(6550) Advanced Composite Materials (also CEE 676[6760], M&AE/MS&E 655[6550])**

Spring. 4 credits. T&AM 455/555 not a prerequisite but excellent background. Topics center around micromechanical and statistical (reliability) aspects of the strength and fatigue of fibrous composites. Topics include Hedgepeth shear-lag models of stress transfer around arrays of fiber breaks; statistical theories of composite failure to forecast reliability; stress distributions around holes and cuts in composite laminates; and compressive strength of composites.

**T&AM 663(6630) Solid Mechanics I**

Fall. 4 credits. Rigorous introduction to solid mechanics emphasizing linear elasticity: tensors; deformations, rotations and strains; balance principles; stress; small-strain theory; linear elasticity, anisotropic and isotropic; basic theorems of elastostatics; and boundary-value problems, e.g., plates, St. Venant's solutions.

**T&AM 664(6640) Solid Mechanics II**

Spring. 4 credits. Prerequisites: MATH 610 and T&AM 663 or equivalent. Preparation for advanced courses in solid mechanics. Topics include singular solutions in linear elasticity; plane stress, plane strain, anti-plane shear, airy stress functions; linear viscoelasticity; cracks and dislocations; classical plasticity; thermoelasticity; and three-dimensional elasticity.

**T&AM 751(7510) Continuum Mechanics and Thermodynamics**

Spring. 3 credits. Prerequisites: T&AM 610 and 611; and 663 and 664 or equivalents. Course topics include kinematics; conservation laws; the entropy inequality; constitutive relations: frame indifference, material symmetry; and finite elasticity, rate-dependent

materials, and materials with internal state variables.

**[T&AM 752(7520) Nonlinear Elasticity]**

Spring. 3 credits. Prerequisites: T&AM 610, 611, and 751 or equivalents. Not offered 2006-2007.

Review of governing equations. Topics include linearization and stability; constitutive inequalities; exact solution of special problems.]

**[T&AM 753(7530) Fracture]**

Spring. 3 credits. Prerequisites: T&AM 610 or 611; and 663 and 664 or equivalents. Not offered 2006-2007.

Fundamentals of linear elastic fracture mechanics; K, small-scale yielding, solutions of elastic crack problems, energy concepts, J-integral.]

**[T&AM 754(7540) Topics in Continuum Mechanics]**

Spring. 3 credits. Not offered 2006-2007.]

**T&AM 757(7570) Inelasticity**

Spring. 3 credits. Plasticity: dislocations and slip systems; early experimental observations; torsion and bending of bars; inflation of thick cylinders and spheres; general equations governing yielding, flow and work hardening; solution of general boundary value problems; numerical solutions radial return and the consistent tangent operator. Linear viscoelasticity: simple rheological models; correspondence principle; hereditary integral approach; torsion and bending of bars; inflation of thick cylinders and spheres; solution of general quasi-static boundary value problems; thermoviscoelasticity, wave propagation.

**[T&AM 759(7590) Boundary Element Methods]**

Spring. 4 credits. Not offered 2006-2007. Topics include a variety of applications of the boundary element method. Examples are: potential theory, linear elasticity, elastoplasticity, micro and nano-electro-mechanical systems, meshfree boundary methods.]

**Dynamics and Space Mechanics****T&AM 570(5700) Intermediate Dynamics**

Fall. 3 credits. Topics include Newtonian mechanics; motion in rotating coordinate systems; introduction to analytical mechanics; virtual work, Lagrangian mechanics; Hamilton's principle; small vibration and stability theory. Newtonian-Eulerian mechanics of rigid bodies; and gyroscopes. As time allows, introduction to orbital mechanics and chaos may be offered.

**T&AM 578(5780) Nonlinear Dynamics and Chaos**

Spring. 3 credits. Prerequisite: MATH/ T&AM 293 or equivalent. Introduction to nonlinear dynamics, with applications to physics, engineering, biology, and chemistry. Emphasizes analytical methods, concrete examples, and geometric thinking. Topics include one-dimensional systems; bifurcations; phase plane; nonlinear oscillators; and Lorenz equations, chaos, strange attractors, fractals, iterated mappings, period doubling, renormalization.

**T&AM 671(6710) Hamiltonian Dynamics**

Spring. 3 credits. Prerequisite: T&AM 570 or equivalent.

Course topics include review of Lagrangian mechanics, Kanes equations; Hamilton's principle, the principle of least action, and related topics from the calculus of variations; Hamilton's canonical equations; approximate methods for two-degrees-of-freedom systems (Lie transforms); canonical transformations and Hamilton-Jacobi theory; KAM theory; and Melnikov's method.

**T&AM 672(6720) Celestial Mechanics (also ASTRO 579[6579])**

Spring. 3 credits. Course topics include description of orbits; 2-body, 3-body, and n-body; Hill curves, libration points and their stability; capture problems; osculating orbital elements perturbation equations; effects of gravitational potentials, atmospheric drag, and solar radiation forces on satellite orbits; and secular perturbations, resonances, mechanics of planetary rings.

**[T&AM 673(6730) Mechanics of the Solar System (also ASTRO 571[6570])]**

Spring. 3 credits. Prerequisite: advanced undergraduate course in dynamics. Not offered 2006-2007.

Course topics include gravitational potentials, planetary gravity fields; free and forced rotations; Chandler wobble, polar wander, and damping of nutation.]

**[T&AM 675(6750) Nonlinear Vibrations]**

Fall. 3 credits. Prerequisite: T&AM 578 or equivalent. Not offered 2006-2007. Quantitative analysis of weakly nonlinear systems in free and forced vibrations, perturbation methods, averaging method. Applications to problems in mechanics, physics, and biology.]

**[T&AM 768(7680) Elastic Waves in Solids]**

Fall. 3 credits. Not offered 2006-2007. Theory and equipment. Forward and Inverse Problems.]

**T&AM 776(7760) Applied Dynamical Systems (also MATH 717[7170])**

Spring. 4 credits. For description, see MATH 717.

**T&AM 796(7609) Mechanics of Terrestrial Locomotion**

Spring. 3 credits. Prerequisite: T&AM 570, M&AE 571, or A+ level understanding of any sophomore or above mechanics course.

The energetics and stability of people, other legged animals and robots are studied by mechanical analysis of simple models.

**Special Courses, Projects, and Thesis Research****T&AM 491-492(4910-4920) Project in Engineering Science**

491, fall; 492, spring. 1-4 credits TBA. Projects for undergraduates under the guidance of a faculty member.

**T&AM 796-800(7960-8000) Topics in Theoretical and Applied Mechanics**

Fall, spring. 1-3 credits TBA. Special lectures or seminars on subjects of current interest. Topics are announced when the course is offered.

**T&AM 890(8900) Master's Degree Research in Theoretical and Applied Mechanics**

Fall, spring. 1-15 credits TBA. S-U grades.

Thesis or independent research at the M.S. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

**T&AM 990(9900) Doctoral Research in Theoretical and Applied Mechanics**

Fall, spring. 1-15 credits TBA. S-U grades. Thesis or independent research at the Ph.D. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

## FACULTY ROSTER

Abel, John F., Ph.D., U. of California, Berkeley. Prof., Civil and Environmental Engineering, Emeritus

Ahner, Beth A., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Biological and Environmental Engineering

Albonesi, David H., Ph.D., U. of Massachusetts. Assoc. Prof., Electrical and Computer Engineering

Albright, Louis D., Ph.D., Cornell U. Prof., Biological and Environmental Engineering

Allmendinger, Richard, Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences

Allmon, Warren D., Ph.D., Harvard U. Adjunct Assoc. Prof., Earth and Atmospheric Sciences

Andronicos, Christopher L., Ph.D., Princeton U. Assoc. Prof., Earth and Atmospheric Sciences

Aneshansley, Daniel J., Ph.D., Cornell U. Prof., Biological and Environmental Engineering

Anton, A. Brad, Ph.D., California Inst. of Technology. Assoc. Prof., Chemical and Biomolecular Engineering

Apanasovich, Tatiyana, Ph.D., Texas A&M U. Asst. Prof., Operations Research and Industrial Engineering

Apsel, Alyssa B., Ph.D., Johns Hopkins U. Clare Boothe Luce Assistant Professor of Electrical and Computer Engineering

Aquino, Wilkens, Ph.D., U. of Illinois. Asst. Prof., Civil and Environmental Engineering

Archer, Lynden A., Ph.D., Stanford U. Marjorie L. Hart '50 Professor of Engineering, Chemical and Biomolecular Engineering

Arms, William, Ph.D., U. of Sussex (England). Prof., Computer Science

Ast, Dieter G., Ph.D., Cornell U. Prof., Materials Science and Engineering

Avedisian, C. Thomas, Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering

Baeumner, Antje J., Ph.D., U. of Stuttgart (Germany). Assoc. Prof., Biological and Environmental Engineering

Bailey, Graeme, Ph.D., U. of Birmingham (England). Prof., Computer Science

Baker, Shefford P., Ph.D., Stanford U. Assoc. Prof., Materials Science and Engineering

Bala, Kavita, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science

Barazangi, Muawia, Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences

Bartel, Donald L., Ph.D., U. of Iowa. Prof., Mechanical and Aerospace Engineering and Biomedical Engineering

Bartsch, James A., Ph.D., Purdue U. Assoc. Prof., Biological and Environmental Engineering

Bassett, William A., Ph.D., Columbia U. Prof. (Emeritus), Earth and Atmospheric Sciences

Bhave, Sunil, Ph.D., U. of California, Berkeley. Asst. Prof., Electrical and Computer Engineering

Bird, John M., Ph.D., Rensselaer Polytechnic Inst. Prof. (Emeritus), Earth and Atmospheric Sciences

Birman, Kenneth P., Ph.D., U. of California, Berkeley. Prof., Computer Science

Bisogni, James J., Ph.D., Cornell U. Assoc. Prof., Civil and Environmental Engineering

Blakely, John M., Ph.D., Glasgow U. (U.K.). Herbert Fisk Johnson Professor of Engineering, Materials Science and Engineering

Bland, Robert G., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering

Bloom, Arthur L., Ph.D., Yale U. Prof. (Emeritus), Earth and Atmospheric Sciences

Bojanczyk, Adam W., Ph.D., U. of Warsaw (Poland). Assoc. Prof., Electrical and Computer Engineering

Bonassar, Lawrence J., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Biomedical Engineering and Mechanical and Aerospace Engineering

Booker, John F., Ph.D., Cornell U. Graduate School Prof. (Emeritus), Mechanical and Aerospace Engineering

Brock, Joel D., Ph.D., Massachusetts Inst. of Technology. Director and Prof., Applied and Engineering Physics

Brown, Larry D., Ph.D., Cornell U. Prof., Earth and Atmospheric Sciences

Brutsaert, Wilfried H., Ph.D., U. of California, Davis. William L. Lewis Prof. of Engineering, Civil and Environmental Engineering

Buhrman, Robert A., Ph.D., Cornell U. John Edson Sweet Professor of Engineering, Applied and Engineering Physics

Burns, Joseph A., Ph.D., Cornell U. Irving Porter Church Professor of Engineering, Theoretical and Applied Mechanics; Astronomy

Burtscher, Martin, Ph.D., U. of Colorado, Boulder. Asst. Prof., Electrical and Computer Engineering

Cady, K. Bingham, Ph.D., Massachusetts Inst. of Technology. Prof., Theoretical and Applied Mechanics; Nuclear Science and Engineering

Callister, John R., Ph.D., Cornell U. Kinzelberg Director of Entrepreneurship in Engineering

Campbell, Mark E., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Mechanical and Aerospace Engineering

Cardie, Claire T., Ph.D. U. of Massachusetts, Amherst. Assoc. Prof., Computer Science

Caruana, Richard, Ph.D., Carnegie Mellon U. Asst. Prof., Computer Science

Cathles, Lawrence M. III, Ph.D., Princeton U. Prof., Earth and Atmospheric Sciences

Caughey, David A., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering

Chiang, Hsiao-Dong, Ph.D., U. of California, Berkeley. Prof., Electrical and Computer Engineering

Cisne, John L., Ph.D., U. of Chicago. Prof., Earth and Atmospheric Sciences

Clancy, Paulette, Ph.D., Oxford U. (England). Prof., Chemical and Biomolecular Engineering

Cohen, Claude, Ph.D., Princeton U. Prof., Chemical and Biomolecular Engineering

Collins, Lance R., Ph.D., U. of Pennsylvania. Prof., Mechanical and Aerospace Engineering

Colucci, Stephen J., Ph.D., SUNY Albany. Prof., Earth and Atmospheric Sciences

Constable, Robert L., Ph.D., U. of Wisconsin. Prof., Computer Science

Conway, Harry D., Ph.D., London U. (England). Prof. Emeritus, Theoretical and Applied Mechanics

Cook, Kerry H., Ph.D., North Carolina State U. Prof., Earth and Atmospheric Sciences

Cooke, J. Robert, Ph.D., North Carolina State U. Prof. Emeritus, Biological and Environmental Engineering

Cool, Terrill A., Ph.D., California Inst. of Technology. Prof., Applied and Engineering Physics

Cowen, E. A., Ph.D., Stanford U. Assoc. Prof., Civil and Environmental Engineering

Craighead, Harold G., Ph.D., Cornell U. Charles W. Lake Jr., Prof. of Engineering, Applied and Engineering Physics

Cranch, Edmund T., Ph.D., Cornell U. Prof. Emeritus, Theoretical and Applied Mechanics

D'Andrea, Raffaello, Ph.D., California Inst. of Technology. Assoc. Prof., Mechanical and Aerospace Engineering

Datta, Ashim K., Ph.D., U. of Florida. Prof., Biological and Environmental Engineering

Davidson, Rachael A., Ph.D., Stanford U. Asst. Prof., Civil and Environmental Engineering

Dawson, Paul R., Ph.D., Colorado State U. Prof., Mechanical and Aerospace Engineering

deBoer, P. C. Tobias, Ph.D., U. of Maryland. Graduate School Prof. Emeritus, Mechanical and Aerospace Engineering

DeGaetano, Arthur T., Ph.D., Rutgers U. Assoc. Prof., Earth and Atmospheric Science

Delchamps, David F., Ph.D., Harvard U. Assoc. Prof., Electrical and Computer Engineering

DeLisa, Matthew, P., Ph.D., U. of Maryland. Asst. Prof., Chemical and Biomolecular Engineering

Derry, Louis, Ph.D., Harvard U. Assoc. Prof., Earth and Atmospheric Sciences

Diamessis, Peter, Ph.D., U. of California, San Diego. Asst. Prof., Civil and Environmental Engineering

Dick, Richard I., Ph.D., U. of Illinois. Prof., Civil and Environmental Engineering

Dieckmann, Rudiger, Ph.D., U. of Hannover (Germany). Prof., Materials Science and Engineering

Doerschuk, Peter C., Ph.D., Massachusetts Inst. of Technology/M.D., Harvard U. Prof., Biomedical Engineering and Electrical and Computer Engineering

Duncan, T. Michael, Ph.D., California Inst. of Technology. Assoc. Prof., Chemical and Biomolecular Engineering

Dworsky, Leonard B., M.A., U. of Michigan. Prof., Civil and Environmental Engineering

Eastman, Lester F., Ph.D., Cornell U. Given Foundation Professor of Engineering, Electrical and Computer Engineering

Elber, Ron, Ph.D., Hebrew U. (Israel). Prof., Computer Science

Engstrom, James R., Ph.D., California Inst. of Technology. Prof., Chemical and Biomolecular Engineering

Erickson, David C., Ph.D., U. of Toronto (Canada). Asst. Prof., Mechanical and Aerospace Engineering

Escobedo, Fernando A., Ph.D., U. of Wisconsin, Madison. Assoc. Prof., Chemical and Biomolecular Engineering

Estroff, Lara A., Ph.D., Yale U. Asst. Prof., Materials Science and Engineering

Fan, K-Y Daisy, Ph.D., Cornell U. Asst. Prof., Computer Science

Fine, Terrence L., Ph.D., Harvard U. Prof., Electrical and Computer Engineering

- Fisher, Elizabeth M., Ph.D., U. of California, Berkeley. Assoc. Prof., Mechanical and Aerospace Engineering
- Francis, Paul, Ph.D., U. Coll. London (England). Assoc. Prof., Computer Science
- Friedman, Eric, Ph.D., U. of California, Berkeley. Assoc. Prof., Operations Research and Industrial Engineering
- Fuchs, W. Kent, Ph.D., U. of Illinois, Urbana-Champaign. Prof., Electrical and Computer Engineering
- Gaeta, Alexander L., Ph.D., U. of Rochester. Prof., Applied and Engineering Physics
- Gao, H. Oliver, Ph.D., U. of California, Davis. Asst. Prof., Civil and Environmental Engineering
- Garcia, Ephraim, Ph.D., SUNY Buffalo. Assoc. Prof., Mechanical and Aerospace Engineering
- Gebremedhin, Kifle G., Ph.D., U. of Wisconsin. Prof., Biological and Environmental Engineering, Civil and Environmental Engineering
- Gehrke, Johannes, Ph.D., U. of Wisconsin, Madison. Assoc. Prof., Computer Science
- George, Albert R., Ph.D., Princeton U. John F. Carr Prof. of Mechanical Engineering, Mechanical and Aerospace Engineering
- Giannelis, Emmanuel, Ph.D., Michigan State U. Walter R. Read Professor of Engineering, and Director Materials Science and Engineering
- Gossett, James M., Ph.D., Stanford U. Prof., Civil and Environmental Engineering
- Gouldin, Frederick C., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
- Greenberg, Donald P., Ph.D., Cornell U. Prof., Computer Science
- Greene, Charles, Ph.D., U. of Washington. Prof., Earth and Atmospheric Sciences
- Gries, David, Dr rer. nat. Munich Inst. of Technology (Germany). Prof., Computer Science
- Grigoriu, Mircea D., Ph.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
- Grubb, David T., Ph.D., Oxford U. (England). Assoc. Prof., Materials Science and Engineering
- Guckenheimer, John, Ph.D., U. of California, Berkeley. Prof., Mathematics and Theoretical and Applied Mechanics
- Guo, Xin, Ph.D., Rutgers U. Asst. Prof., Operations Research and Industrial Engineering
- Haas, Zygmunt J., Ph.D., Stanford U. Prof., Electrical and Computer Engineering
- Haith, Douglas A., Ph.D., Cornell U. Prof., Biological and Environmental Engineering
- Halpern, Joseph, Ph.D., Harvard U. Prof., Computer Science
- Hammer, David A., Ph.D., Cornell U. J. Carlton Ward Prof. of Nuclear Energy Engineering; Electrical and Computer Engineering
- Hartmanis, Juris, Ph.D., California Inst. of Technology. Walter R. Read Professor Emeritus of Computer Science
- Healey, Timothy J., Ph.D., U. of Illinois. Prof., Theoretical and Applied Mechanics
- Hemami, Sheila S., Ph.D., Stanford U. Assoc. Prof., Electrical and Computer Engineering
- Henderson, Shane, Ph.D., U. of Michigan. Assoc. Prof., Operations Research and Industrial Engineering
- Hopcroft, John E., Ph.D., Stanford U., IBM Professor of Engineering and Applied Mathematics, Computer Science
- Hover, Kenneth C., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
- Hui, Chung Y., Ph.D., Harvard U. Prof., Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Hunter, Jean B., Ph.D., Columbia U. Assoc. Prof., Biological and Environmental Engineering
- Huttenlocher, Daniel, Ph.D., Massachusetts Inst. of Technology. Prof., Computer Science/Johnson Graduate School of Management
- Hysell, David L., Ph.D., Cornell U. Assoc. Prof., Earth and Atmospheric Sciences
- Ingraffea, Anthony R., Ph.D., U. of Colorado. Dwight C. Baum Prof. in Engineering, Civil and Environmental Engineering
- Irwin, Lynne H., Ph.D., Texas A&M U. Assoc. Prof., Biological and Environmental Engineering
- Isacks, Bryan L., Ph.D., Columbia U. William and Katherine Snee Prof. of Earth and Atmospheric Sciences
- Jackson, Peter L., Ph.D., Stanford U. Prof., Operations Research and Industrial Engineering
- Jarrow, Robert A., Ph.D., Massachusetts Inst. of Technology. Prof., Operations Research and Industrial Engineering
- Jenkins, James T., Ph.D., Johns Hopkins U. Walter S. Carpenter, Jr., Professor of Engineering, Theoretical and Applied Mechanics
- Jewell, William J., Ph.D., Stanford U. Prof., Biological and Environmental Engineering
- Joachims, Thorsten, Ph.D., U. of Dortmund (Germany). Asst. Prof., Computer Science
- Johnson, C. Richard, Jr., Ph.D., Stanford U. Prof., Electrical and Computer Engineering
- Joo, Yong Lak, Ph.D., Stanford U. Asst. Prof., Chemical and Biomolecular Engineering
- Jordan, Teresa, Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences
- Kan, Edwin C., Ph.D., U. of Illinois, Champaign-Urbana. Assoc. Prof., Electrical and Computer Engineering
- Karig, Daniel E., Ph.D., D. U. of California (S.I.O.). Prof. (Emeritus), Earth and Atmospheric Sciences
- Kay, Robert W., Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences
- Kay, Suzanne M., Ph.D., Brown U. Prof., Earth and Atmospheric Sciences
- Keich, Uri, Ph.D., Courant Inst. Asst. Prof., Computer Science
- Kelley, Michael C., Ph.D., U. of California, Berkeley. James A. Friend family Distinguished Prof., Electrical and Computer Engineering
- Kintner, Paul M., Ph.D., U. of Minnesota. Prof., Electrical and Computer Engineering
- Kirby, Brian L., Ph.D., Stanford U. Asst. Prof., Mechanical and Aerospace Engineering
- Kleinberg, Jon M., Ph.D., Massachusetts Inst. of Technology. Prof., Computer Science
- Kleinberg, Robert, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science
- Kline, Ronald R., Ph.D., U. of Wisconsin. Prof., Electrical and Computer Engineering (History of Technology)
- Knapp, Warren W., Ph.D., U. of Wisconsin. Prof. (Emeritus), Earth and Atmospheric Sciences
- Koch, Donald L., Ph.D., Massachusetts Inst. of Technology. Prof., Chemical and Biomolecular Engineering
- Kornegay, Kevin T., Ph.D., U. of California, Berkeley. Assoc. Prof., Electrical and Computer Engineering
- Kostroun, Vaclav O., Ph.D., U. of Oregon. Assoc. Prof., Applied and Engineering Physics
- Kozen, Dexter, Ph.D., Cornell U. Joseph Newton Pew, Jr. Professor in Engineering, Computer Science
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- Kusse, Bruce R., Ph.D., Massachusetts Inst. of Technology. Prof., Applied and Engineering Physics
- Lal, Amit, Ph.D., U. of California, Berkeley. Assoc. Prof., Electrical and Computer Engineering
- Lance, R. H., Ph.D., Brown, Prof. Emeritus, Theoretical and Applied Mechanics
- Lee, Kelvin, Ph.D., California Inst. of Technology. Assoc. Prof., Chemical and Biomolecular Engineering
- Lee, Lillian, Ph.D., Harvard U. Assoc. Prof., Computer Science
- Leibovich, Sidney, Ph.D., Cornell U. Samuel B. Eckert Prof. of Mechanical and Aerospace Engineering
- Lewis, Adrian, Ph.D., Cambridge U. (England). Prof., Operations Research and Industrial Engineering
- Lewis, Mark, Ph.D., Georgia Inst. of Technology. Assoc. Prof., Operations Research and Industrial Engineering
- Liddell, Chekesha, Ph.D., Georgia Inst. of Technology. Asst. Prof., Materials Science and Engineering
- Lindau, Manfred, Ph.D., Technical U. Berlin (Germany). Assoc. Prof., Applied and Engineering Physics
- Lion, Leonard W., Ph.D., Stanford U. Prof., Civil and Environmental Engineering
- Lipson, Hod, Ph.D., Technion Israel Inst. of Technology. Asst. Prof., Mechanical and Aerospace Engineering
- Lipson, Michal, Ph.D., Technion Israel Inst. of Technology. Asst. Prof., Electrical and Computer Engineering
- Liu, Philip L.-F., Sc.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
- Loucks, Daniel P., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
- Louge, Michel Y., Ph.D., Stanford U. Prof., Mechanical and Aerospace Engineering
- Lovelace, Richard V. E., Ph.D., Cornell U. Prof., Applied and Engineering Physics
- Lumley, John L., Ph.D., Johns Hopkins U. Willis H. Carrier Professor (Emeritus) of Engineering, Graduate School Prof. Mechanical and Aerospace Engineering
- Luo, Dan, Ph.D., Ohio State U. Asst. Prof., Biological and Environmental Engineering
- Lynn, Walter R., Ph.D., Northwestern U. Prof., Civil and Environmental Engineering
- Malliaras, George G., Ph.D., Rijksuniversiteit Groningen (Greece). Assoc. Prof., Materials Science and Engineering
- Manohar, Rajit, Ph.D., California Inst. of Technology. Assoc. Prof., Electrical and Computer Engineering
- March, John C., Ph.D., U. of Maryland. Asst. Prof., Biological and Environmental Engineering
- Marschner, Steve, Ph.D., Cornell U. Asst. Prof., Computer Science
- Martínez, José F., Ph.D., U. of Illinois, Urbana-Champaign. Asst. Prof., Electrical and Computer Engineering
- Mbwana, John, Ph.D., Cornell U. Sr. Research Assoc., Civil and Environmental Engineering
- McGuire, Stephen C., Ph.D., Cornell U. Assoc. Prof., Engineering

- McKee, Sally A., Ph.D., U. of Virginia. Asst. Prof., Electrical and Computer Engineering
- Meyburg, Arnim H., Ph.D., Northwestern U. Prof., Civil and Environmental Engineering
- Miller, Matthew, Ph.D., Georgia Inst. of Technology Assoc. Prof., Mechanical and Aerospace Engineering
- Moon, Francis C., Ph.D., Cornell U. Joseph C. Ford Professor, Mechanical and Aerospace Engineering
- Moore, Franklin, Ph.D., Cornell U. Prof. (Emeritus), Mechanical and Aerospace Engineering
- Muckstadt, John A., Ph.D., U. of Michigan. Acheson-Laike Prof., Operations Research and Industrial Engineering
- Mukherjee, Subrata, Ph.D., Stanford U. Prof., Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Muller, David, Ph.D., Cornell U. Assoc. Prof., Applied and Engineering Physics
- Myers, Andrew, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
- Nozick, Linda K., Ph.D., U. of Pennsylvania. Prof., Civil and Environmental Engineering
- Ober, Christopher K., Ph.D., U. of Massachusetts. Francis Norwood Bard Professor, Materials Science and Engineering
- Olbricht, William L., Ph.D., California Inst. of Technology. Prof., Chemical and Biomolecular Engineering and Biomedical Engineering
- Oliver, Jack, Ph.D., Columbia U. Prof. (Emeritus), Earth and Atmospheric Sciences
- O'Rourke, Thomas D., Ph.D., U. of Illinois. Thomas R. Briggs Professor of Engineering, Civil and Environmental Engineering
- Papoulia, Katerina D., Ph.D., U. of California, Berkeley. Asst. Prof., Civil and Environmental Engineering
- Parks, Thomas W., Ph.D., Cornell U. Prof., Electrical and Computer Engineering
- Parlange, Jean-Yves, Ph.D., Brown U. Prof., Biological and Environmental Engineering
- Peck, Mason, A., Ph.D., U. of California, Los Angeles. Asst. Prof., Mechanical and Aerospace Engineering
- Peköz, Teoman, Ph.D., Cornell U. Prof., Civil and Environmental Engineering
- Pershing, Andrew J., Ph.D., Cornell U. Asst. Prof., Earth and Atmospheric Sciences
- Phelan, Richard, M.M.E., Cornell U. Prof. (Emeritus), Mechanical and Aerospace Engineering
- Philpot, William D., Ph.D., U. of Delaware. Assoc. Prof., Civil and Environmental Engineering
- Phipps Morgan, J., Ph.D., Brown U. Prof., Earth and Atmospheric Sciences
- Phoenix, S. Leigh, Ph.D., Cornell U. Prof., Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Plisch, Monica J., Ph.D., Cornell U. Instr., Applied and Engineering Physics
- Pollack, Lois, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Applied and Engineering Physics
- Pollock, Clifford R., Ph.D., Rice U. Ilda and Charles Lee Prof. of Engineering, Electrical and Computer Engineering
- Pope, Stephen B., Ph.D., Imperial Coll. of Science and Technology (England). Sibley College Professor of Mechanical Engineering, Mechanical and Aerospace Engineering
- Pritchard, Matthew E., Ph.D., California Inst. of Technology. Asst. Prof., Earth and Atmospheric Sciences
- Protter, Philip, Ph.D., U. of California, San Diego. Prof., Operations Research and Industrial Engineering
- Psiaki, Mark L., Ph.D., Princeton U. Assoc. Prof., Mechanical and Aerospace Engineering
- Putnam, David A., Ph.D., U. of Utah. Asst. Prof., Biomedical Engineering and Chemical and Biomolecular Engineering
- Ralph, Daniel, Ph.D., Cornell U. Assoc. Prof., Physics
- Rana, Farhan, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Electrical and Computer Engineering
- Rand, Richard H., Sc.D., Columbia U. Prof., Theoretical and Applied Mechanics
- Reeves, Anthony P., Ph.D., U. of Kent, Canterbury (England). Assoc. Prof., Electrical and Computer Engineering
- Renegar, James, Ph.D., U. of California, Berkeley. Prof., Operations Research and Industrial Engineering
- Resler, Edwin, Ph.D., Cornell U. Prof. Emeritus, Mechanical and Aerospace Engineering
- Resnick, Sidney, Ph.D., Purdue U. Prof., Operations Research and Industrial Engineering
- Rhodes, Frank H. T., Ph.D., U. of Birmingham (England). Prof. Emeritus/President Emeritus, Earth and Atmospheric Sciences
- Richardson, Ruth E., Ph.D., U. of California, Berkeley. Asst. Prof., Civil and Environmental Engineering
- Riha, Susan, Ph.D., Washington State U. Prof., Earth and Atmospheric Sciences
- Roundy, Robin, Ph.D., Stanford U. Prof., Operations Research and Industrial Engineering
- Rugina, Radu, Ph.D., U. of California, Santa Barbara. Asst. Prof., Computer Science
- Ruina, Andy L., Ph.D., Brown U. Prof., Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Ruoff, Arthur L., Ph.D., U. of Utah. Class of 1912 Professor, Materials Science and Engineering
- Ruppert, David, Ph.D., Michigan State U. Prof., Operations Research and Industrial Engineering
- Rusmievichengtong, Paat, Ph.D., Stanford U. Asst. Prof., Operations Research and Industrial Engineering
- Sachse, Wolfgang H., Ph.D., Johns Hopkins U. Meinig Family Prof. of Engineering, Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Samorodnitsky, Gennady, D.S., Technion Israel Inst. of Technology. Prof., Operations Research and Industrial Engineering
- Sansalone, Mary J., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
- Sass, Stephen L., Ph.D., Northwestern U. Prof. and Stephen H. Weiss Presidential Fellow, Materials Science and Engineering
- Scaglione, Anna, Ph.D., U. of Rome (Italy). Asst. Prof., Electrical and Computer Engineering
- Schaffer, Christopher B., Ph.D., Harvard U. Asst. Prof., Biomedical Engineering
- Schneider, Fred B., Ph.D., SUNY Stonybrook. Prof., Computer Science
- Schuler, Richard E., Ph.D., Brown U. Prof., Civil and Environmental Engineering/Economics
- Schwartz, David, Ph.D., SUNY Buffalo. Sr. Lec., Computer Science
- Scott, Norman R., Ph.D., Cornell U. Prof., Biological and Environmental Engineering
- Selman, Bart, Ph.D., U. of Toronto (Canada). Prof., Computer Science
- Sengers, Phoebe, Ph.D., Carnegie-Mellon U. Asst. Prof., Science and Technology Studies/Computing and Information Science
- Servetto, Sergio D., Ph.D., U. of Illinois, Champaign-Urbana. Asst. Prof., Electrical and Computer Engineering
- Seyler, Charles E., Jr., Ph.D., U. of Iowa. Prof., Electrical and Computer Engineering
- Shealy, J. Richard, Ph.D., Cornell U. Prof., Electrical and Computer Engineering
- Shen, Shan-Fu, Sc.D., Massachusetts Inst. of Technology. Prof. (Emeritus), Mechanical and Aerospace Engineering
- Shmoys, David B., Ph.D., U. of California, Berkeley. Computer Science and Operations Research and Industrial Engineering
- Shoemaker, Christine A., Ph.D., U. of Southern California. Joseph P. Ripley Prof. of Engineering, Civil and Environmental Engineering
- Shuler, Michael L., Ph.D., U. of Minnesota. Samuel B. Eckert Prof. of Chemical and Biomolecular Engineering and Biomedical Engineering
- Silcox, John, Ph.D., Cambridge U. (England). David E. Burr Prof. of Engineering, Applied and Engineering Physics
- Sirer, Emin Gun, Ph.D., U. of Washington. Asst. Prof., Computer Science
- Skorton, David J., M.D., Northwestern U. Prof., Biomedical Engineering and Weill Medical College
- Slate, Floyd O., Ph.D., Purdue U. Assoc. Prof., Civil and Environmental Engineering
- Spanswick, Roger M., U. of Edinburgh (U.K.). Prof., Biological and Environmental Engineering
- Spencer, Michael G., Ph.D., Cornell U. Prof., Electrical and Computer Engineering
- Stedinger, Jerry R., Ph.D., Harvard U. Prof., Civil and Environmental Engineering
- Steen, Paul H., Ph.D., Johns Hopkins U. Prof., Chemical and Biomolecular Engineering
- Steenhuis, Tammo S., Ph.D., U. of Wisconsin., Prof., Biological and Environmental Engineering
- Stewart, Harry E., Ph.D., U. of Massachusetts, Amherst. Assoc. Prof., Civil and Environmental Engineering
- Strogatz, Steven H., Ph.D., Harvard U. Prof., Theoretical and Applied Mechanics
- Stroock, Abraham D., Ph.D., Harvard U. Asst. Prof., Chemical and Biomolecular Engineering
- Tang, Chung L., Ph.D., Harvard U. Spencer T. Olin Professor of Engineering, Electrical and Computer Engineering
- Tardos, Eva, Ph.D., Eötvös U. (Hungary). Prof., Computer Science and Operations Research and Industrial Engineering
- Teitelbaum, R. Tim, Ph.D., Carnegie-Mellon U. Assoc. Prof., Computer Science
- Thomas, Robert J., Ph.D., Wayne State U. Prof., Electrical and Computer Engineering
- Thompson, Michael O., Ph.D., Cornell U. Assoc. Prof., Materials Science and Engineering
- Timmons, Michael B., Ph.D., Cornell U. Lester B. Knight Director of the Knight Laboratory, Prof., Biological and Environmental Engineering
- Tiwari, Sandip, Ph.D., Cornell U. Prof., Electrical and Computer Engineering
- Todd, Michael J., Ph.D., Yale U. Leon C. Welch Prof., Operations Research and Industrial Engineering
- Tong, Lang, Ph.D., U. of Notre Dame. Prof., Electrical and Computer Engineering



- Topaloglu, Huseyin, Ph.D., Princeton U. Asst. Prof., Operations Research and Industrial Engineering
- Torrance, Kenneth E., Ph.D., U. of Minnesota. Joseph C. Ford Professor, Mechanical and Aerospace Engineering
- Trotter, Leslie E., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering
- Turcotte, Donald L., Ph.D., California Inst. of Technology. Prof. (Emeritus), Earth and Atmospheric Sciences
- Turnbull, Bruce W., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering
- Turnquist, Mark A., Ph.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
- Umbach, Christopher, Ph.D., Cornell U. Asst. Prof., Materials Science and Engineering
- Valero-Cuevas, Francisco, Ph.D., Stanford U. Asst. Prof., Mechanical and Aerospace Engineering
- van der Meulen, Marjolein C. H., Ph.D., Stanford U. Assoc. Prof., Mechanical and Aerospace Engineering
- van Dover, R. Bruce, Ph.D., Stanford U. Prof., Materials Science and Engineering
- Van Loan, Charles F., Ph.D., U. of Michigan. Joseph C. Ford Professor of Engineering, Computer Science
- Varner, Jeffrey D., Ph.D., Purdue U. Asst. Prof., Chemical and Biomolecular Engineering
- Vavasis, Stephen A., Ph.D., Stanford U. Prof., Computer Science
- Voelcker, Herbert B., Ph.D., Imperial Coll. of Science and Technology (England). Charles W. Lake Jr. Professor of Engineering Graduate School Prof. (Emeritus), Mechanical and Aerospace Engineering
- Wagner, Aaron B., Ph.D., U. of California, Berkeley. Asst. Prof., Electrical and Computer Engineering
- Walker, Larry P., Ph.D., Michigan State U. Prof., Biological and Environmental Engineering
- Walter, Michael F., Ph.D., U. of Wisconsin. Prof., Biological and Environmental Engineering
- Walter, Michael T., Ph.D., Washington State U. Asst. Prof., Biological and Environmental Engineering
- Wang, Kuo, Ph.D., U. of Wisconsin. Prof. (Emeritus), Mechanical and Aerospace Engineering
- Wang, Yi, Ph.D., U. of Wisconsin. Prof., Biomedical Engineering and Weill Medical College
- Wang, Z. Jane, Ph.D., U. of Chicago. Assoc. Prof., Theoretical and Applied Mechanics
- Warhaft, Zellman, Ph.D., U. of London (England). Prof., Mechanical and Aerospace Engineering
- Webb, Watt W., Sc.D., Massachusetts Inst. of Technology. Samuel B. Eckert Professor of Engineering, Applied and Engineering Physics
- Weber, Stefan, Ph.D., Humboldt Universität zu Berlin (Germany), Asst. Prof., Operations Research and Industrial Engineering
- Weber-Shirk, Monroe, Ph.D., Cornell U. Lec., Civil and Environmental Engineering
- White, Richard N., Ph.D., U. of Wisconsin. Prof., Civil and Environmental Engineering, Emeritus
- White, William M., Ph.D., U. of Rhode Island. Prof., Earth and Atmospheric Sciences
- Wickham, Lisa, Ph.D., Cornell U. Instructor, Applied and Engineering Physics
- Wicker, Stephen B., Ph.D., U. of Southern California. Prof., Electrical and Computer Engineering
- Wiesner, Ulrich B., Ph.D., U. of Mainz (Germany). Prof., Materials Science and Engineering
- Wilks, Daniel S., Ph.D., Oregon State U. Prof., Earth and Atmospheric Sciences
- Williamson, Charles, Ph.D., Cambridge U. (England). Prof., Mechanical and Aerospace Engineering
- Williamson, David P., Ph.D., Massachusetts Inst. of Technology. Prof., Operations Research and Industrial Engineering
- Wise, Frank W., Ph.D., Cornell U. Prof., Applied and Engineering Physics
- Wysocki, Mark S., M.S., Cornell U. Sr. Lec., Earth and Atmospheric Sciences
- Xu, Chris, Ph.D., Cornell U. Asst. Prof., Applied and Engineering Physics
- Zabaras, Nicholas, Ph.D., Cornell U. Prof., Mechanical and Aerospace Engineering
- Zabih, Ramin, Ph.D., Stanford U. Assoc. Prof., Computer Science
- Zehnder, Alan, Ph.D., California Inst. of Technology. Prof., Theoretical and Applied Mechanics; Mechanical and Aerospace Engineering
- Zipfel, Warren, Ph.D., Cornell U. Assoc. Prof., Biomedical Engineering

## GRADUATE SCHOOL

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### THE GRADUATE SCHOOL

The graduate program at Cornell permits an unusual degree of accommodation to the needs and interests of the individual student. Degree requirements are kept to a minimum. There are no specific course or credit requirements for the advanced general degrees of master of arts, master of science, and doctor of philosophy but only such general requirements as best accomplish the aim of graduate study: a period of study in residence, mastery of one subject, adequate knowledge of allied subjects, oral examinations to establish competency for presentation of a dissertation or thesis, and a satisfactory dissertation or thesis. Certain advanced professional degree programs have specific course or credit requirements that are determined by the faculty of the professional school or college in which the degrees are offered.

A close working relationship between the student and faculty members is essential to the graduate program at Cornell. Under the Special Committee system, the student is guided by, and works with, at least two or three faculty members chosen by the student to represent his or her major and minor subjects. The major subject representative is the chair of the Special Committee, who usually has the primary responsibility for directing the student's thesis or dissertation research.

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A successful applicant to the Graduate School must:

1. hold a baccalaureate degree or its equivalent granted by a faculty or university of recognized standing;

2. have adequate preparation for graduate work in the chosen field of study;
3. have fluent command of the English language;
4. present evidence of promise in advanced study and research; and
5. take the Graduate Record Examinations® (GRE) General Test or other specific examinations required by the various fields of study.

Additionally, international applicants whose native language is not English must provide proof of competency in English as part of the admissions process. Proof can be one of the following:

1. a score of at least 213 on the Test of English as a Foreign Language (TOEFL) taken between September 1, 2003, and September 1, 2005. Applicants who take the new four-part TOEFL after September 1, 2005, must meet the following minimum scores: writing, 20; listening, 15; reading, 20; and speaking, 22. Individual fields of study may set higher minimums.

or

2. evidence of at least two years of study in a college or university in a country where English is both the native language and the language of instruction.

Information about the TOEFL exam and the GRE—including examination times, dates, locations, and application forms—is available online from the Educational Testing Service ([www.ets.org](http://www.ets.org)) or by postal mail at ETS, Princeton, NJ 08541, U.S.A.

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Each graduate field of study has specific deadlines for fall and spring admission. The earliest deadline is December 1; many deadlines fall in mid-January. Applications should be received no later than those published dates, which are available in the application booklet or online at [catalog.gradschool.cornell.edu](http://catalog.gradschool.cornell.edu).

### INQUIRIES

Applicants should contact the fields of study for answers to specific questions about admission to their graduate programs. Contacts in the fields of study also can answer questions about facilities for advanced study and research, special requirements, and opportunities for fellowships and assistantships. Phone numbers, e-mail addresses, and other contact information are available online at [catalog.gradschool.cornell.edu](http://catalog.gradschool.cornell.edu).

General questions about graduate study can be directed to Graduate School Student Services, 255-5820, or [gradschool@cornell.edu](mailto:gradschool@cornell.edu) or [www.gradschool.cornell.edu](http://www.gradschool.cornell.edu) or by writing

to Graduate School, 143 Caldwell Hall, Cornell University, Ithaca, NY 14853-2602.

### FOR MORE INFORMATION

Detailed information about the admissions process, academic programs, financial aid, and student services is available at the Graduate School web site, [www.gradschool.cornell.edu](http://www.gradschool.cornell.edu). The site features links to the Graduate School's online application ([apply.gradschool.cornell.edu](http://apply.gradschool.cornell.edu)), printable forms, and links to sites of interest to graduate applicants.

## SCHOOL OF HOTEL ADMINISTRATION

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Molly deRoos, associate director of career management

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Dina Kristof, registrar

### DEGREE PROGRAMS

	Degree
Hotel and Restaurant Administration	B.S.
	M.M.H.
	M.S.
	Ph.D.

### FACILITIES

**Statler Hall** Statler Hall is a unique building designed expressly to meet the needs of the faculty and students of the School of Hotel Administration. The building serves both practical and theoretical instruction, houses classrooms, lecture rooms, laboratories, a library, a computer center, a beverage management center, a newly refurbished auditorium, and the Statler Hotel and J. Willard Marriott Executive Education Center. Statler Hall and the Statler Hotel were designed expressly for the school's academic and executive education programs, providing students with training and work experience in facilities similar to those in which they will work after graduation. In the fall of 2004, the school opened the Robert A. and Jan M. Beck Center, a 35,000-square-foot addition to Statler Hall. This \$16.2 million expansion provides state-of-the-art classroom and meeting spaces, a computer laboratory, and teaching

technologies that facilitate an interactive teaching style.

**The School of Hotel Administration's Nestlé Library** has the largest single collection of hospitality-related materials in the United States. The collection contains approximately 23,000 books, 2,000 videotapes, and more than 600 journal, magazine, newsletter, and newspaper subscriptions. Materials on lodging, foodservice, travel and tourism, real estate, and general hospitality business topics comprise the core of the library's collections. Among the library's special features are numerous computerized information resources, including *Business Source Premier*, *Proquest*, *Hotel Outlook*, *Mintel Marketing Intelligence*, and the *Hospitality and Tourism Index*, a unique index to hospitality articles. Information resources and services for the hospitality industry are available for a fee through the library's HOSTLINE service. More detailed information about the Nestlé Library can be found at [www.nestlelib.cornell.edu](http://www.nestlelib.cornell.edu). In addition to offering an excellent collection of materials and access to extensive electronic resources, the Hotel School library provides instruction and research support to every student.

**Statler Hotel and J. Willard Marriott Executive Education Center** The Statler Hotel comprises 153 guest rooms, an executive education center, three restaurants, a lounge, and the university's faculty and staff club. The Statler is an independent, self-sustaining teaching hotel that provides quality food, beverage, meeting, and lodging services to the local community and campus visitors, including parents and those who visit Cornell as part of the application process. The Statler Hotel provides a unique brand of hospitality that integrates the management theory taught at the Cornell Hotel School with practical expertise of the hotel's professional and student staff. The hotel offers part-time jobs to approximately 200 students each semester with priority given to students in the hotel school. A select group of students participate in the Statler Leadership Development program and earn supervisory and management positions in the hotel.

### UNDERGRADUATE CURRICULUM

The School of Hotel Administration offers education in the numerous disciplines required for modern management in the global hospitality industry. Included in the core curriculum are courses in operations, management and organizational behavior, human resource management, finance/accounting, real estate development, food and beverage management, marketing, tourism, strategy, facilities management planning and design, communication, information systems, and law. Students also are encouraged to pursue a broad range of elective courses, including those in the humanities, social sciences, and natural sciences, as preparation for assuming leadership positions in the

business and local community. For more complete information about undergraduate program requirements, see the school's student handbook (available in the Office of Student Services, 180 Statler Hall).

### Requirements for Graduation

Regularly enrolled undergraduate students in the School of Hotel Administration are candidates for the degree of bachelor of science. The requirements for that degree are:

1. completion of eight semesters in residence for those who entered as freshmen; semesters of residence for transfer students are determined by the amount of transfer credit awarded;
2. completion, with a minimum cumulative grade point average (GPA) of 2.0 (including a GPA of 2.0 in a full-time schedule of courses on campus in the final semester), of 120 required and elective credits (note: 120 credits does not include PE courses), as set forth in the table on the following page;
3. qualification in one language other than English. This requirement may be met by any one of the following: (a) three years of high school study of one foreign language; (b) score of 560 on Cornell Placement Test; (c) passing language course level 121 and 122 (8 credits) or the equivalent, and attaining a minimum grade of at least C- or "Satisfactory" in each (C or above for transfer credit from other institutions); or (d) passing language course level 123 or the equivalent;
4. completion of two units of practice credit; and
5. completion of the university requirement in physical education.

Suggested course programs appear on the following pages. The core courses account for 69 of the 120 credits needed for graduation, the hotel school electives account for 12 credits, and 18 credits are allotted for distributive electives. The remaining 21 credits may be earned in courses chosen from the offerings of any college of the university, provided that the customary requirements for admission to such courses are met.

Students in the School of Hotel Administration who plan to attend summer school at Cornell or any other four-year college or university, with the expectation that the credit earned will be counted toward the Cornell degree in hotel administration, must obtain the approval of the school in advance. Without advance approval, such credit may not count toward the degree.

Credit earned in military science, aerospace studies, or naval science courses may be counted in the 21-credit group of free electives. No credit toward the degree is allowed for "00"-level courses, such as EDUC 005.

## Transfer Credit Policy

Transfer students are required to complete all degree requirements with at least 60 credits at Cornell University. In the core, transfer credit may be allowed against basic courses only (e.g., H ADM 121, 106). The communication courses (H ADM 165 and 365) are tailored specifically to the School of Hotel Administration and, thus, communication courses taken elsewhere generally are not accepted against core courses.

Hotel elective courses may not transfer, except from the Culinary Institute of America. Eighteen credits in distributive electives may transfer, and 21 credits in free electives may transfer.

## Concentration

While completing the hotel school elective courses, undergraduates in the school may select a concentration.

Before selecting a field of concentration, students should consult the coordinator of instruction in that area during the sophomore year to plan the sequence of courses that will best fit their program.

Upon completion, the concentration will be noted on the transcript, provided a cumulative GPA of 3.0 in the concentration was attained.

## Foreign Languages

Mastery of a foreign language is particularly desirable for students who are planning careers in the hospitality industry and, hence, the second language requirement for graduation. Further information on foreign language courses at Cornell, and placement in language courses, may be found under "Modern Languages, Literature, and Linguistics" and under "Advanced Placement for Freshmen" in the College of Arts and Sciences section of this catalog.

## Independent Study and Research

Students may conduct independent study or research projects in any academic area of the school under the direction of a resident faculty member. Credit is arranged on an individual basis. To enroll in an independent study or research project, students must obtain written permission from the school before the add deadline. See H ADM 497, 498, 499, 698, or 699 for more details.

## Practice Credit Requirement

As part of the degree requirements, undergraduates enrolled in the School of Hotel Administration must fulfill the practice credit requirement and submit verification thereof. Further details are set forth in the *Student Handbook for Undergraduates in the School of Hotel Administration* (available in the Office of Student Services, 180 Statler Hall).

## Management-Intern Program

Hotel school juniors and seniors have a unique opportunity to gain invaluable knowledge and experience in the hospitality industry through the Management-Intern Program (MIP). Students receive 12 free elective credits and 1 practice credit. While on the internship, tuition is reduced and students may receive a salary from the sponsoring organization. Positions are available in the United States and internationally. Sponsors include, but are not limited to, hotels,

restaurants, casinos, corporate offices, consulting firms, and clubs. Application should be made one semester in advance. Information meetings are held at the beginning of each semester and are open to all students. See H ADM 493, 494, and the student handbook for more details about the Management-Intern Program (available in the Office of Student Services, 180 Statler Hall).

## Study Abroad

All students planning to study abroad apply through Cornell Abroad; please see the Cornell Abroad program description in the introductory section of this catalog.

The hotel school represents the international aspects of the hospitality industry in many ways—from the large number of international students in its program, to career opportunities throughout the world. To prepare for the global nature of the industry, students are encouraged to consider studying abroad in either the fall or spring semesters (or, in some cases, both). While abroad, students have the opportunity to learn about other cultures, become more proficient in a second (or perhaps third) language and, in those programs where internships are offered, work in an international environment.

Students should start the process of investigation early, including consultation with the hotel school study abroad advisor, 180 Statler Hall, as well as with the staff in the Cornell Abroad office, 300 Caldwell Hall. Requirements for college approval include a GPA of 3.0 or higher, good academic standing, registered full-time student status, and not being in one's final semester. Credits earned abroad are considered transfer credits, and, as such, they would count against the maximum of 60 transfer credits allowed. A maximum of 15 credits may be transferred from study abroad, and students should plan on taking no less than 15 credits while abroad. Courses typically transfer into distributive and free electives. Credit for study abroad will be awarded only after successful completion (marks equivalent to a Cornell grade of C or higher) of the semester abroad and receipt of the official transcript by the college.

For further details on the application process and deadlines, see the "Cornell Abroad" section of this catalog or view the Cornell Abroad web site at [www.cuabroad.cornell.edu/](http://www.cuabroad.cornell.edu/).

## Culinary Institute of America Alliance

The School of Hotel Administration has an alliance with the Culinary Institute of America, which is located in Hyde Park, N.Y. Among other opportunities, hotel school juniors and seniors are encouraged to apply for the Culinary Institute of America immersion program in January and during the summer. More information is available in the Office of Student Services, 180 Statler Hall.

## Part-Time Study

Generally, part-time study is not allowed. Exceptions may be made for employee degree candidates, students who have medical reasons for a reduced schedule, or in other very extenuating circumstances. In no event shall a student be allowed to enroll on a part-time basis during the last semester of study. Further details on part-time study may be found in the school's student handbook

(available in the Office of Student Services, 180 Statler Hall).

## Grading System

Letter grades ranging from A+ to F are given to indicate academic performance in each course. These letter grades are assigned a numerical value for each semester average as follows: A is equivalent to 4.0; B to 3.0; C to 2.0; D to 1.0; F to 0. For good standing, the student must maintain a minimum average of 2.0. A maximum of 4 credits each semester may be taken on a "satisfactory-unsatisfactory" (S-U) basis. Students should be aware that a satisfactory grade equals C- or above and an unsatisfactory grade equals D+ or lower.

Students whose semester averages are at least 3.3 and who took at least 12 credits of letter grades with no unsatisfactory or incomplete grades are honored by being placed on the Dean's List.

## Course Requirements for the Bachelor of Science Degree

**Note:** The curriculum was revised during the 2003–2004 academic year, and the following requirements are for students entering the program in the fall of 2004 or later. Students who enrolled before the fall of 2004 should check their individual graduation requirements with the Office of Student Services, 180 Statler Hall.

Required courses	Credits
Operations: H ADM 105, 106, 201, 301, 305	14
Management and Organizational Behavior: H ADM 115	3
Human Resources Management: H ADM 211	3
Finance/Accounting: H ADM 121, 221, 222, 321	12
Food and Beverage Management: H ADM 236	4
Marketing, Tourism, and Strategy: H ADM 243, 441	6
Facilities Management, Planning, and Design: H ADM 255, 355	6
Managerial Communication: H ADM 165, 365, first-year writing seminar	9
Information Systems: H ADM 174, 275	6
Law: H ADM 387	3
Economics: H ADM 141	3
<i>Specifically required credits</i>	69
<i>Hotel electives</i>	12
<i>Distributive electives</i>	18
<i>Free electives</i>	21
<b>Total credits required for graduation</b>	<b>120</b>

## Typical Course Sequences

The following arrangements of courses tend to be more fixed in the freshman and sophomore years, with a greater degree of flexibility characterizing the upperclass years.

**Freshman Year**

Typically, a freshman schedule will consist of 15 to 16 credits each semester, to include the following:

<i>Required courses</i>	<i>Credits</i>
H ADM 105 Introduction to Hotel Operations	2
H ADM 106 Introduction to Food Service Operations	2
H ADM 115 Organizational Behavior and Interpersonal Skills	3
H ADM 121 Financial Accounting	3
H ADM 141 Microeconomics for the Service Industries	3
H ADM 165 Managerial Communication I	3
H ADM 174 Microcomputing	3
First-year writing seminar	3
Electives	6
	<hr/> 28

**Sophomore Year**

<i>Required courses</i>	<i>Credits</i>
H ADM 201 Hospitality Quantitative Analysis	3
H ADM 211 Human Resources Management	3
H ADM 221 Managerial Accounting	3
H ADM 222 Finance	3
H ADM 236 Culinary Theory and Practice	4
H ADM 243 Principles of Marketing	3
H ADM 255 Hotel Development and Planning	3
H ADM 275 Introduction to Information Systems Management	3
Electives	6
	<hr/> 31

**Junior Year**

<i>Required courses</i>	<i>Credits</i>
H ADM 301 Service Operations Management	3
H ADM 305 Restaurant Management	4
H ADM 321 Hospitality Financial Management	3
H ADM 355 Hospitality Facilities Operations	3
H ADM 365 Managerial Communication II	3
H ADM 387 Business and Hospitality Law	3
Electives	12
	<hr/> 31

**Senior Year**

<i>Required courses</i>	<i>Credits</i>
H ADM 441 Strategic Management	3
Electives	24
	<hr/> 27

**GRADUATE CURRICULUM**

The school's programs for advanced degrees include those of Master of Management in Hospitality, Master of Science, and Doctor of Philosophy. For further information on graduate programs, contact the Office of Student Services, 180 Statler Hall, 255-6376.

**Required Program for Master of Management in Hospitality Degree**

<i>Required courses</i>	<i>Credits</i>
H ADM 610 Dean's Distinguished Lecture Series	1
H ADM 700 Externship	1
H ADM 703 Operations Management	3
H ADM 711 Organizational Behavior	3
H ADM 712 Human Resources Management	3
H ADM 723 Corporate Finance	3
H ADM 724 Managerial Accounting	3
H ADM 743 Hospitality Marketing	3
H ADM 744 Competitive Strategies for the Hospitality Industry	3
H ADM 751 Property Development and Planning	3
H ADM 761 Managerial Communication	3
H ADM 772 Information Systems Management	3
H ADM 791 Professional Development I	0.5
H ADM 792 Professional Development II	0.5
H ADM 795 Master Class	1
H ADM 796 Charette	1
H ADM 797 Hospitality Industry Leadership Development Institute	1
Balance of courses is electives.	
Total credits required for the master of management in hospitality program	<hr/> 48

**Course Schedule Information**

For up-to-date information about course scheduling, and to obtain a course supplement, contact the Office of Student Services, 180 Statler Hall, 255-6376.

**ORGANIZATIONAL MANAGEMENT, COMMUNICATION, AND LAW****Management and Organizational Behavior****H ADM 110(1110) Distinguished Lectures in Hospitality Management**

Fall. 1 credit. Elective. Dean M. Johnson. The Dean's Distinguished Lecture Series is a long-standing hotel school tradition that provides a unique opportunity for successful industry leaders to share their experiences with Cornell students. In its 40-year history, the Dean's Distinguished Lecture Series has hosted the most influential and accomplished leaders from every segment of the hospitality industry. Speakers share their views about successful management styles, possible career paths, critical industry-related issues, and qualities conducive to successful business leadership. Students have an unparalleled

opportunity to learn and question how hospitality leaders view the current and future status of the industry.

**H ADM 115(1115) Organizational Behavior and Interpersonal Skills**

Fall and spring. 3 credits. Required. T. Hinkin and K. Walsh.

Focuses on managing people in the workplace. Students develop theoretic lenses for understanding people and organizations, and practical tools for accomplishing personal and organizational goals. Topics include: individual differences, conflict management, problem-solving, power and influence, motivation, leadership, coaching and counseling, and group process. Students learn through case studies, self-assessments, experiential exercises, readings, discussions, papers, and group activities.

**H ADM 310(3310) Statler Leadership Development Program**

Fall and spring. 1 credit. Elective.

Prerequisite: one semester (200 hours) of employment in Statler Hotel.

The SLDP is a partnership among Hotel School faculty, Statler Hotel management, and industry executives, who together teach and guide students to become tomorrow's leaders. The program enables students to progress through five different paid employment phases in the Statler Hotel, from entry level to student manager. Students who progress to the level of student manager become Statler Fellows and will travel to a major city for an all-expense-paid trip that includes forums with industry leaders, site visits of leading industry facilities, and cultural activities. Each phase requires approximately 200 hours of paid employment at the Statler Hotel and is completed through a certification process. Weekly Friday afternoon sessions (2:30-4:00 P.M.) with Statler Hotel managers include discussions, performance reflection, training sessions, and industry forums with hospitality leaders.

**[H ADM 314(3314) High-Performance Leadership**

Fall. 3 credits. Elective. Limited to 30 students. Prerequisite: hotel school juniors and seniors; H ADM 115. Not offered 2006-2007. T. Simons.

Explores the nature of leaders and leadership from a variety of perspectives. Discussion of current articles in leadership prepares participants to be thoughtful leaders and discriminating consumers of leadership ideas. Topics include charismatic leadership, leadership characteristics, the exercise of power, symbolic communication, gender challenges, and related themes. Leadership is examined from the individual, small group, and organizational perspectives. Case studies further illustrate the application of course material. Students assess their own leadership style and engage in leadership development activities. Class members have opportunities to interact with hospitality leaders and to gain a better understanding of the dynamics of leadership behavior.]

**H ADM 410(4410) Hospitality Management Seminar**

Fall. 1 credit. Elective. Limited to 30 students. Prerequisite: hotel seniors and graduate students. Corequisite: H ADM 110. Preregistered students or students wishing to add course who do not attend first class and fail to notify secretary in 146 Statler Hall of their absence before



first class automatically are moved to instructor's waiting list. Students permitted to take course will have until F, Sept. 1, 2006, to add it. Failure to do so will result in their being dropped from course. Dean M. Johnson.

Complements H ADM 110 by giving students the opportunity to interact with guest speakers, and to participate in roundtable discussions on issues relating to the hospitality industry. The dialog can give students a better understanding of industry trends, challenges, and opportunities.

#### **[H ADM 411(4110) Negotiations in the Hospitality Industry]**

Spring. 3 credits. Elective. Limited to 30 students. Prerequisite: undergraduate standing; H ADM 115 or equivalent. Not offered 2006–2007.

Negotiation is a critical factor in business success. This course provides hands-on experience in negotiation in the hospitality context. Through role-play exercises, discussion, and writing, students develop into tough negotiators with whom people will want to continue doing business. Students become more comfortable with negotiations, and develop their own personal negotiating style. Students also learn how to adjust their negotiating style to respond appropriately to others' different personalities and negotiation tactics.]

#### **H ADM 414(4414) Quality Planning in the Hospitality Industry**

Spring. 3 credits. Elective. Limited to 25 students. Prerequisites: senior or graduate standing; all required hotel school undergraduate courses at 100, 200, and 300 levels. T. Hinkin.

Covers the analysis of work processes and examines organizations from three perspectives: the external customer, the internal customer, and management. This course is designed to provide students with a systematic approach to identifying, prioritizing, and improving key job functions and work processes. Students learn to use the tools of quality management including cost of quality, flowcharting, statistical process control, and collecting, organizing, and presenting data. A major component of the course is HOTS, an interactive hotel simulation that is conducted as a group activity. This is a seminar course, requiring active participation in discussion of readings and case studies.

#### **H ADM 415(4415) Managerial Leadership in the 21st Century**

Spring. 1 credit. Elective. Owing to popularity of class, priority is given in following order: seniors/second-semester grads, juniors/first-semester grads, nonemployees, extramural students, sophomores, freshmen, and Cornell employees. Space permitting, class may be added up to first day, but absolute deadline for dropping course is 12 noon F, Feb. 9. F Feb. 16 (1–8 P.M.), S, Feb. 17 (10 A.M.–6 P.M.), Sun, Feb. 18 (10 A.M.–4:30 P.M.), 2007, in Statler Auditorium. Attendance mandatory for credit. Fee for required notebook (charged to student's bursar bill; notebook distributed on first day of class): \$35. K. Blanchard.

Helps students become participant observers in their own lives through studying the field of applied behavioral science. Students will be able to use what they learn about human beings and how they function best in groups and organizations on a day-to-day

basis to develop high-quality relationships between themselves and the people they support and depend upon (their boss, staff, peers/associates, and customers). When high-quality relationships exist, organizations tend to be characterized by high levels of integrity, customer satisfaction, employee empowerment, and organizational effectiveness. The concepts learned also help students create quality friendships and family relationships. A final paper is due three weeks after the last day of class.

#### **H ADM 610(6610) M.M.H. Distinguished Lectures in Hospitality Management**

Fall. 1 credit. Required. M.M.H. students only. M. Johnson.

#### **[H ADM 611(6611) Negotiations in the Hospitality Industry]**

Spring. 3 credits. Elective. Limited to 30 students. Prerequisites: graduate standing; seniors by permission of instructor; H ADM 710 or equivalent. Not offered 2006–2007. T. Simons.

Negotiation is a critical factor in business success. This course provides hands-on experience in negotiation in the hospitality context. Through role-play, discussion, and writing, students develop into tough negotiators with whom people will want to continue doing business. Students become more comfortable with negotiations, and develop their own personal negotiating style. Students also learn how to adjust their negotiating style to respond appropriately to others' personalities and negotiation tactics.]

#### **[H ADM 614(6614) High-Performance Leadership]**

Fall. 3 credits. Elective. Limited to 30 students. Prerequisite: H ADM 710; hotel graduate students. Juniors and seniors should enroll in H ADM 314. Not offered 2006–2007. J. Brownell.

For description, see H ADM 314.]

#### **H ADM 711(7711) Organizational Behavior**

Fall. 3 credits. M.M.H. requirement. Prerequisite: M.M.H. students or written permission of instructor in advance of preenrollment. T. Hinkin.

Teaches how individuals, groups, and organizations interact within a complex, globalized service environment. Students develop interpersonal skills and gain a greater awareness of how their personal style influences leadership and decision-making. They learn to motivate others, negotiate ethical decisions, manage teams, and lead organizations through change.

### **Human Resources Management**

#### **H ADM 211(2211) Human Resource Management**

Fall, spring. 3 credits. Required. Limited to 60 students per lec. Not open to freshmen or graduate students. Prerequisite: H ADM 115. B. Tracey.

Provides students with a broad yet in-depth overview of the policies, practices, and procedures that can be used to attract, select, develop, and retain quality employees. A number of factors are considered that high-influence HRM policies and practices and provide opportunities to apply course topics to substantive situations that students will face as future hospitality professionals. Lectures, discussions, case studies, and videos.

#### **H ADM 712(7712) Human Resource Management**

Spring. 3 credits. M.M.H. requirement. Prerequisite: M.M.H. students or written permission of instructor in advance of preenrollment. M. Sturman.

Covers the strategies that enable companies to attract, develop, and retain high-quality employees, focusing on selection, compensation, performance appraisal, and career management. In each of these areas the focus is on the return on the human-resource investment.

### **Managerial Communication**

#### **H ADM 165(1165) Managerial Communication I**

Fall, spring. 3 credits. Required. Limited to 18 students per lec. (Students required to take this course generally may not delay it. If extenuating circumstances exist, student must petition to drop course by end of first week of classes. Course must be taken within first two semesters in hotel school, including any semesters in Internal Transfer Division (ITD). Add/drop and sec exchange must be approved by chairperson.) Priority given to hotel students. N. Dahl, L. Arliss, A. Newman, and C. Snow.

Introduction to the role and importance of effective communication in managerial work, especially in the hospitality industry. Development of abilities in analytical thinking and clear expression. The process of planning, preparing, and executing professional communications with an emphasis on written documents. Students write a series of business documents and give oral presentations.

#### **H ADM 364(3364) Corporate Communication**

Spring. 3 credits. Elective. Limited to 20 students per lec; priority given to hotel students. Prerequisite: junior, senior, or graduate standing or written permission of instructor; for hotel undergraduates H ADM 165 or waiver; for non-hotel undergraduates, completion of their college's writing requirement. A. Newman.

Focuses on communicating challenging messages in business contexts. Writing assignments emphasize delivering both internal and external persuasive messages. Discussions focus on the use of technology in creating and maintaining a corporate image. Assignments often include business letters and memos written for various contexts, promotional materials, negative messages, and analytical reports requiring research.

#### **H ADM 365(3365) Managerial Communication II**

Fall, spring. 3 credits. Required. Limited to 22 students per lec; priority given to hotel students. Prerequisites: junior or senior standing; for hotel undergraduates, H ADM 165 and 115. N. Dahl and D. Lennox.

Broad study of communication in a management context. Emphasizes the significant role of communication in developing work relationships that enable managers to achieve their goals. Presents the theories and principles of persuasive communication that allow managers to influence professional audiences. Students increase their individual communication abilities by applying these concepts in a variety of managerial contexts, including interacting one-to-one, working in groups,

and formally developing and presenting ideas to larger audiences.

**H ADM 462(4462) Intercultural Communication in the Hospitality Industry**

Spring. 3 credits. Elective. Priority given to hotel students. D. Lennox.

Designed to help managers develop proficiency communicating among and between people who do not share some of their own cultural assumptions. Students can expect to learn communication variables that differ among cultural groups, including the use of eye contact, body language, personal space, hierarchy, and time. Additional topics include persuasion and negotiation across cultures, and the ethics of communication in international business. A blend of theory and practice. Activities include lectures, guided discussions, group projects, student and guest speaker presentations, and analysis of specific cross-cultural managerial challenges, with emphasis on the service industry.

**H ADM 761(7761) M.M.H. Managerial Communication**

Fall. 3 credits. Required. Limited to 20 M.M.H. students per sec. D. Lennox, C. Snow, and A. Newman.

Managers use communication strategies that involve written and oral messages to solve problems and accomplish professional goals within the workplace. The chief goal of this course is to help students become competent, confident, and versatile communicators. Each student prepares clear and powerful messages—reports, oral presentations, letters, and memos—and learns to approach problems analytically and make thoughtful communication choices, some of which are situation-specific.

**Law**

**H ADM 385(3385) Business Law I**

Fall, spring. 3 credits. Elective. Open to hotel school juniors, seniors, and graduate students and non-hotel students. P. Wagner.

Provides students with a presentation of three substantive areas of business law: contracts, intellectual property, and business organizations. Students read judicial opinions, learn to identify issues, and analyze the issues by applying legal principles.

**H ADM 387(3387) Business and Hospitality Law**

Fall, spring. 3 credits. Required. Prerequisite: junior, senior, or graduate standing. D. Sherwyn.

Provides students with an integrated presentation of employment discrimination, tort, and contract concepts as they apply to the legal aspects of hospitality management. Examines relevant federal and state cases and statutes. The overall objective is to enable students to recognize, analyze, and evaluate legal issues for the purpose of making and articulating appropriate decisions in the workplace.

**H ADM 485(4485) Employment Discrimination Law and Union-Management Relations**

Spring. 3 credits. Elective. Prerequisites: junior, senior, or graduate standing; H ADM 387 or permission of instructor. D. Sherwyn.

Anti-discrimination statutes and union-management relations are two of the most

pervasive legal issues affecting the hospitality industry. Managers must take these issues into account whenever they make a personnel decision. This course provides students with an understanding of the discrimination law, a framework for complying with law, a method using the law to maintain positive employment relations, and an understanding of how to negotiate and administer a union contract.

**H ADM 487(4487) Real Estate Law**

Fall, spring. 3 credits. Elective. Prerequisite: junior, senior, or graduate standing. Recommended: completion of H ADM 387. A. Klausner.

Provides students with an understanding of the legal issues surrounding the ownership, transfer, and use and development of real estate. Students learn to recognize and evaluate legal issues to inform the decision-making process with respect to real estate, whether as a business executive, an entrepreneur, or in personal life.

**H ADM 489(4489) The Law of the Internet and e-Commerce**

Fall. 3 credits. Elective. Prerequisite: junior, senior, or graduate standing. A. Klausner.

The Internet has changed how business is done in the hospitality industry. The change has raised numerous legal issues that courts and legislatures are trying to decide on or enact. The purpose of this course is to allow students to identify and understand the rapid developments of the law of e-commerce. Topics are: how the Internet works; consumer protection; privacy; intellectual property (patent, trademark, and copyright); personal jurisdiction in cyberspace; and online contracts and legal disclaimers. This course introduces students to this emerging area of the law and enables them to identify issues so that they can seek counsel intelligently and understand the law as it continues to evolve.

**HOSPITALITY FACILITIES AND OPERATIONS**

**Food and Beverage Management**

**H ADM 236(2236) Culinary Theory and Practice**

Fall, spring. 4 credits. Required. Prerequisite: H ADM 106. Because this course is laboratory-based, students may not drop after second full week of classes; during first two weeks of classes, students may drop only with permission of instructor and/or academic dean. T. O'Connor and R. Spies.

Introduces the student to food-and-beverage operations through three major components: fundamental food composition and properties, food products and preparation, and food safety. Students prepare recipes, menus, and production schedules. Students develop the ability to recognize properly prepared foods by preparing, tasting, and evaluating them. They also are involved in a project where they create menus, develop and standardize recipes, and complete a plan for a dining event. Completion of a five-hour practicum experience in the Statler Hotel back-of-the-house is a required course activity.

**H ADM 430(4430) Introduction to Wines**

Fall, spring. 2 credits. Elective. Prerequisite: hotel juniors and seniors; seniors and graduate students in all other colleges. Hotel students strongly encouraged to enroll in fall semester. Students are exempt from 21-year-old age requirement under Section 65 of New York State law. Preregistered students who do not attend first class and fail to notify secretary in 274 Statler Hall of their absence before first class are automatically dropped from instructor's records. However, students still must drop course officially with their own college. Because of high demand for this course and because a product is consumed, absolute drop deadline in fall for all students is F, Sept. 8, 2006, and drop deadline in spring is F, Feb. 2, 2007. Fee (includes cost of wine glass and tasting kit): \$30. No auditors. S. Mutkoski.

Introduction to the major wine-producing regions of the world, and what the consumer needs to know to purchase wine at retail outlets and in a restaurant setting. Lecture topics include flavor components in wine, pairing wine and food, responsible drinking, selecting quality and value wine, and wine etiquette. Samples from a variety of countries, regions, and vineyards are evaluated.

**H ADM 431(4431) Wine and Food Pairing Principles and Promotion**

Fall. 2 credits. Elective. Limited to 20 students. Prerequisite: hotel school juniors, seniors, and graduate students; H ADM 430. G. Pezzotti.

Focuses on the pairing and creative marketing of wine and food. Students develop an understanding of regional and varietal wine styles, how food flavors can change a wine's flavor, and the promotion of wine and food. Topics include wine and food pairing principles, cuisines and their flavor components, food trends in restaurant and in the home, special event planning, and wine-list development. Students design and present wine and food tastings to industry guests.

**H ADM 432(4432) Contemporary Healthy Foods**

Fall. 3 credits. Elective. Prerequisite: H ADM 305 or equivalent. Priority given to 20 seniors and graduate students; others may enroll, space permitting. Cost of required field trip: \$75. M. Tabacchi.

Designed to build a greater awareness and understanding among nutrition and foodservice professionals of the origins and manifestations of today's health-conscious and educated foodservice patron. Addresses the marriage of nutrition and the imaginative, flavorful cuisine demanded by today's consumer. Emphasis is on the use of fresh produce, lean meats, and lack of fabricated diet foods. Creativity and nutrient density of foods served are very important components of menu design in this course. Key topics include the preparation, marketing, merchandising, and selling of healthy menus in the Statler Hotel.

**H ADM 434(4434) Creating Pleasurable Dining Experiences**

Spring. 3 credits. Elective. Prerequisite: H ADM 305 or permission of instructor. J. LeBel.

This course provides students with the conceptual and analytical tools to better understand the customers' view of the dining experience. We will explore the complexities

of dining behavior and dining experiences such as the phenomenology and psychology of pleasure, the history of dining and celebrity chefs, the importance of context in shaping guests' dining behavior, as well as the role of the media in shaping dining trends. Students will be required to examine restaurants and dining experiences with a critical eye supported by both a theoretical and empirical point of view.

**H ADM 435(4435) Selection, Procurement, and Supply Management**

Fall, first seven weeks of semester. 2 credits. Elective. Limited to 20 students. Prerequisite: hotel school juniors, seniors, and graduate students or permission of instructor. Add/drop deadline Sept. 1, 2006. R. Spies.

Deals with contemporary management issues related to the procurement activities of the hospitality industry. Focuses on both the food distribution industry and the hospitality industry so that students understand the role the distributor plays in the movement of food and supplies from the producer to the hospitality operator, and how the creation of distributor partnerships serves to improve efficiency and reduce costs. Topics include distribution channels and intermediaries in the supply chain, food distributor financial statement analysis, evaluation and selection of suppliers, developing buying strategies, purchase timing and inventory management, the emerging role of the Internet, and e-procurement service providers.

**H ADM 436(4436) Beverage Management**

Spring. 3 credits. Elective. Limited to 25 students. Prerequisites: hotel juniors, seniors, and graduate students; H ADM 430 (co-registration not allowed). S. Mutkoski.

Designed for students who intend to pursue food and beverage management as a career. Deals specifically with the management of beverage operations. Lectures cover: dram shop liability; staff training and responsible customer service; beverage pricing; food and wine pairings; wine list development; purchasing, storage, and service; wine regions; cost controls and loss prevention; and creative beverage merchandising. Guest lectures highlight industry trends and outlooks.

**H ADM 437(4437) Anheuser Busch Seminar in Quality Brewing and Fine Beer**

Fall, spring, first seven weeks of semester. 2 credits. Elective. Prerequisite: H ADM 430; hotel students only. G. Pezzotti.

Designed for upper-level students who intend to pursue food and beverage careers. Serves to advance one's knowledge about beers in terms of managing such products in a restaurant setting or other foodservice outlet. Lecture topics include the brewing process, sensory aspects of beer, international beer types and styles, marketing malt products, purchasing and distribution, storage and service, beer and food pairings, staff training and education, cost controls, and third-party liability issues. There is one required local field trip, no fee.

**H ADM 438(4438) Seminar in Culture and Cuisine**

Fall. 3 credits. Elective. Limited to 20 students. Prerequisites: H ADM 236 or permission of instructor. R. Spies.

Explores various cuisines in terms of history, lifestyle, and foods peculiar to a culture.

Through readings, research, and meal preparation, students explore various cuisines in depth. The goal of the course is to develop an awareness of several international cuisines enabling students to make comparisons and draw relationships among foodways of different cultures. Possible incorporation of each cuisine into restaurant menus is discussed as well. Each student is involved in writing research reports, making oral presentations, and designing and orchestrating the preparation of menus.

**H ADM 631(6631) Multi-Unit Restaurant Growth Strategies**

Spring, first seven weeks of semester. 2 credits. Elective. Deadline to drop seven-week course is midpoint of course. Prerequisite: graduate standing; seniors only by permission of instructor. A. Susskind.

Through a series of directed readings, case studies, and roundtable discussions with industry leaders, this course focuses on the strategic issues in the food and beverage industry that affect the growth and development of multi-unit restaurant companies. In addition to the weekly scheduled seminar time, students are required to attend two additional receptions to honor the roundtable speakers. In class students critically evaluate selected research papers related to multiunit business management to serve as the basis for class discussion and the fostering of a broader understanding of leadership and growth strategies in the multiunit restaurant business.

**Operations**

**H ADM 105(1105) Introduction to Hotel Operations**

Fall, spring, seven weeks. 2 credits. Required. Prerequisite: hotel or ITD students. Corequisite: H ADM 106. Students enrolled in Lec 1 of H ADM 105 take Lec 1 of H ADM 106 in same semester, and vice versa. R. McCarthy.

Designed to introduce students to the scope of the hotel industry in addition to the organizational structure and operational mechanics of how the departments within the rooms division of an individual hotel operate. Understanding the scope of the industry involves understanding who the major players are and what market segments their brands serve. Students gain an understanding of how work is performed and how activities are coordinated within and between hotel departments.

**H ADM 106(1106) Introduction to Food Service Operations**

Fall, spring, seven weeks. 2 credits. Required. Prerequisite: hotel or ITD students. Corequisite: H ADM 105. Students enrolled in Lec 1 of H ADM 106 take Lec 1 of H ADM 105 in same semester, and vice versa. J LeBel.

Introduction to the principles of food and beverage management, beginning with an overview of the foodservice industry at large. Attention is focused on major industry segments, business practices, and trends. Subsequently, detailed consideration is given to the components of the foodservice system: marketing, menu planning, logistical support, production, service, and controls and quality assurance. Product and systems differentiation in various industry segments are emphasized throughout. Completion of a work experience

in the Statler Hotel is a required course activity.

**H ADM 201(2201) Hospitality Quantitative Analysis**

Fall, spring, seven weeks. 3 credits. Required. Prerequisite: hotel or ITD students. R. Lloyd.

Introductory statistics course taught from the perspective of solving problems and making decisions within the hospitality industry. Students learn some introductory probability and how to gather data, evaluate the quality of data, graphically represent data, and apply some fundamental statistical methodology. Statistical methods covered include estimation and hypothesis testing relating to one- and two-sample problems of means, simple linear regression, and multiple regression. Problems involving multiple means (one way ANOVA) are covered as a special case of multiple regression, time allowing. Minitab is used as the statistical computing software.

**H ADM 301(3301) Service Operations Management**

Fall, spring. 3 credits. Required. Limited to 60 students per lec. Prerequisite: hotel students. Faculty.

Introduces statistical and operations research methods appropriate for the hospitality industry. The goal of the course is to provide students with the skills and understanding necessary for decision making using quantitative data. Students use computer spreadsheet software extensively. A key requirement of the course is an ability to communicate the results of the analyses in a clear manner. Topics include probability, decision analysis, modeling, forecasting, quality management, process design, waiting lines, and project management.

**H ADM 303(3303) Club Management**

Fall, second seven weeks; spring, first seven weeks. 2 credits. Elective. Deadline to drop seven-week course is midpoint of course. Limited to 35 students in fall; open enrollment in spring. Prerequisites for fall: no freshmen; hotel juniors and seniors. R. James.

Study of private membership clubs and the leadership role in club administration. The application of current management principles in a not-for-profit environment is discussed and club management is compared to other areas of the hospitality industry and other not-for-profit organizations. Topics include tournament, facility, and recreation management; legal, financial, and legislative issues; human relations and human resource considerations; and marketing, pricing policies, and quality standards.

**H ADM 305(3305) Restaurant Management**

Fall, spring. 4 credits. Required. Limited to 27 students per lab. Prerequisites: hotel students; H ADM 236. Cost of lab manual, certification for alcohol service, utensils for front and back of house: approx. \$85.

**Because this is a group course, absolute deadline to drop course in fall is Sept. 1, 2006, and in spring is Jan. 26, 2007.**

A. Susskind.

Offers the opportunity to synthesize the skills, concepts, and theories students have learned in other classes and apply them practically in an actual restaurant setting. Lecture topics cover pertinent issues and principles relevant to the industry at large and then, as a class,

the principles are incorporated into actions that occur in the student-run operation.

#### **H ADM 401(4401) Restaurant Entrepreneurship**

Fall, spring. 3 credits. Elective. Limited to 20 students. Prerequisite: hotel students; written permission of instructor. Max. cost of five required field trips: \$350. G. Pezzotti.

Designed for students who have a strong interest in food and beverage operations and who may be considering a career as an entrepreneur. Under the supervision of the instructor and using student-developed case studies, the students visit and analyze various independently owned restaurant operations. Analysis covers, but is not limited to: the restaurant's concept (market), organization, ownership, management, physical structure, staff, front-of-the-house operations, back-of-the-house operations, and fiscal integrity. Readings relative to current topics in the restaurant industry are required. Classes alternate weekly between field trips (2:30 P.M. through dinner hour) and seminar/case presentation.

#### **H ADM 403(4403) Specialty Food and Beverage Operations: Guest Chefs**

Spring. 3 credits. Elective. Limited to 20 students. Prerequisites: H ADM 305; hotel juniors, seniors, and graduate students by permission of instructor. G. Pezzotti.

Designed for students focusing in food and beverage preparation. Students considering a career in the hotel or restaurant food and beverage environment or those who anticipate interacting with present-day culinary trends find the course especially beneficial. Over the course of the semester, the class, working in groups, is responsible for the marketing, organization, planning, production, service, financial analysis, and accounting relative to three guest-chef specialty production nights. The chef is asked to recommend the evening's menu reflecting his or her culinary background and work with the class in producing the meal for the Cornell community using the hotel facility. A required final project analyzes the relative degree of success experienced during each guest-chef event. The analysis considers consumer reaction as well as proper application of food and beverage management principles.

#### **H ADM 404(4404) Catering and Special Events Management**

Fall. 3 credits. Elective. Limited to 30 students. Prerequisites: H ADM 236 or permission of instructor. Cost of required field trip to New York City: approx. \$250. R. Spies.

The catering and special events industries are among the fastest-growing segments of the hospitality industry. This course focuses on off-premise and on-premise catering for social and business functions, and the management of large-scale independent events, such as sporting events, artistic performances, and product launches. Topics include organizational structure, legal aspects of catering and special events management, product and service development, marketing and sales, catered function and special event planning and execution, staff recruitment and training, post-event analysis, financial success of catering, and special events businesses.

#### **H ADM 407(4407) Seminar in Hotel Operations**

Spring. 3 credits. Elective. Limited to 40 students. Prerequisite: junior or senior standing. Cost of field trips: approx. \$250. Faculty.

Students develop their leadership abilities through a series of hands-on projects for the Statler and Waldorf-Astoria hotels. They gain experience by identifying the requirements and challenges of a project, creating a plan, and carrying out the leadership responsibilities that will result in others successfully implementing their recommendations. Drawing on their specific knowledge and skills in all the academic disciplines, students gain a broader perspective on the hotel as a business organization. They investigate the combination of human and technical forces that make a hospitality business succeed or fail. Emphasis is on reconciling the real or apparent conflicts between theory, as learned in the students' college courses, and practice, as observed in actual hotel operations. Upon completion of the course, students are able to evaluate issues and formulate cogent strategies for managing hotel operations.

#### **H ADM 408(4080) Introduction to Casino Operations**

Fall. 2 credits. Elective. Prerequisite: hotel students. Cost of required field trip to Atlantic City: approx. \$250. R. McCarthy.

A vital part of the hospitality industry, casino gaming is one of the most exciting and fastest-growing industries. This course focuses primarily on the operation and ownership of commercial casinos and the hotels attached to them. It is designed to introduce students to the internal and external casino environment. It looks at the historical development of gaming in America to understand how the industry has evolved to its present form. Students learn the organizational structure of a casino hotel, how it operates, and how it makes money. Students also gain an understanding of the different companies that own casino hotels and the current issues facing these companies. Topics include casino marketing strategies and player rating systems; the social and economic impact of gaming and the various regulatory environments within which casinos operate; and how common casino games are played and the mathematics of the various games. Students build on their food and beverage and hotel knowledge to better understand the specific challenges facing casino hotel operators.

#### **H ADM 502(5502) Advanced Hospitality Quantitative Analysis**

Spring. 3 credits. Elective. Prerequisite: H ADM 201 or permission of instructor. R. Lloyd.

An applied statistics course designed for professionals working in the hospitality industry. Topics include a thorough review of multiple linear regression, including model-building with partial regression plots and first-order interactions, and use of categorical predictors and the interpretation of their coefficients, increasingly used to answer questions in finance, marketing, and other managerial areas. Other topics include simple and multiple logistic regression, analysis of proportions, tests of independence with follow-up analysis, one- and two-factor ANOVA with follow-up analysis, and prediction and forecasting with neural networks, used in operations and revenue management.

#### **H ADM 602(6602) Spa and Spa Hotel and Resort Development and Management**

Fall, spring. 3 credits. Elective. Limited to 33 students. Prerequisite: hotel seniors and graduate students; others may enroll, space permitting. Cost of two required field trips: approx. \$150. M. Tabacchi.

Emphasizes the development, management and marketing of spas, spas in hotels and resorts, and spa restaurants. Day spas, resort spas, and destination spas are studied in depth. The feasibility of success for new spas and marketing research necessary to establish new spas is discussed. The design of menus, mental and physical fitness programs, stress management, spa medical treatments, complementary medical treatments, and other spa programs are all considered. Personnel required, safety, legal, and ethical issues regarding spas are an important part of the course. The integration of nutritious menu items into restaurant menus and their marketing and merchandising is studied. Guest speakers from spas are an integral part of the course.

#### **H ADM 605(6605) Yield Management**

Fall. 3 credits. Elective. Limited to 30 students. Prerequisite: senior or graduate standing; H ADM 301 or 703 or equivalent. Faculty.

Helps students learn how to apply the principles of yield management effectively. Focuses on the integration of yield management techniques with information technology, internal management issues, and external marketing concerns. Topics include yield management techniques, forecasting, overbooking, group decisions, and management and marketing issues.

#### **H ADM 606(6606) Restaurant Revenue Management**

Fall. 3 credits. Elective. Limited to 40 students. Prerequisites: H ADM 703; graduate standing or permission of instructor. S. Kimes.

Revenue management is a method for profitably managing capacity. The objective of this course is to help students learn how to apply the principles of revenue management to restaurants. The course focuses on methods of managing duration and price with the intent of maximizing revenue per available seat-hour. Topics include forecasting, overbooking, reservations systems, information technology, process design, pricing, and management and marketing issues.

#### **H ADM 609(6609) Airline Service Management**

Spring. 3 credits. Elective. Priority given to 30 seniors and graduate students; others may enroll, space permitting. Cost of field trip: approx. \$75. M. Tabacchi.

A must for those interested in careers in the airlines industry. The impact of 9/11 upon the industry is investigated. Airline service and on-board services are used as competitive advantages by airline carriers. In fact, names such as Singapore Airlines and Virgin Atlantic have become synonymous with service excellence in a service economy. The strategies of developing competitive and superior service in today's erratic economic climate is a major part of class discussion. Guest speakers from American Airlines, Singapore Airlines, US Airways, Delta, Continental Airlines, Virgin Atlantic, and SkyChefs are featured. In addition to service



strategies both on the ground and in the air, students study the challenge of serving meals on international flights. Strategies, planning, and forecasting by these executives are examined. Case studies based upon national and international airline business are an integral part of the course. A field trip to an airline's hub city enables students to observe first hand the industry and its personnel in action.

#### **H ADM 703(7703) Operations Management**

Summer. 3 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. G. Thompson.

Based on principles of scientific management, the course gives students the skills and understanding necessary for decision-making using quantitative and qualitative data. Students use computer spreadsheet software extensively for "number-crunching" analyses and learn to communicate the results of their analyses in a clear manner. Students are provided with a "tool kit" of sophisticated Excel models for solving service-operations problems.

### **Facilities Management, Planning, and Design**

#### **H ADM 255(2255) Hospitality Development and Planning**

Fall, spring. 3 credits. Required.

Prerequisite: sophomore standing. S. Robson.

Introduction to the issues and opportunities inherent in the development and planning of hospitality facilities, specifically hotels and restaurants. Course components include the project development sequence, conceptual and space planning, architectural design criteria, construction management, and the interpretation of architectural design and consultant drawings. The emphasis is on setting appropriate facilities requirements, understanding industry practice, and implementing properties decisions within a balanced design, operations, and financial framework.

#### **H ADM 351(3351) Hospitality Facilities Design**

Fall. 4 credits. Elective. Limited to 36 students. Prerequisite: H ADM 255 or permission of instructor. R. Penner.

This intensive studio course provides the graphic skills important for design and experience in applying these skills in hospitality planning and design situations. Students prepare design projects using both hand drafting and computer-aided design (CAD) software. These assignments cover basic graphic skills and layouts for typical hotel spaces including guestroom suite, lobby and lobby bar, and full-service restaurant or specialty coffee retail outlet.

#### **H ADM 352(3352) Hotel Planning and Interior Design**

Spring. 3 credits. Elective. Limited to 24 students. Prerequisites: H ADM 351 or permission of instructor. Cost of required field trip: min. \$250; cost of presentation materials: min. \$150. R. Penner.

Helps students understand how to manage the design process—how to establish the scope of work, contracts, and budgets. Builds on earlier courses to give students experience in planning and designing guestrooms, lobby, food and beverage, function, and fitness spaces. The studio course focuses on a

semester-long project, in which student teams prepare the interior design for an actual hotel development. The class visits a northeastern city, tours the project site and competitive hotels, meets with an architect or designer, and establishes an integrated concept for the hotel. Students design all the main interior spaces, modifying the architectural plan as necessary, lay out furniture and fixtures, select finishes and FF&E, and prepare a full design presentation.

#### **H ADM 355(3355) Hospitality Facilities Operations**

Fall, spring. 3 credits. Required.

Prerequisite: H ADM 255. D. Zemke.

Overview of the operation of hospitality facilities, including operating costs for various types of facilities, types and characteristics of major building systems, and the responsibilities of the engineering maintenance department. The renovation needs of hospitality facilities are examined and key managerial aspects of renovations considered.

#### **H ADM 451(4451) Restaurant Development**

Fall. 3 credits. Prerequisites: hotel seniors or graduate students; juniors by permission of instructor; for undergraduates, H ADM 305. Students who wish to develop design skills for restaurant concepts are encouraged to enroll in H ADM 453 in the following spring. S. Robson.

Exposes students to the process, challenges, and rewards of developing a restaurant concept from idea to the construction of the first unit. Specific topics include concept creation, market research, creating the delivery process, concept testing and evaluation, restaurant feasibility, site selection, facility programming, and development issues such as licensing, permitting, and construction. Visitors from industry address best practices and their own experiences in getting a restaurant concept off the ground. The course includes readings, discussions with industry leaders, and cases, and culminates with students' formulating a detailed restaurant concept and development plan.

#### **H ADM 452(4452) Sustainable Development and the Global Hospitality Industry**

Fall. 3 credits. Elective. Prerequisite: junior, senior, or graduate standing. Cost of required overnight field trip: approx. \$150. D. Stipanuk.

Multidimensional course introducing the global sustainability and environmental movements, their impact on the hospitality industry, and responses to and opportunities associated with sustainability. Readings are drawn from the environmental, sustainability, and hospitality literature. Students should be prepared to encounter conflicting views in the readings and in classroom discussions. The course attempts to portray a variety of viewpoints regarding issues of contemporary interest to society and the business community. Discussion of these issues is a key component of the course.

#### **H ADM 453(4453) Foodservice Facilities Design**

Spring. 3 credits. Elective. Limited to 12 students per sec. Pre- or corequisites:

H ADM 351, 305, and 451 (other commercial food production experience acceptable) or permission of instructor; hotel seniors; juniors by permission of instructor. S. Robson.

Introduction to the basic concepts of foodservice facilities design and planning with an emphasis on restaurants. Students determine space allocations for the front and back of house areas, develop production workflow in the preparation and service areas, and select equipment using standards for production capability, quality of construction, and the ease of maintenance. All documentation is produced on CAD, which is taught as part of the weekly studio. Students also use studio time for planning, designing, and writing specifications for a medium-size restaurant kitchen.

#### **H ADM 457(4457) Hotel Development**

Fall. 3 credits. Elective. Prerequisite: senior or graduate standing; juniors by permission of instructor. Cost of required overnight field trip: approx. \$150. D. Stipanuk.

Focuses on the management structure and systems, laws and regulations, and industry practices that most influence the successful development of hospitality real estate, including lodging and eating facilities. Topics include: market studies, franchise requirements, governmental approvals, design construction contracts, the construction process, scheduling, budgeting, and emerging issues and opportunities. Guest speakers present case studies of actual development projects.

#### **H ADM 751(7751) Properties Development and Planning**

Fall. 3 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. R. Penner.

Overview of hospitality project development and planning from the perspective of an owner and manager. Students learn about the role of the development team, feasibility studies, space programming, and construction management, and about functional and design criteria for hotels and restaurants. Teams prepare program documentation for a new hotel or restaurant or one undergoing major repositioning.

## **MARKETING, TOURISM, STRATEGY, AND INFORMATION SYSTEMS**

### **Marketing, Tourism, and Strategy**

#### **H ADM 141(1141) Microeconomics for the Service Industry**

Fall, spring. 3 credits. Required. Limited to 60 students per lec. Prerequisite: hotel students. B. Carroll.

Introduces students to microeconomic principles and theories in the context of applications and solutions associated with the service industry with a focus on hospitality and travel. Topics include principles of production, supply and demand, firm behavior, costs, pricing and topics specifically associated with the travel and hospitality industry. Includes readings, lec's, discussions, problem sets, and guest speakers.



**H ADM 243(2243) Marketing Management for Services**

Fall, spring. 3 credits. Required. Limited to 60 students per lec. Prerequisite: hotel students excluding freshmen.

L. Klein-Pearo and R. Kwornik.

Develops an understanding of marketing management, the process through which organizations analyze, plan, implement, and control programs to develop and maintain beneficial exchanges with target buyers. Students learn about marketing management through a mix of readings, lectures, class discussions, individual and group exercises, industry guest speakers, and exams. A key element of the course involves working as part of a small team to complete a marketing plan for a business organization. The plan provides a road map of an organization's future marketing strategies and programs.

**H ADM 343(3343) Marketing Research for Decision Makers**

Fall. 3 credits. Elective. Prerequisite: H ADM 243 and a statistics course.

M. Lynn.

Helps students become better consumers of marketing research. Topics include issues involved in designing, conducting, and interpreting focus groups, depth interviews, surveys, experiments, and choice models. Special emphasis is placed on what each method should and should not be used for and why.

**H ADM 347(3347) Consumer Behavior**

Fall, spring. 3 credits. Elective. Limited to 45 students. Prerequisite: junior or senior standing; H ADM 243. M. Lynn.

Helps students become better at understanding, predicting, and influencing consumer behavior. Topics include motivation, perception, learning, decision making, attitudes, nonverbal communication, persuasion, compliance, geodemographics, and psychographics. The practical implications of psychological principles are emphasized. Specific applications involve such areas as guest frequency programs, menu design, promotional strategy, personal selling, sales and marketing planning, and marketing research. Class time is used for discussions and application exercises as well as for the presentation of relevant information.

**H ADM 441(4441) Strategic Management**

Fall, spring. 3 credits. Required.

Prerequisites: senior standing; at least one course in each of accounting, finance, marketing, operations, economics, and information systems. Because students work in groups, absolute drop deadline is two weeks after first day of class.

A. Kalnins.

Students learn to evaluate firms, industries, and the broader environments in which they exist. Since this is a capstone course, a part of the analysis process involves integrating material learned in all of the functional disciplines. Students also evaluate specific firm strategies and their impact on competitiveness and performance. Using all of this information, students are trained to select strategies for firms and develop plans for implementing them. Topics include environmental analysis, firm resource analysis, competitive analysis, strategy formulation, strategy implementation, international strategy, and strategic control.

**H ADM 442(4442) Strategic Marketing**

Fall. 3 credits. Elective. Prerequisite: senior standing; marketing course. C. Dev.

Offers innovative, practical, and profitable knowledge and insights to improve revenue, profit, and customer loyalty. Concepts include underlying strategic marketing, best-practice examples, and challenges facing hospitality brands. The unique benefits of this course come from the extensive use of detailed cases in which students break into competing teams to formulate strategies and tactics in a realistic marketing environment. Brands whose marketing strategies are examined include Hilton, Marriott, Accor, Choice, Four Seasons, Club Med, Harrah's, Shangri-La, Yum Brands, Starbucks, Disney, and Southwest Airlines. Learning is assessed via in-class contributions, written analysis of cases, a mid-term, and a final exam.

**H ADM 443(4443) Innovation and Dynamic Management (also AEM 328(3280))**

Spring. 3 credits. Elective. Limited to 15 students. Prerequisite: junior, senior, or graduate standing. C. Enz.

University-wide seminar-style course that investigates the innovation process and how to develop good management practice. Innovative firms are studied via case analyses, and effective management skills and capabilities are explored. Emphasis is placed on examining how businesses and managers can build profitable organizations through a process of creative rethinking, re-evaluating, and discarding existing practices. The class will operate as a seminar.

**H ADM 447(4447) Managing Hospitality Distribution Strategies**

Spring. 3 credits. Elective. Prerequisites: H ADM 141 and 243. B. Carroll.

Provides a framework for managing marketing distribution strategies. Presents and analyzes the structure and interrelationships among distribution channels within the travel and hospitality industry. Theories of marketing distribution management and analysis are evaluated and applied within the context of that system. Topics include dimensions of hospitality marketing distribution, economics of the major hospitality distribution segments, managing hospitality distribution strategies, and the role of convention and visitors bureaus, national tourist organizations, and associations in distribution management.

**H ADM 540(5540) Brand Management**

Fall. 3 credits. Elective. C. Dev.

Brands have become the central organizing principle of most hospitality organizations, guiding every decision and every action. Individuals that are adept at developing and managing brands reap great rewards. This course addresses important brand management decisions faced by hospitality firms. Combining the latest in thought leadership on this topic with practical exercises, case studies, and guest speakers you understand how to manage a brand for increased customer loyalty, market advantage, and profitability. You will learn the key elements of brand management via presentations and discussions on key concepts, reading and discussing current brand management research, insights from guest speakers, and preparing and analyzing hospitality brand case studies.

**H ADM 645(6645) Advanced Topics in Services Marketing**

Fall. 3 credits. Elective. Prerequisite: graduate standing; marketing course or permission of instructor. R. Kwornik.

The main goal is to develop critical analytic skills and knowledge needed to implement service strategies for competitive advantage. Topics include key differences in goods versus services marketing and service gaps analysis, services consumer behavior and satisfaction, service quality, relationship marketing, service recovery, service design (including analysis of service as theater), service blueprinting and the "servicescape," and services demand management, pricing, promotion, and distribution. Lectures, discussion of current services research, case analyses, and guest-speaker presentations. Also used are a variety of group and individual written projects and presentations, including a services-marketing audit.

**H ADM 743(7743) Marketing Management for Services**

Summer. 3 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. L. Klein-Pearo.

Covers the fundamental concepts of marketing management and in the techniques, analyses, and frameworks for solving marketing-management problems. Explores theories and conceptual frameworks that draw on customer, competitor, and core-capability analyses in marketing planning and implementation. Students develop decision-making capabilities in product/service development, pricing, advertising and promotions, and distribution policies. The capstone of the course is team development of a marketing plan for a new hospitality business.

**H ADM 744(7440) Competitive Strategies for the Hospitality Industry**

Spring. 3 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. Faculty.

Strategic management considers the total enterprise, the industry, and the competitive environment in which firms operate. This integrative capstone course focuses on how firms formulate, implement, and evaluate corporate and business strategies. The goal is for students to develop a mastery of the tools used to perform analyses of the industry and competitors and to develop skill at evaluating and implementing strategies to sustain a firm's competitive advantage while generating superior value for customers.

**Information Systems****H ADM 174(1174) Microcomputing**

Fall, spring. 3 credits. Required. Limited to 30 students per sec. Prerequisite: fall, hotel school freshmen and transfer students; spring, open enrollment. P. Clark, M. McCarthy, and M. Talbert.

Provides a foundation in information technology (IT) and how it relates to everyday business computing. Teaches IT concepts during lectures and reinforces these concepts in practical lab sessions using current standards of business computing. Topics include fundamental IT concepts, proficiency in Microsoft Office, and understanding the issues of tool selection, standardization, and efficiency, integration of applications, and recognizing the importance of good computer management.

**H ADM 274(2274) Microcomputing**

Spring. 3 credits. Elective. Limited to 30 students per lec. Prerequisite: non-hotel students. P. Clark.

Introduction to business computing to develop functional computer fluency. Students develop their skills in the areas of text, spreadsheets, presentation and file management, and web site management. The course is entirely lab-oriented and students work using Windows 2000. Software used is the latest in word processing, spreadsheet, presentation, database management, and web design.

**H ADM 275(2275) Introduction to Information Systems Management**

Fall, spring. 3 credits. Required.

Prerequisite: hotel students; H ADM 174. G. Piccoli and E. Wagner.

Goals are to learn about information systems; understand and be able to clearly articulate the difference between information technology and information systems; link concepts and technical jargon to the real-world uses of information systems; and learn the information-systems fundamentals needed throughout hospitality careers. Designed for students who will work within hospitality organizations as end users, user-managers, leaders, and information-systems professionals. This is not a course for technologists but rather for the general-management student. Provides the essential information that all hospitality management students should know about information systems.

**H ADM 374(3374) Fundamentals of Database Management and Data Analysis**

Fall. 3 credits. Elective. Limited to 30 students. E. Wagner.

Prepares students to create and manage information in a knowledge-based organization. The design and use of database and spreadsheet functionality are used to perform analyses and make decisions. Students gain a conceptual foundation and then practice applying these ideas through project activities and course readings. Topics include information and information management in organizations; fundamentals of relational database design and implementation; SQL queries; how to work in a database design team and as an individual research analyst; database design and management using Microsoft Access; how to normalize a database design to ensure effective use of the technology; analysis of the managerial decision-making process functionality within Microsoft Access and Excel; the conversion of data into information and knowledge that can be leveraged for particular business goals; the role of data and information management in contemporary society; and data management opportunities in the hospitality industry.

**H ADM 375(3375) Internet Technologies for the Entrepreneur**

Spring. 3 credits. Elective. Prerequisite: H ADM 174 or equivalent. **Owing to capacity restraints in Binenkorb lab, attendance at first class is mandatory; no-show students are dropped from course to make room for stand-by students; students may not drop course after second week of class.** M. Talbert.

Introduces students to the technical underpinnings of the Internet, with an emphasis on the World Wide Web. Students survey many of the key technologies that form

the mechanism of the web, including HTML, DHTML, XML, JavaScript, VBScript, Java, Style Sheets, Browsers, Servers, ActiveX, and Active Server Pages. The goal is a managerial familiarity with a broad range of important technologies, rather than proficiency in any single technology. This is an implementation course; in other words, programming. Students should expect a considerable demand on outside time for practice necessary to gain programming fluency in the languages introduced.

**H ADM 474(4474) Strategic Information Systems**

Spring. 3 credits. Elective. G. Piccoli.

Targeted to students contemplating careers in general management and operations, marketing, or information systems. Managerial in nature, the course is designed to help students think strategically about IT (and, by extension, about any organizational resource) and provides students with analytical tools that can help them make effective decisions about the use (or not) of IT in organizations. Students learn the managerial implications of recent technology trends, the economic premises of the new competitive landscape dominated by pervasive networks (e.g., the Internet), how information technologies can be leveraged to create shareholder value and service customers, how information and advanced IT can create competitive advantage, and when and how a competitive advantage based on IT can be sustained. Course includes lectures, case study discussions, guest presentations, and project work. Many of the class activities center on analysis and discussion of readings and case studies. Class meetings are very interactive.

**H ADM 476(4476) Visual Basic for Applications: End-user Programming**

Fall, spring 3 credits. Elective. Limited to 30 students per lec. **Owing to capacity restraints in Binenkorb lab, attendance at first class is mandatory; no-show students are dropped from course to make room for stand-by students; students may not drop course after second week of class.**

M. Talbert.

Introductory programming course for end-users (e.g., business managers and consultants). Students develop fluency in the popular Visual Basic for Applications (VBA) language. Using VBA, students learn how to customize and extend the Microsoft Office Suite, with an emphasis on Excel. They also develop custom information systems using Microsoft Office applications as programmable building blocks. Secondary objectives of the course are to cover fundamental design and programming principles. The course is entirely lab based.

**H ADM 477(4477) Advanced Business Modeling**

Fall, spring, second seven weeks of semester. 2 credits. Limited to 21 students. Prerequisite: seniors and graduate students with priority given to M.M.H. students; H ADM 174. Note: Deadline to drop seven-week course is midpoint of course.

M. McCarthy and M. Talbert.

Focuses on organizational systems, planning, and decision process, and how information is used for decision support in organizations. Provides students with practical skills in developing spreadsheet computer models using Microsoft Excel. Topics include business planning and forecasting, numerical

methods, advanced formulas and functions, user-interface design, data protection and validation, importing external data, and output presentation.

**H ADM 772(7720) Information Systems Management**

Spring. 3 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or written permission of instructor. G. Piccoli.

Information technologies (IT)-based information systems are important to almost all organizations. They are a primary means for ensuring efficient operations and effective decision-making, and they offer the potential to increase a firm's competitiveness when appropriately planned and used. Students become comfortable with all aspects of information systems decision-making, including systems analysis and design, systems selection and purchasing, and the risks in IT investments. They become familiar with the systems found in hospitality operations. The course is not overly technical, but you are expected to be comfortable researching and discussing information technologies.

**FINANCE AND REAL ESTATE****Finance/Accounting****H ADM 120(1120) Personal Financial Management**

Fall, spring. 2 credits. Elective. Limited to 50 non-hotel students. L. Hensley and E. Cornell.

Overview of personal financial planning including money management, tax planning, use of credit, insurance, investing, retirement planning, and estate planning.

**H ADM 121(1121) Financial Accounting**

Fall, spring. 3 credits. Required.

Prerequisite: hotel students. D. Dittman.

Introduction to the basic principles of accounting, involving transaction analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

**H ADM 221(2221) Managerial Accounting**

Fall. 3 credits. Required. Prerequisites: H ADM 121 and 174 or equivalents. G. Potter and J. Hesford.

Focuses on the use of accounting information for management decision making and control. Topics include product costing, budgeting, management decision making, and control systems. There is one common exam at the end of the semester.

**H ADM 222(2222) Finance**

Fall and spring. 3 credits. Required. Prerequisites: hotel students or permission of instructor; H ADM 121, 221, or equivalents, or permission of instructor. L. Canina and S. Carvell.

Provides students with accounting cash flow information for financial planning, capital structure decisions, capital budgeting evaluation, and short-term and long-term financial decision-making. Topics include current asset management, short-term financing, capital budgeting, long-term financing, cost of capital, and problems in international finance.

**H ADM 223(2223) Financial Accounting Principles**

Fall, spring, 3 credits. Elective. Prerequisite: non-hotel students. P. Strebel.

In-depth introduction to the principles of financial accounting, involving transaction analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

**H ADM 225(2225) Finance**

Fall, spring, 3 credits. Elective. Prerequisite: undergraduate non-hotel students. Faculty. Students are exposed to a wide variety of corporate finance topics, including: time value of money, risk and return, valuation models, cost of capital, capital budgeting, capital structure, and dividend policy.

**H ADM 321(3321) Hospitality Financial Management**

Fall, spring, 3 credits. Required. Limited to 54 students per sec. Prerequisites: hotel students; H ADM 121, 221, and 222, or permission of instructor. A. N. Geller.

Integrates the areas of financial accounting, managerial accounting, and finance, and applies the interpretive and analytical skills of each to hospitality industry situations. Topics provide an understanding of: the analysis and interpretation of financial statements and operating reports, the budgeting and forecasting process, the application of C-V-P and other decision models to hospitality operations, operating agreements, capital investment analysis, financial feasibility, project and general financing, valuation techniques, and measuring value for important stakeholders.

**H ADM 421(4421) Internal Control in Hospitality Operations**

Fall, 3 credits. Elective. Limited to 30 students. Prerequisites: H ADM 321, 722, or equivalent. A. N. Geller.

Deals primarily with operations. Generally, hotel and restaurant operations are analyzed from the perspective of preventing fraud and embezzlement. Specifically, the design and distribution of production, accounting, information systems, and supervisory tasks are studied in a manner that ensures effective internal control and verifiable audit trails. The course relies heavily on case studies of actual frauds perpetrated in hotel and restaurant operations.

**H ADM 422(4422) Taxation and Management Decisions**

Fall, 3 credits. Elective. Limited to 75 students. Prerequisite: junior, senior, or graduate standing. L. Hensley.

Introduction to tax advantages and disadvantages of various organizational structures, including: corporations, partnerships, subchapter "S" corporations; financial information reporting to tax authorities and to shareholders and how these reports differ; use of depreciation methods to achieve tax reductions; and syndication techniques and the role tax laws play in promoting private investments and development.

**H ADM 426(4426) Advanced Corporate Finance**

Fall, 3 credits. Elective. Prerequisite: junior or senior standing; H ADM 321. Graduate students should enroll in H ADM 326. Faculty.

In-depth analysis of corporate financial management, including: financing alternatives and capital structure decisions, cash management and working capital management, capital budgeting decisions, risk analysis, valuations of real options, and Economic Value Added analysis. Although applicable to all businesses, special attention is placed on issues important to the hospitality industry. The course emphasizes analytical methods through case studies and a semester project.

**H ADM 427(4427) Multinational Finance and International Risk Management**

Spring, 3 credits. Prerequisites: H ADM 121, 221, 222, or equivalents. Graduate students should enroll in H ADM 627. C. Chang.

Focuses on the international aspects of financial management important to the hospitality industry with the intention of providing an understanding of and confidence in dealing with the economic issues faced by the multinational corporation. The major areas covered are: the international financial management environment, the management of foreign exchange risk, international asset management, and international sources of funds.

**H ADM 429(4429) Investment Analysis and Portfolio Management**

Fall, spring, 3 credits. Elective. Prerequisites: Intro Corporate Finance, Financial Accounting, Intro Statistics, and beginner knowledge of Excel or permission of instructor. Graduate students should enroll in H ADM 629. C. Chang.

The course is an exploration of the three major investment vehicles: bonds, equity, and derivatives. In each case, it discusses what they are, how they are valued, and what risks they entail. The intimate relationship between return/value and risk is explored. At the focus of these discussions lies the idea that optimal investing is chiefly about balancing risk with returns, about extracting maximum gains with minimum exposure, about creating portfolios of "good trade-offs." A study of theories develops a toolkit of skills and a detailed look at practical application including pricing anomalies, trading "programs," and a hands-on portfolio simulation hopes to illuminate this investigation.

**H ADM 624(6624) Reporting and Analysis of Financial Statements**

Fall, spring, 3 credits. Elective. Limited to 60 students. Prerequisite: junior, senior, or graduate standing. G. Potter.

Designed to provide understanding of the basic accounting model, the underlying concepts for income measurement, and the accounting rules for the valuation of assets, liabilities, and owners' equity. Emphasis is placed on understanding the economic substance of the transactions and the implication of using alternate accounting rules on the resulting numbers, especially in assessing the "earnings quality." Focus is from an outsider's view of the company, and students should be able to evaluate and interpret the published financial information, specifically in the context of valuation, debt and compensation contracts, and credit assessment.

**H ADM 626(6626) Advanced Corporate Finance**

Fall, 3 credits. Elective. Prerequisite: H ADM 321; graduate standing. Faculty. For description, see H ADM 426.

**H ADM 627(6627) Multinational Finance and International Risk Management**

Spring, 3 credits. Elective. Prerequisites: H ADM 121, 221, 222, or equivalents. Undergraduates should enroll in H ADM 427. C. Chang. For description, see H ADM 427.

**H ADM 629 (6629) Investment Analysis and Portfolio Management**

Fall, spring, 3 credits. Elective. Prerequisites: Intro Corporate Finance, Financial Accounting, Intro Statistics, and beginner knowledge of Excel or permission of instructor. Undergraduates should enroll in H ADM 429. C. Chang. For description, see H ADM 429.

**H ADM 723(7723) Corporate Finance**

Summer, 3 credits. M.M.H. requirement. Prerequisite: M.M.H. students or permission of instructor. L. Canina. Builds on the prerequisite courses in financial accounting and financial reporting. Topics include applications of discounting techniques, evaluation of capital expenditures, estimating cost of capital, bond and stock valuation, portfolio theory, asset-pricing models, and capital-structure decisions. The course emphasizes valuation skills as a means to bring together the cost of capital, financing, and operating issues faced by a firm. Students come to understand the financial impact of managerial decisions, know how to differentiate decisions that increase the value of a firm, and know how to properly evaluate investment, financing, and payout decisions. They also learn standard techniques of financial analysis, such as discounted cash-flow valuation, capital budgeting, risk analysis, and estimating the cost of debt and equity.

**H ADM 724(7724) Managerial Accounting**

Summer, 3 credits. M.M.H. requirement. Prerequisite: M.M.H. students or permission of instructor. J. Hesford. This introduction to managerial accounting, which is the use of accounting information for decision-making and control, covers cost behavior, cost classification, cost-volume-profit analysis, product costing, budgeting, variance analysis, cost estimation, cost allocations, customer-profitability analysis, managerial control systems, and performance measurement.

**Real Estate Development****H ADM 420(4420) Principles of Real Estate**

Fall, spring, 3 credits. Elective. Limited to 50 students. Prerequisites: H ADM 222 or equivalent; junior or senior standing. Graduate students must enroll in H ADM 620. J. deRoos.

This survey course approaches real estate from four perspectives: investment, market, mortgage finance, and legal. Understanding these perspectives enable students to make better investment and financing decisions, use real estate resources wisely, understand public policy issues, and be prepared for additional courses in real estate investment, finance, and development.

**H ADM 423(4423) Hospitality Real Estate Finance**

Fall, 3 credits. Elective. Prerequisite: H ADM 321 or equivalent; junior or senior standing. Graduate students must enroll in H ADM 621. D. Quan.

Focuses on real estate financing for hospitality-oriented projects. Addresses the following topics: methods of measuring rates of return; feasibility and appraisal processes; equity and debt financing vehicles to include joint ventures, limited partnerships, construction mortgages, participating, convertible, and seller-financed mortgages; forms of operating agreements to include management contracts, leases, and franchises; and trends in international hotel franchising. Presentations by hospitality industry real estate practitioners tie course material to current industry practices.

**H ADM 620(6620) Principles of Real Estate**

Fall, spring, 3 credits. Elective. Prerequisite: graduate standing; H ADM 721 or equivalent. J. Corgel.

For description, see H ADM 420. Includes much of the material in H ADM 420 plus special topic sessions that feature guest speakers from industry, faculty from other colleges, and case studies.

**H ADM 621(6621) Hospitality Real Estate Finance**

Fall, 3 credits. Elective. Prerequisite: H ADM 722 or equivalent; graduate standing. J. deRoos.

Focuses on real estate financing for hotel and restaurant projects. Methods of measuring rates of return; feasibility and appraisal processes; equity and debt financing vehicles to include participating, convertible, and seller-financed mortgages; forms of operating agreements to include management contracts, leases, and franchises; and trends in international hotel financing. Presentations by hospitality industry real estate practitioners tie course material to current industry practices.

**H ADM 622(6622) Hospitality Asset Management**

Spring, 3 credits. Elective. Prerequisite: for undergraduates, H ADM 321 and completion of H ADM 420 highly recommended; for graduate students, H ADM 722 and completion of H ADM 620 highly recommended. J. deRoos.

Hotel asset management is the fiduciary responsibility of managing the hospitality investment to meet the specific objectives of ownership. The asset manager's role in building value is analyzed at both the portfolio and property levels. Lectures, assignments, cases, and guest speakers introduce the latest techniques in asset management and provide insights into current lodging-market and operational challenges. Topics include management contracts, managing the manager, benchmarking property performance, and the capital improvements decision.

**H ADM 625(6625) Securitization and Structured Financial Products**

Fall, spring, 3 credits. Elective. Limited to 40 students. Prerequisites: H ADM 222 or 721, and 427 or permission of instructor; senior or graduate standing. D. Quan.

Deals with the structure and analysis of securitized financial products with an emphasis on residential and commercial mortgage-backed securities (MBS). The course

is intended for those who wish to acquire a working knowledge in the analysis of such securities (e.g., collateralized mortgage obligations, commercial MBS, auto loan, and credit card backed securities) and an understanding of the securitization process. The course's subject matter necessitates a highly analytic and quantitative approach, and students are required to have a strong background in finance and economics. Students who have questions about preparation or background should see the instructor.

**H ADM 628(6628) Real Estate Finance and Investments**

Spring, 3 credits. Elective. Limited to 40 students. Prerequisites: H ADM 323 or 621, 450 or 651; graduate standing. J. Corgel.

Promotes sound real estate investment and finance decision-making, use of advanced theory, and techniques in financial economics. Real estate investment decisions are made through applications of an extended version of the after-tax discounted cash flow model, and other valuation models including option pricing models and regression models. Financing decisions are made using the techniques of modern financial analysis. A wide array of financing options are considered including participating and accrual mortgages. Securitization of equity and debt claims to real estate also are extensively covered. All types of residential and nonresidential real estate are analyzed, including hospitality properties.

**OTHER****H ADM 290(2290) Introduction to Culinary Arts**

Spring, 2 credits. Elective. Limited to 28 non-hotel students; priority given to seniors and graduate students. Fee (includes cost of uniform and uniform cleaning): \$75. Preregistered students who do not attend first class are automatically dropped from instructor's record. Absolute drop deadline for this course is W of second week of classes. Students on wait list will be selected through a lottery system. All lottery participants must attend first week's class. T. O'Connor.

Study of food groups and their methods of preparation, cooking, and presentation. The course is designed specifically for non-hotel students who are interested in learning the professional approach to food preparation and service with hands-on practice. Students are involved in food product identification, preparation and service methods, and learning the professional language of food and cooking.

**H ADM 490(4490) Exploring Social Responsibility: Hunger and Homelessness**

Spring, 3 or 4 credits, variable. Elective. T. O'Connor.

Through lectures, class discussions, research, community service work, and a field placement practicum, students explore the economic, social, and political issues of our country's concern with housing and feeding disenfranchised and marginalized people. Students also explore public and private sector approaches to addressing poverty, hunger, and homelessness. This is a *service learning* course centered on community work experience. Students must choose one of three options:

(1) 4 credits. Students work in pairs or small groups with a local area agency that provides services for homeless or disadvantaged people. This field practicum comprises approximately 60 hours of community work during this semester, half of which is in direct service and half of which is project-based. (2) 4 credits. Students participate in the Alternative Spring Break through Cornell's PSC in various domestic or international locations. Students work in an agency that serves low-income, homeless, hungry, or disenfranchised people. Housing and transportation are arranged. This option may cost students up to \$100. Students interested in this option must see the instructor at pre-registration time. (3) 3 credits. Students do community work in the Ithaca area with an agency that serves homeless, hungry, incarcerated, or disenfranchised people. Students work on a regular weekly basis for a minimum of 30 hours during this semester.

**H ADM 491(4491) Hotel Ezra Cornell (H.E.C.)**

Fall and spring. Variable credit: 2-3 in fall and 3-4 in spring. Elective. Prerequisite: hotel juniors, seniors, and second-year M.M.H. students; permission of instructor. Cost of required field trip to Nov. Hotel show in NYC: approx. \$200. R. McCarthy. Student-elected board members of Hotel Ezra Cornell (H.E.C.) may receive up to 3 credits in hotel electives for their participation in the planning, organizing, staffing, directing, and controlling of H.E.C. '07 to be held April 12-15, 2007. Additional credit would be in free electives only. Next year's board will continue to implement the business plan developed by the previous H.E.C. board of directors: "To establish Hotel Ezra Cornell as the premier forum to deliver a unique hospitality learning experience to industry leaders and students in an interactive setting." Board positions are limited to students in good standing with a minimum cumulative GPA of 2.5. Eligibility requirements for specific board positions can be obtained in the Office of Student Services, 180 Statler Hall. Eligible students considering a board position for H.E.C. should pre-enroll for the course and speak with the instructor; final enrollment is determined by an election process.

**H ADM 493(4493) Management Intern Program I—Operations**

Fall, spring, 6 credits. Elective. Prerequisites: H ADM 105 or 115, 201, 211, 121, 221, 222, 106 or 236, 243, 255, 165, 174, and 275. Highly recommended: H ADM 321, 305, 355, and 365. Additional course work may be required for applicants considering specialized internships. Students must submit detailed plan for completion of all remaining academic requirements before acceptance into course. Faculty.

Limited to juniors and seniors in the hotel school with approval of the Management-Intern Program (MIP) faculty committee. The application process begins the semester before the planned internship. An MIP information meeting is held at the beginning of each semester. Students accepted to MIP enroll in both H ADM 493 and 494. Students enrolled in H ADM 493 receive academic credit in free electives as well as practical experience in the hospitality field. Six performance evaluations are used to determine this grade. Students must be in good academic standing and have a GPA of at least 2.0 in the preceding semester. Further information is available in the Office of Student Services, 180 Statler Hall.



**H ADM 494(4494) Management Intern Program II—Academic**

Fall, spring. 6 credits. Elective. Faculty. Limited to juniors and seniors in the hotel school with approval of the Management Intern Program (MIP) faculty committee. The application process begins the semester before the planned internship. An MIP information meeting is held at the beginning of each semester. Students accepted into MIP enroll in both H ADM 493 and 494. Students enrolled in H ADM 494 receive academic credit in free electives for submission of a goals and objectives statement, four management reports, six journal entries which focus on insights gained through analysis of events occurring in the workplace, and four Hospitality Management Checklist summaries. Upon return to campus, each intern completes a debriefing and an oral presentation to fulfill the academic requirements. Students must be in good academic standing and have a GPA of at least 2.0 in the proceeding semester. Further information is available in the Office of Student Services, 180 Statler Hall.

**H ADM 495(4495) Implementing Strategies for Tying Wellness Practices to Company Profit**

Spring. 3 credits. Elective. Priority given to juniors, seniors, and graduate students; others may enroll, space permitting. M. Tabacchi.

There is increasing evidence linking job-induced stress to overall health and happiness or lack thereof. Adding to workplace stress are the needs of its diverse and changing population. These stresses affect the financial health of the corporation as well as the psychological and physical health of the individual. The purpose of this course is to encourage future managers to evaluate the work environment and to enhance opportunities for diverse worker productivity, which can sharpen the corporation's competitive edge. The emerging fields of complementary and alternative medicines are explored as preventive and cost-effective methods of improving workers' health. Business models for encouraging workplace wellness, systems for implementation, reward, and accountability of managers and corporate officers are introduced in this course. Only a few corporations overtly reward managers and corporate officers for the well-being and concomitant enhanced performance and productivity of their employees.

**H ADM 497(4970) Undergraduate Research**

Fall, spring. Variable credit. Elective. Faculty.

Outstanding students may conduct independent research under faculty supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report. Students make two presentations coordinated by the Center for Hospitality Research (CHR): one at a preliminary stage and one at project completion. Students submit the completed report to the CHR, which will be available online through the CHR web site.

**H ADM 498(4980) Undergraduate Independent Study**

Fall, spring. Variable credit. Elective. Faculty.

Can be taken only by students conducting two independent studies in one semester. For more details, see H ADM 499.

**H ADM 499(4990) Undergraduate Independent Study**

Fall, spring. Variable credit. Elective. Faculty.

Students have the option of conducting an independent study project in any academic area. The number of credits for which students may register are arranged on an individual basis. Note: Students commit themselves to a certain number of credits of independent academic work per week per credit hour if they choose to do an independent study project, and the work must be performed in the semester for which the student is enrolled in the independent study. The usual add/drop policy applies, and retroactive credit for work commenced after an academic semester has ended is not allowed. Projects are conducted under the direction of a faculty member, and regular, frequent consultations are mandatory. Also, a written report must be produced and made available to all faculty members and students of the school after its submission to the supervising faculty member. Credit for independent study projects may not count toward the hotel school elective requirement, but, rather, toward free electives. Students cannot earn academic credit for independent study when the equivalent material is offered in a regular course, and credit is not earned for teaching a course. Students should consider all aspects of their situation before committing themselves to an independent study project. Enrollment forms are available in the Office of Student Services, 180 Statler Hall.

**H ADM 698(6980) Graduate Independent Research**

Fall, spring. Elective. Faculty.

Each student must have in mind a project and obtain agreement from an individual faculty member to oversee and direct the study. Written permission is required before course enrollment. Permission forms are available in the Office of Student Services, 180 Statler Hall.

**H ADM 699(6990) Graduate Independent Research**

Spring. 2 credits. Elective. Faculty.

Each student must have in mind a project and obtain agreement from an individual faculty member to oversee and direct the study. Written permission is required before course enrollment. Permission forms are available in the Office of Student Services, 180 Statler Hall.

**H ADM 790(7790) Externship**

Winter. 1 credit. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. Faculty.

**H ADM 791(7791) Professional Development I**

Summer. 0.5 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. Faculty.

Seminar format, varies week to week.

**H ADM 792(7792) Professional Development II**

Fall. 0.5 credits. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. Faculty.

Seminar format, varies week to week.

**H ADM 795(7795) Master of Management in Hospitality Master Class**

Spring, three-day immersion seminar taught by industry leaders at their establishment during Jan. winter break. 1 credit. Elective. Prerequisite: M.M.H. students or permission of instructor. Faculty.

Students solve problems based on real-life scenarios and present their solutions to industry leaders and the Hotel School faculty members who accompany them. A final paper is due in the spring semester immediately following the seminar.

**H ADM 796(7796) M.M.H. Charette**

Fall. 1 credit. Required. M.M.H. students only. A. Susskind.

Held during fall break. The M.M.H. Charette is one of several professional and leadership development elements in the required M.M.H. Program curriculum. The M.M.H. Charette provides students with a group dynamics laboratory, giving an opportunity to practice group problem solving, prepare a group presentation, and receive group feedback. The Charette is conducted in a three-day, intensive format working with faculty and a firm in the hospitality industry. Students, working in groups on a problem defined by the firm, present the results of their work 48 hours after receiving instructions to a panel of faculty and firm representatives.

**H ADM 797(7797) Hospitality Industry Leadership Development Institute**

Summer. 1 credit. M.M.H. requirement.

Prerequisite: M.M.H. students or permission of instructor. Faculty.

A dozen or more senior executives from the hospitality industry visit the campus to evaluate students as individuals and as part of a team. They assess how well the students are able to lead, take direction, work with others, present ideas, and listen to other ideas. At the end of the class, one or more of them meet with students individually, and in teams, to evaluate performance. This centerpiece of the orientation process is designed to outline some of the personal and career goals students will want to work toward in the coming year.

**H ADM 890(8890) M.S. Thesis Research**

Fall, spring. Required. Faculty.

**H ADM 990(9990) Ph.D. Thesis Research**

Fall, spring. Required.



## FACULTY ROSTER

- Brownell, Judith, Ph.D., Syracuse U. Prof.  
 Canina, Linda, Ph.D., New York U. Assoc. Prof.  
 Carroll, William, Ph.D., Penn State U. Sr. Lec.  
 Carvell, Steven A., Ph.D., SUNY Binghamton. Assoc. Prof.  
 Chang, Charles S., Ph.D., U. of California, Berkeley. Asst. Prof.  
 Clark, Preston, M.S., Syracuse U. Lec.  
 Corgel, John, Ph.D., U. of Georgia. Prof.  
 Dahl, Nicholas, M.A., Oregon State U. Lec.  
 deRoos, Jan A., Ph.D., Cornell U. Hospitality Valuation Services Professor of Hotel Finance and Real Estate  
 Dev, Chekitan S., Ph.D., Virginia Polytechnic Inst. and State U. Assoc. Prof.  
 Dittman, David A., Ph.D., Ohio State U. Herbert E. Westfall Professor of Accounting  
 Enz, Cathy A., Ph.D., Ohio State U. Prof. and Lewis G. Schaeneman, Jr. Professor of Innovation and Dynamic Management  
 Geller, A. Neal, Ph.D., Syracuse U. Robert A. Beck Prof. of Hospitality Financial Management  
 Hesford, James, Ph.D., U. of Southern California. Asst. Prof.  
 Hinkin, Timothy, Ph.D., U. of Florida. Prof.  
 Jameson, Daphne A., Ph.D., U. of Illinois. Assoc. Prof.  
 Kalnins, Arturs, Ph.D., U. of Michigan. Assoc. Prof.  
 Kimes, Sheryl E., Ph.D., U. of Texas. Prof. and Assoc. Dean for Academic Affairs  
 Klein-Pearo, Lisa, D.B.A., Harvard U. Asst. Prof.  
 Kwortnik, Robert, Ph.D., Temple U. Asst. Prof.  
 LeBel, Jordan, Ph.D., McGill U. Assoc. Prof.  
 Lennox, David, Ph.D., U. of Washington. Lec.  
 Lloyd, Russell, Ph.D., Cornell U. Sr. Lec.  
 Lynn, Wm. Michael, Ph.D., Ohio State U. Assoc. Prof.  
 McCarthy, Mark, M.M.H., Cornell U. Teaching Support Specialist  
 McCarthy, Reneta, M.P.S., Cornell U. Lec.  
 Mutkoski, Stephen A., Ph.D., Cornell U. Banfi Vintners Professor of Wine Education and Management  
 Newman, Amy, M.S., New York U. Lec.  
 O'Connor, Therese A., M.S., Elmira Coll. Sr. Lec.  
 Penner, Richard H., M.S., Cornell U. Prof.  
 Pezzotti, Giuseppe G. B., M.P.S., Cornell U. Sr. Lec.  
 Piccoli, Gabriele, Ph.D., Louisiana State U. Asst. Prof.  
 Potter, Gordon S., Ph.D., U. of Wisconsin, Madison. Assoc. Prof.  
 Pullman, Madeleine. Ph.D., U. of Utah. Assoc. Prof.  
 Quan, Daniel W. C., Ph.D., U. of California, Berkeley. Assoc. Prof.  
 Renaghan, Leo M., Ph.D., Pennsylvania State U. Assoc. Prof.  
 Robson, Stephani, M.S., Cornell U. Sr. Lec.  
 Sherwyn, David, J.D., Cornell U. Asst. Prof.  
 Siguaw, Judy, D.B.A., Louisiana Technical U. Assoc. Prof., Dean, Cornell Nanyang Institute  
 Simons, Tony L., Ph.D., Northwestern U. Assoc. Prof.  
 Snow, Craig, Ph.D., Purdue U. Sr. Lec.  
 Spies, Rupert, Studienassessor. Sr. Lec.  
 Stipanuk, David M., M.S., U. of Wisconsin. Assoc. Prof.  
 Sturman, Michael, Ph.D., Cornell U. Assoc. Prof.  
 Susskind, Alex, Ph.D., Michigan State U. Asst. Prof.
- Tabacchi, Mary H., Ph.D., Purdue U. Assoc. Prof.  
 Talbert, Mark, M.P.S., Cornell U. Lec.  
 Thompson, Gary M., Ph.D., Florida State U. Assoc. Prof. and Executive Director, Center for Hospitality Research  
 Tracey, J. Bruce, Ph.D., SUNY Albany. Assoc. Prof.  
 Wagner, Erica, Ph.D., London School of Economics and Political Science. Asst. Prof.  
 Walsh, Kate, Ph.D., Boston Coll. Asst. Prof.  
 White, Robert, A.O.S., Culinary Inst. of America. Teaching Support Specialist  
 Zemke, Dina, Ph.D., University of Nevada, Las Vegas. Asst. Prof.

## COLLEGE OF HUMAN ECOLOGY

### ADMINISTRATION

Lisa Staiano-Coico, dean

Alan Mathios, associate dean

S. Kay Obendorf, associate dean

Brenda Bricker, director, undergraduate affairs

Darryl Scott, director, admission, student, and career services

Tracey L. Thompson, college registrar

### COLLEGE FOCUS

The College of Human Ecology anticipates and responds to human needs in the areas of nutrition and health, economic and social well-being, environmental design and technology; as well as human development through education, basic and applied research, and the extension of knowledge. The college is distinctively characterized by the quality of its research in the natural and social sciences and the design arts, a global perspective in academic programs, a preventive approach to contemporary societal problems, multidisciplinary departments and programs, development of leadership in students and citizens, and a commitment to diverse populations. Faculty and students examine individuals in relation to their family, neighborhood, workplace, and community, seeking a balance between theory and practice that will improve the quality of everyday life.

### FACILITIES

The college is housed in Martha Van Rensselaer (MVR), Savage, and Kinzelberg Halls. The buildings include administrative and faculty offices, classrooms, auditoriums, galleries, and lecture halls; wet chemistry and biochemistry laboratories for nutrition, food science, and textile science; experimental food laboratories; design studios and computer-aided design laboratories; woodworking shops; experimental observation rooms with one-way vision screens and sound-recording equipment; human factors and infant research facilities; and an audiovisual classroom for distance learning. Also included are learning resource centers for career planning, field and international study, a historical costume collection, a human metabolic research unit, an animal research facility, cold rooms, a constant temperature and humidity laboratory, and an early childhood research and care program.

Specialized equipment for teaching and research includes biochemical and chemical instruments for spectroscopy, chromatography, radioisotope analysis, electrophoresis, microscopy, and ultracentrifugation; physical testing equipment; and cameras, videotape, and sound recording equipment.

### DEGREE PROGRAMS

Cornell programs in Human Ecology lead to the degrees of bachelor of science (B.S.), master of arts (M.A.), master of science (M.S.), master of professional studies in human ecology (M.P.S.), master of health administration (M.H.A.), and doctor of philosophy (Ph.D.).

General academic information concerning the bachelor of science degree is given here under "Undergraduate Study." Curricula for major studies are described under the various academic areas.

Programs leading to master and doctoral degrees are administered by the Graduate School. They are described in the *Announcement of the Graduate School* and in announcements published by the individual field offices (Design and Environmental Analysis, Human Development, Nutritional Sciences, Policy Analysis and Management, and Textiles and Apparel). For information regarding the Sloan Program in Health Services Administration, contact the Department of Policy Analysis and Management.

### UNDERGRADUATE DEGREES

Bachelor of science (B.S.) degrees are offered in the following areas:

Biology and society  
Design and environmental analysis  
Human biology, health, and society  
Human development  
Individual curriculum  
Nutritional sciences  
Policy analysis and management  
Textiles and apparel

### UNDERGRADUATE AFFAIRS

Persons interested in undergraduate study in human ecology should contact the admissions office, 170 MVR (255-5471). Those interested in graduate study should contact the graduate field representative identified among the faculty of each department. Department faculty members are listed at the beginning of the course descriptions for each department.

Counselors in the Office of Admission, Student, and Career Services (172 MVR) can help prospective students understand college programs and requirements, as well as college and university resources and services. They provide a broad range of career services and personal support for all matriculated undergraduates. The college registrar and degree auditor (145 MVR) assists undergraduates with questions about academic credit and graduation requirements.

### The Student Body

The College of Human Ecology undergraduate enrollment is 1,222. Roughly 400 students graduate each year; last year 255 freshmen and 115 transfer students matriculated. Ninety faculty members serve as advisors to undergraduates.

The college's undergraduate admissions committee selects applicants who are academically well prepared and appear most likely to profit from the college's various curricula. Admission is highly selective. Approximately two-thirds of the student body comes from New York State, with the remainder coming from other parts of the United States and abroad. In 2005, 30 percent were identified as members of minority groups. Members of the college faculty chair the special committees of approximately 200 graduate students.

### Mature Students

The college recognizes that students who interrupted their formal education and are returning to school have needs different from those of younger undergraduates. To facilitate the education of mature students, defined as those 24 years old or older at first matriculation, the college has adopted certain procedures specifically for that group. Counselors in the Office of Admission, Student, and Career Services (172 MVR) can provide information of interest to mature students. Mature students are permitted to enroll for as few as 6 credits without petitioning for permission and also are permitted to extend their residency beyond the normal eight semesters. To find out about qualifying for prorated tuition, mature students must see the college registrar during the course enrollment period in the preceding semester.

### Special Students

Students eligible for special status are those visiting from other institutions and interested in particular programs in the college, those with a bachelor's degree who are preparing for graduate study or jobs and careers in human ecology-related fields, or those who have interrupted their education and are considering completing degree programs. Students accepted in the nondegree status of special student may enroll for a maximum of two semesters. During the second semester of attendance, a special student must either apply for admission as a transfer student or plan to terminate studies in the college at the end of the semester. Special students are expected to take a minimum of 12 credits each semester and to take one-half to two-thirds of their work in the statutory divisions of the university. Courses taken while a person is classified as a special student may be counted toward the requirements of the bachelor's degree. Those interested in becoming special students should make appointments to discuss admissions procedures in the Office of Admission (170 MVR, 255-5471).

## Empire State Students

Occasionally a student who is completing requirements for a degree through the Empire State College Program is interested in taking a human ecology course. This can be done by registering through the Division of Summer Session, Extramural Study, and Related Programs (B20 Day Hall, 255-4987). All rules of the extramural division apply, and registrations will be accepted only on a space-available basis and with the written approval of the course instructor. At the time of registration, Empire State College students must provide the extramural division with a completed copy of Empire State College's notification of cross-registration (form number SA-22, F-031) to verify enrollment in Empire State College. Such students will be charged 25 percent of the standard extramural tuition per credit.

## Transfer Students

Students may be considered transfer students once they complete 12 college credits after high school graduation. An external transfer student is one who transfers to Human Ecology from an institution outside of Cornell University. Liberal arts credits from other institutions transfer readily, but students must earn a minimum of 60 Cornell credits to graduate. Internal transfer students are admitted to Human Ecology from one of Cornell's other six undergraduate units. Students transferring internally should take special care to learn the policies of Human Ecology, because rules at the various Cornell colleges often differ. Before admission, both internal and external transfer candidates should contact the Office of Admission (170 MVR, 255-5471) to discuss credit transfer. Upon matriculation, admitted transfer students should attend the orientation and contact the Human Ecology registrar's office (145 MVR, 255-2235) to discuss how transfer credits will apply to their specific degree program.

## MAJORS

The college requires students to fulfill requirements for a major to graduate. Students must declare a major by the end of the sophomore year. It is common for students to change interests during their undergraduate careers. Counselors in the Office of Admission, Student, and Career Services (172 MVR), academic advisors, and directors of undergraduate study in each of the academic departments can help students to consider their options and engage in academic planning. All changes of major require submission of the change of major form and are processed through the college registrar's office, 145 MVR. Change of major will trigger re-evaluation of all academic credit and assignment of a new faculty advisor.

## DESIGN AND ENVIRONMENTAL ANALYSIS

The Department of Design and Environmental Analysis (DEA) is concerned with planning, designing, and managing the built environment and its effects on human behavior, experience, and the environment itself. The processes for creating, managing,

and maintaining the built environment, and the implications for how we live our lives face enormous challenges. These include frequent social and organizational change, technological advances, new building methods, and finite resources. The program in DEA is dedicated to preparing graduates who can help individuals, groups, and organizations meet these challenges.

Diverse faculty backgrounds and teaching approaches help students to develop multidisciplinary problem-solving and creative abilities, aesthetic judgment, and analytical thinking. Students explore innovative concepts for the design and management of interior environments through laboratory, shop, studio, and computer facilities. The relationship between people and their physical surroundings is explored through a combination of academic courses, field experience, and applied research. Examples of student class projects and faculty work are frequently on display in the MVR gallery. The DEA resource center includes books, journals, newsletters, and material samples for student use.

## Options

The department offers undergraduate education in three areas: interior design, facility planning and management, and human factors and ergonomics. The interior design option is accredited by the Foundation for Interior Design Education Research (FIDER). The Facility Planning and Management Program at Cornell is an IFMA Recognized Program. This means that it meets the standards for recognition of programs established by the International Facility Management Association.

To take full advantage of the course sequences and electives, it is important to select an option as early as possible. This is particularly true in the interior design option. Transfer students in the interior design option should plan on a minimum of six semesters at Cornell to complete the program.

### Option I: Interior Design

This option prepares students for professional careers in interior design. The program emphasizes a design process in which innovative solutions are based on research-derived knowledge of human behavior, values, and attitudes. Students develop an understanding of design theory and methods, design history, behaviorally based programming, and post-occupancy evaluation. They learn about design communication, building systems, furnishings, materials and finishes, and professional practice. Students may use their elective courses to develop a specialization in areas such as design history, historic preservation, theory and criticism, design leadership, interactive multimedia, design sustainability, and behavior-based design.

This program also serves as an excellent preparation for graduate study in interior design, facility management, architecture, and industrial design.

### Option II: Facility Planning and Management

This option prepares students for professional careers in facility management. The program focuses on the planning, design, and management of facilities for large, complex

organizations such as corporations, health care institutions, research and development laboratories, and universities. Facility planning and management is a basic management function that coordinates and integrates information and expertise from areas such as planning and design, real estate, and business administration with human factors, ergonomics, environmental psychology, telecommunications, and building operations for the purpose of developing and managing facilities that support individual and organizational effectiveness.

Excellent career opportunities exist in the facility management divisions of private companies, institutions, the health care industry, and with private consulting firms offering facility management services. The program is also a good preparation for graduate study in business, planning, or one of the design disciplines and for advanced study in facility planning and management.

### Option III: Human Factors and Ergonomics

This option focuses on the interaction between people and their physical surroundings. The program seeks to expand understanding of how the environment affects human perception, cognition, motivation, performance, health, safety, and social behavior. This knowledge is then used to help architects, planners, interior and product designers, and facility managers to plan, design, and manage safe and effective environments. The effect of human capabilities or characteristics such as family structure, lifestyle, social class, and stage-in-life cycle on environmental needs and requirements is also a focus of the program. Career opportunities are available in design firms and in urban planning and other public agencies as well as in the facility management and product design division of private companies. Human factors and ergonomics is good preparation for graduate study leading to a Ph.D. degree in the social sciences and a career in academic or other research-oriented settings in either the public or private sector. It can also serve as the basis for graduate study in an environmental planning or design discipline such as architecture, facility planning and management, interior design, landscape architecture, or city and regional planning. Electives in the social sciences and in research methods and statistics are encouraged.

## Academic Advising

All DEA majors are matched with a faculty advisor during their first semester by the director of undergraduate studies, Professor Jan Jennings, E219 MVR.

Consultation with faculty advisors about future goals, departmental requirements, sequences of courses, and electives inside or outside the college helps students develop their programs. Students majoring in interior design, especially, must begin early to plan and collect materials for a portfolio of their work, which is necessary for many positions and for application to graduate schools. Faculty advisors can make recommendations on what to include. Students are free to change advisors. Although advisors must approve students' schedules during course enrollment each semester, it is the student's responsibility to keep track of his or her courses and to make sure that they meet graduation requirements for their major and college.

### Ownership and Exhibition of Student Work

All design work done in studios as part of an academic program is the property of the department until it has been released by the instructor. The department is not responsible for loss or theft of student work.

## HUMAN BIOLOGY, HEALTH, AND SOCIETY

The human biology, health, and society (HBHS) program permits students to combine their interests in the biological sciences while exploring human health issues from the perspectives of both the biological and behavioral sciences. HBHS majors select the issues they want to explore in depth from Human Ecology courses that address health and the broad range of factors that influence human well-being. Issues that can be explored include biology and behavior; metabolism, genetics, and health; biology, growth, and development; and food and health policy and health promotion. Most students in this program will proceed to programs of advanced study to pursue careers related to health. This major is offered by faculty in the Division of Nutritional Sciences. More information about this program can be found in a separate section of the catalog that describes the division's programs.

## HUMAN DEVELOPMENT

Human development majors explore the psychological, social, cultural, and biological development of people from conception to old age, focusing on the processes and mechanisms of growth and change over the life course. A wide range of issues are included in the study of human development, including biological, cognitive, and emotional development; the role of family, neighborhood, workplace, and culture in development; and the influence that developing humans have on their environment. The human development major provides an excellent foundation for many careers, such as medicine (particularly family medicine, pediatrics, and psychiatry), clinical psychology and other mental health professions, law, business (especially human resources), child and family advocacy, and education (from preschool and elementary school teaching to school administration). The major prepares students for academic careers as professors in human development, psychology, or sociology departments. Learning about human development also helps students understand more clearly their own development and the development of those around them.

The faculty of the Department of Human Development comes from several disciplines, including developmental and clinical psychology, sociology, and education. The diversity of faculty expertise results in a wide-ranging view of human development. The research of the department's faculty is extensive. It includes basic research on issues such as the neurobiology of personality, the role of childhood attachments in the development of adult romantic relationships, the acquisition of language in infants, and the

effects of environmental stressors on children's cognitive development. It also includes applied research useful for the creation of public policy, such as studies of the causes and consequences of child maltreatment and studies of the effectiveness of reading programs for Head Start preschoolers, apprenticeship programs for high school students, and support programs for aging adults in community and congregate settings.

### Curriculum

Human development is the most flexible major in the College of Human Ecology. While all students learn the fundamentals of human development, each student can focus on one or more areas of particular interest. The flexibility of the major also allows students ample opportunity to meet the requirements for admission to many professional schools, including medical, dental, law, and business schools.

Requirements specified by the College of Human Ecology make up part of each student's curriculum, and include classes in the social and natural sciences, humanities, writing, and communication. In addition, there are requirements for the human development major. Students in this major can choose up to 14 elective courses from the broad range of offerings across the Cornell campus.

### Special Opportunities

Beyond formal course work, students have many other opportunities that involve ongoing individual work with Cornell faculty or other professionals. Academic credit can be earned through all of them. These opportunities include the following:

**Field Placements.** Human development majors can arrange internships with Urban Semester in New York City, Cornell in Washington, and Cornell Abroad programs and in local agencies. These have included hospitals, psychiatric hospitals, juvenile detention centers, senior housing, and the department's on-campus Early Childhood Program. Students have also participated in projects with the Tompkins County Office of Aging, the Tompkins County Youth Bureau, and the Law Guardian's Office of Tompkins County.

**Faculty Research.** Many students work as research assistants on faculty projects. Students use research techniques ranging from laboratory procedures to family observations to large surveys. They assist in study design, data collection, and data analysis. Participation in faculty research provides the type of experience that many graduate and professional schools expect from their top applicants. Recent projects have included the study of parent-infant interactions, the transition of high school students into the world of work, evaluation of pre-kindergarten programs, and the impact of poverty on stress responses in children and teens.

**Independent Research.** Under faculty supervision, some advanced students complete an honors thesis in an area of personal interest by designing a study and collecting and analyzing data. Recent thesis topics have included development in families that adopt school-age children, connections between speed of visual processing in infants and later scores on intelligence tests, ethnic variation in exposure to stressors in adolescence, and the relationship of religious beliefs to well-being.

**Undergraduate Teaching Assistant.** Advanced students can serve as undergraduate teaching assistants. This requires close work with the professor teaching the course as well as with students taking the course.

**Teaching Certification.** A cooperative education program exists between the Department of Human Development and Wells College. This program requires careful planning and course scheduling. It enables students to graduate with a Cornell bachelor's degree and New York State Certification to teach nursery school through sixth grade. This certification is honored by most other states.

The program requires a minimum of a three-semester commitment. Cornell HD students take four courses at Wells College and student teach their last semester at Cornell. Although there is van transportation between Cornell and Wells College, it is important for students to have access to a car, especially while student teaching. Students will be registered at Cornell during the entire undergraduate program and usually maintain Ithaca housing. Wells College courses count as Cornell courses and are used as electives but are not included in a student's GPA. The one-semester student teaching experience is typically based in the Ithaca area, though not necessarily within the city of Ithaca.

This program is open to HD majors only. Students must have at least a 3.0 Cornell cumulative GPA upon application and must maintain a 3.0 GPA to qualify for student teaching and to complete the program. For more information, contact Judith Ross-Bernstein in G56 MVR at 255-0826.

## NUTRITIONAL SCIENCES

A major in nutritional sciences (NS) focuses on the complex interrelationships of food patterns, nutritional status, and health. This field draws upon chemistry, biology, and the social sciences to understand questions such as: How are nutrients used by the body? What factors influence human food choice? What nutrients and dietary patterns are recommended to promote growth, maintain health, or reduce the risk of chronic disease? Students in this program may also fulfill the courses required for didactic training in dietetics toward registration as a dietitian (R.D.), which will enable them to be employed as nutrition counselors, clinical nutritionists, sports nutritionists, or administrators of food and nutrition services. Students also may prepare for medical school and other types of advanced degree programs through this major. The requirements for this program are outlined in the "Nutritional Sciences" section of this catalog.

### Special Opportunities

#### Dietetics and Clinical Nutrition

Interested students should complete the academic requirements for the didactic program in Dietetics, approved by The American Dietetic Association (ADA). Courses in foods, nutrition and disease, microbiology, management, statistics, and economics are added to the core curriculum (specific requirements). Evaluation of academic credentials to qualify for a dietetic internship should be completed before graduation. Seniors should initiate this

academic evaluation process in March if they will graduate in January or in September if they will graduate in May. All students who will complete the academic requirements by graduation should participate in the evaluation process while at Cornell. Students who meet most but not all of the academic requirements are encouraged to have their academic work evaluated while they are at Cornell so that deficiencies can be identified and documented.

Advisors in the dietetics program can also help students plan to meet the experience or supervised practice component required for active membership and/or eligibility to take the Registration Examination to be registered as a dietitian (R.D.). For additional information about meeting ADA requirements, contact the DNS academic affairs office, 335 MVR, 255-4410.

### Exercise Science Minor

Students can complete the applied exercise science concentration at Ithaca College, which includes courses in fitness measurements, exercise physiology, and biomechanics of human movement. Nutrition courses of special interest relate to growth and development, regulation of body weight, and community nutrition and health. For information about the applied exercise science concentration, contact the DNS academic affairs office, 335 MVR, 255-4410.

## POLICY ANALYSIS AND MANAGEMENT

The policy analysis and management (PAM) major produces graduates skilled in policy analysis and possessing management skills applicable in the public, nonprofit, and private sectors. In addition, the PAM graduate will have concentrated knowledge in one of three policy areas: family/social welfare, health, or consumer policy. Graduates are well-qualified for a wide variety of public, not-for-profit, and private sector employment emphasizing either policy analysis or management. The major also attracts large numbers of pre-law students, pre-M.B.A. students, and students intending to pursue graduate education in public affairs and policy analysis programs. The potential exists to pursue a five-year program resulting in a B.S. and a master of health administration.

The PAM major combines theoretical underpinnings from economics, sociology, psychology, demography, and government to critique and analyze our society's laws, policies, and programs. It also gives students the knowledge to build management skills for use in public, not-for-profit, and for-profit settings. Ideas of social justice, equity, and economic efficiency will be studied. Research methods, statistics, and planning concepts will be learned and used to direct and aid in program planning, policy analysis, and management.

In addition to learning basic policy analysis and management skills, the student will be expected to apply these skills within a particular concentration area—social welfare/family, health, or consumer policy. Social welfare/family policy includes a panoply of governmental and private sector income maintenance, social, and human

service delivery programs and policies that range from child adoption, neglect, and abuse policies and antipoverty programs to policies and programs that impinge on or regulate marriage, divorce, and fertility. Health programs and policies include such politically sensitive programs and issues as health care access, Medicare, Medicaid, long-term care, managed care, public health issues, and substance abuse policies. Consumer programs and policies include regulations and laws governing advertising, corporations, product safety, food and drug safety, nutrition policies, consumer credit, insurance, telecommunications, housing, and public utility markets, and also deal with issues such as the invasion of privacy, Internet, and television.

In addition to meeting college requirements, all PAM majors are expected to take the following core courses: Introduction to Policy Analysis, Research Methods, Multivariate Statistics, Intermediate Microeconomics, and Public Sector Economics. Research Methods, Multivariate Statistics, and Intermediate Microeconomics must be completed by the second semester of the sophomore year. Students also will be expected to develop a concentration of three courses in either social welfare/family, health, or consumer policy. Finally, all PAM majors are encouraged to complete an integrative capstone experience, which may involve an experiential learning program such as Cornell in Washington, the Capital Semester, or Urban Semester, or an honors thesis. Please check with the undergraduate advising coordinator, Professor Rick Geddes, for further details.

### PAM Honors Program

The honors program, which leads to a B.S. degree with honors in Policy Analysis and Management, gives official recognition to students who have demonstrated excellence in their academic work and their capacity for independent study.

In addition to fulfilling requirements for the major, students in the honors program participate in an honors seminar (PAM 498) and prepare an honors thesis. Students work with a research mentor in preparing their thesis. Students should obtain a PAM Honors Program application form from the PAM Undergraduate Office (MVR 122). This form should be completed no later than the second semester of their junior year. For more information, students should contact Professor Rick Geddes.

## TEXTILES AND APPAREL

The Department of Textiles and Apparel (TXA) focuses on the use of textiles and fibrous materials for apparel, composites, biomaterials, residential and contract interiors, geotechnical and other applications. Programs in the department, in keeping with the overall mission of the college, emphasize the use of materials to meet human needs. The undergraduate curriculum focuses on the development of design skills, an understanding of the properties of textile materials, knowledge of marketing, and the use of technology in the industry.

Practical problem-solving skills are developed in the department's studios and laboratories.

Academic course work is further enhanced by field and international experiences. Gallery space provides the setting to display design work. In addition, the Cornell University Costume Collection, housed in the department, provides a valuable resource; items from the collection are made available to students for classroom and special study use.

### Academic Advising

All TXA majors are matched with a faculty advisor by the director of undergraduate studies, Professor Anil Netravali, 201 MVR. Students are strongly urged to discuss their goals, course selection and sequence, electives, and career plans with their faculty advisor. Students in apparel design must begin working with their advisors early to develop a professional portfolio of their work. Students are free to change advisors; changes must be recorded with the director of undergraduate studies. Although advisors must provide the PIN number to lock in courses during course enrollment each semester, it is the student's responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for his or her major and college.

### Ownership and Exhibition of Student Work

All apparel design work done as part of the academic program is the property of the department until it has been released by the instructor. Certain exceptional work may be retained by the department to exhibit for academic purposes. The department is not responsible for the loss or theft of student work.

### Course Fees

No grade will be given in a course unless the course fee has been paid and equipment returned by the last week of classes.

### Options

Students may select options in apparel design, apparel/textile management, or fiber science. The curriculum is based on manipulation of form, color, and the physical characteristics and structures of fabric to solve aesthetic and functional apparel problems; the application of economic and marketing principles to consumer and industry problems in the textile-apparel sector; and the study of chemical, physical, and engineering properties of fibrous structures and polymers. Most transfer students will need at least one extra semester to fulfill the requirements of the major. Transfers in the design option should plan on two additional semesters.

#### Option I: Apparel Design

The apparel design major integrates design, technology, physical sciences, the humanities, and social sciences in the study of clothing, its materials, and its functions. Using a problem-solving approach, the design process is studied and applied in the creation and critique of fashion and functional apparel. The relationships between dress and human behavior, aesthetics, and fashion are studied within the context of the meaning of dress. The materials and technologies used in apparel design and the product interface with the consumer are also integral to the major. The themes of technological innovation,



cultural transmission, innovation by consumers and designer, and geopolitical change are stressed as topics of engagement.

#### Option II: Apparel/Textile Management

Apparel and textile management combines the fields of apparel and textiles with those of economics, business management, and organizational policy. Students combine theory with case studies to find solutions to everyday problems. Course work is drawn from many interrelated disciplines, including textiles, apparel, product development, economics, business management, and communication, as well as practical field experiences. This provides students with the experience of working with professionals from a wide variety of disciplines. Students often combine this option with either Option I (apparel design) or III (fiber science).

#### Option III: Fiber Science

Applications for textile structures include advanced engineering composites, protective clothing for industrial and military environments, and biomedical materials, as well as the more traditional applications found in apparel and home furnishings. The fiber science option provides a strong base in mathematics and the physical sciences combined with supporting courses in engineering, consumer economics, and the social sciences.

#### Career Opportunities

Graduates of programs in the Department of Textiles and Apparel have found challenging employment within the textile and apparel sector, in independent and government-sponsored research, and in community organizations. Recent graduates are working in the fields of design, management, new product development, engineering, communications, and marketing. In addition, the program prepares students for graduate or professional study in fiber and polymer science, textile marketing, apparel design, textiles, or business and management.

### INTERDEPARTMENTAL MAJOR IN BIOLOGY AND SOCIETY

Biology and society is a multidisciplinary program for students with special interests in such problems as genetic engineering, environmental quality, food and population, the right to medical care, and the relation between biology, society, and ethics and/or public policy. It is also designed for students who plan postgraduate study in management, health, medicine, law, or other related fields.

Because the biology and society major is multidisciplinary, students must attain a basic understanding of each of the several disciplines it comprises, by including courses in the fields of biology, humanities, social sciences, and mathematics. In addition, majors take core courses in biology and society, a set of electives, and a special senior seminar.

Course work in the College of Human Ecology may be selected from concentrations in human development, health, or social policy and human services. The other basic requirements of the college must also be met. Programs incorporating those required courses are designed in consultation with a

faculty advisor to accommodate each student's individual goals and interests. For further information on the major, including courses of related interest, specific course requirements, and application procedures, see Nancy Breen, director of undergraduate studies, in 205 MVR.

### INDIVIDUAL CURRICULUM

A student who has educational and professional objectives that cannot be met satisfactorily within the framework of existing majors in the College of Human Ecology may petition to develop an individual curriculum. To be approved, the curriculum must be within the focus of the college and be interdisciplinary in design, include at least 40 credits in human ecology courses, and not exceed the normal number of credits allowed in the endowed divisions. A student develops an individual curriculum in consultation with faculty advisors from at least two subject matter fields and the program coordinator, Patti Papapietro, Office of Admission, Student and Career Services (172 MVR).

Such a program of study should encompass a substantial part of the student's undergraduate education and must include at least three semesters. For this reason, a request to follow an individual curriculum should be made after the freshman year and must be made before the second semester of the junior year.

If an individual curriculum seems advisable, the individual curriculum coordinator will provide direction in developing a formal program of study. Although the coordinator must approve the course enrollment schedule during the course enrollment period each semester, it is the student's responsibility to follow the curriculum as planned or to have any necessary revision approved in writing by his or her advisor and the program coordinator before the program changes are made.

### SPECIAL OPPORTUNITIES

#### Study Abroad

Each year over 75 Human Ecology students spend a semester or more off campus in places spanning the globe, such as Australia and Zaire. There they supplement their Cornell studies with a wide range of cross-cultural and academic experiences. Study abroad opportunities are available through Cornell-sponsored programs and other U.S. college-sponsored programs as well as by direct enrollment at foreign universities.

#### Residency Requirements

All study abroad students must meet college study abroad requirements and remain registered at Cornell during the overseas study. Credits earned count toward the 60 Cornell credits required for graduation (in unusual circumstances some credits earned abroad may be considered as transfer credit). Study abroad credits do not count toward the maximum number of endowed credits that Human Ecology students are permitted to earn.

#### Requirements for College Approval

1. GPA of 3.0 or higher, good academic standing, and well-articulated goals for students' study abroad semester.
2. Completion of the Cornell application; applications from individual programs also must be submitted to Cornell.
3. Completion of the equivalent of 15 semester credits per semester while abroad.
4. Courses taken for a letter grade (unless course is offered with only an S-U option).
5. Submission of a petition by second-semester seniors going abroad.

#### Application Process

Typically, students considering study abroad begin their planning at least a year before the semester abroad. Students should carefully consider what they hope to get out of a study abroad experience (academically and culturally) when investigating program options. Resources can be found in the Cornell Abroad office (300 Caldwell Hall), through the Human Ecology study abroad advisor (170 MVR), or in the Human Ecology Career Development Center (162 MVR). Applications may be found through these resources or in the Human Ecology registrar's office (145 MVR). Completed applications must be submitted to the Human Ecology registrar's office by the following dates:

Fall and year deadlines: February 1

Spring deadline: September 15

Some programs will be filled by these dates. Use of the early deadlines is strongly recommended. These are:

Fall and year deadlines: December 15

Spring deadline: May 1

Approved applications will be signed and forwarded to the respective programs through the Cornell Abroad office.

#### Credits Abroad and Transfer of Credit

Most study abroad courses are transferred to the Cornell degree program as electives or liberal arts distribution credit. Study abroad credit awarded toward one's major is much less common and must be approved via signature of the student's department advising coordinator on the Cornell application. Credit for study abroad will be awarded only after successful completion of the semester abroad (marks equivalent to a Cornell grade of C or higher) and receipt of the official transcript by the college. Official transcripts should be sent to the Cornell Abroad office, which will process and forward them to the Human Ecology registrar.

Courses must be pre-approved before the student's departure. Any variances must be cleared with Human Ecology. Students must include a foreign language course in the country's native language if studying in a country where English is not the native language. All courses taken abroad and grades received will appear on the Cornell transcript. Grades earned do not, however, become part of the Cornell GPA. Students should save all written work from all classes until courses are officially transferred.

## Independent Research

Research opportunities for undergraduates are extensive and valued as an important part of the learning experience. The opportunity to engage in substantive research with some of the leading scientists in their fields is so compelling that approximately half of the college's undergraduates conduct research projects. Students may become involved in research with the guidance of faculty members by conducting research assigned in a class, joining a faculty member's research group, completing an independent study research project, or carrying out an honors program project.

For further information, students should contact individual faculty members or the director of undergraduate studies (DUS) in their department.

## Honors Programs

Students interested in college honors programs that lead to the degree "bachelor of science with honors" usually apply to the appropriate honors committee no later than the end of the first semester of their junior year. A minimum GPA of 3.3 and demonstrated potential for honors-level research is required. Students take approved courses in research methodology and evaluation, attend honors seminars, complete a written thesis, and defend it in an oral examination.

In addition to the college honors program, special programs are offered by the Department of Human Development, the Department of Policy Analysis and Management, and the Division of Nutritional Sciences.

Students who are interested in the honors program should contact the director of undergraduate studies (DUS) in their department or division for information and guidelines.

## Field Study and Internships

Field study and internships provide experiential learning opportunities in real-life circumstances where classroom knowledge is tested and applied. Students are able to master new skills, develop and implement plans of action, solve problems, interact in multicultural situations, and build networks for future job opportunities. By applying techniques of research methods, critical thinking, and self-directed learning, students learn to think conceptually while becoming agents of change.

Check with the director of undergraduate studies for major specific information. The Career Development Center (162 MVR) and career counselors in 172 MVR also can provide resources and assistance in finding internships and other experiential opportunities.

## Concentration/Certificate in Gerontology

For students interested in pursuing study related to aging, the College of Human Ecology, under the auspices of the Bronfenbrenner Life Course Center, offers the option of completing an undergraduate concentration in gerontology. This program is designed to develop an understanding of and competence in dealing with the processes and issues of aging. Study in gerontology

enriches the practical experience of students and prepares them for professional work in this area. The program draws on the resources of several departments and colleges at Cornell and Ithaca College to shape a curriculum suited to each student's professional goals and interests.

The concentration is available in combination with any major offered by the university. Twelve credit hours of course work must be completed, with 9 of these taken in the College of Human Ecology. The courses explore aging through biology, psychology, sociology, economics, and design.

Experiential learning opportunities are strongly recommended as a complement to classroom work. With faculty sponsorship, students can participate in experiences in the Ithaca area, the Urban Semester in New York City, Cornell in Washington, the Capital Semester, or in a placement arranged more individually.

Both Cornell and Ithaca College offer courses that incorporate a service-learning component into their curriculum. Cornell's course *Environments for Elders* (DEA 472) involves service in local agencies (e.g., local nursing homes, Office of Aging, assisted-living facilities), where students gain valuable experience. Students may also join the "Elderly Partnership" through the Cornell Public Service Center to participate in local visits to elders. There also are opportunities for undergraduates to become involved in research projects examining topics such as residential changes and adjustments in the later years, nutrition and elders, social security, and design for people with dementia. In addition, senior students can apply to work as a teaching assistant for a gerontology course.

Departments and programs have designated academic advisors for the gerontology concentration who will help students plan the sequences of courses and electives needed to complete both a major and the gerontology concentration. Because many gerontology courses have prerequisites, early and careful planning is essential.

Specific program requirements may be obtained in the Human Ecology registrar's office (145 MVR, 255-2235) or from Nancy Wells, Bronfenbrenner Life Course Center (E220 MVR, 254-6330).

## Concentrations

The College of Human Ecology formally recognizes as concentrations computer information sciences and international relations (both administered by the College of Arts and Sciences) and the previously described concentration in gerontology (administered by the College of Human Ecology). The college also offers a minor in education. Students interested in pursuing these concentrations should inquire with the college department offering them. If successfully completed before graduation, these concentrations will be posted as part of the student's official transcript.

Students may develop an unofficial concentration in additional fields taught at Cornell by taking 12 credits in an approved area. Africana studies, communications, and business are just a few examples of concentrations that are possible. While these unofficial concentrations are not part of a student's transcript, students may choose

to publicize these concentrations on their personal resumes.

## THE URBAN SEMESTER PROGRAM IN NEW YORK CITY

### Multicultural Issues in Urban Affairs

Sam Beck, Ph.D., director

The Urban Semester Program is a set of courses spanning the entire year. Students choose either fall or spring semester and enroll in three classes focusing on the opportunities and barriers that a multicultural society presents and their relationship with professional, community, or public policy settings and concerns (15-credit residential program). They also intern three days each week in placements of their choosing. One day each week, students carry out community service in an inner city school (pre-K to high school). One day each week, students participate in site visits. Seminars are incorporated into these activities. All students reside in the Olin Hall dormitory of the Weill Medical College of Cornell University.

In the eight-week summer semester (1 to 2 credits), students carry out internships in various medical settings. Students work with the program staff to locate internship placements. For information, contact the Urban Semester Program staff in 162 MVR, 255-1846, or the Urban Semester Program in New York City at 212-746-2273.

New York City offers a wide variety of internship settings. Many bilingual and bicultural internship settings are available in Chinese, Spanish, Creole, Russian, Yiddish, and other languages. Examples of internships follow:

**Health and medicine**—New York Presbyterian Hospital/New York Weill Cornell Medical Center, Queens Medical Center for Women and Children, South Bronx Health Center for Children and Families, Memorial Sloan Kettering Hospital, Hospital for Special Surgery, Montefiore Hospital, Bellevue Hospital, Our Lady of Mercy Hospital

**Private and public law**—NOW Legal Defense and Education Fund, Agenda for Children Tomorrow, Skadden Arps, Slate, Meagher & Flom, Lawyers for Children, DA's Office, Legal Aid Society, AALDEF, Committee Against Anti-Asian Violence, Center for Immigrant Rights, NAACP/DEF, Dorsey & Whitney

**Government and community agencies**—Cornell University Cooperative Extension, Senator Charles Schumer's office, NYC Housing Authority, Dept. of Aging, Women's Action Alliance, NYC Commission on the Status of Women, NYC Dept. of Consumer Affairs, The Center for Puerto Rican Studies, Manhattan Borough President's office, Central Park Wildlife Center, Attorney General's office, The Parks Dept., Health Dept.

**Wall Street firms and other private businesses**—Bloomingdales, Prudential Securities, Merrill Lynch, PricewaterhouseCoopers, Cairns & Associates, Burson Marsteller, Cushman & Wakefield, AIG-AI Underwriters, Salomon Smith Barney, Jane Clark Chermayeff Associates, DDB Needham, KCSA, William M. Mercer Consulting Co., MGM, Madison Square Garden, Gensler Architecture,

Niedehoff-Henkel Century Group, American Management Association

**Private not-for-profit organizations**—City Lights Youth, Council on Economic Priorities, Planned Parenthood, Talbot Perkins, FECS, National Resources Defense Council, Urban Youth Alliance Inc., Phipps Housing, The Door, Covenant House, Global Policy and International Law, UN International Assoc. of Religious Freedom, Mothers and Others for a Livable Planet, UN Child Care Center, WHEDCO, YAI, Families and Work Institute

**Private and public schools**—Beginning with Children, Banana Kelly High School, East Harlem School at Exodus House, The Hetrick Martin Institute, Nuestros Niños, Theodore Roosevelt High School, The Choir Academy of Harlem, El Puente, Genesis RFK Center, River East School, MS 118, Mott Haven Village

**Design and arts organizations**—Harlem Textiles Works, TADA!, NY Theater Workshop, Cynthia Rowley, Inc., Perry Ellis International, Museum of African Art, SOHO20 Gallery, Lower East Side Tenement Museum, Tommy Hilfiger, Polo, The Gap, Liz Claiborne

**Communications and media**—Nickelodeon, *Do Something* magazine, NBC *Dateline*, CNN, CBS *News-48 Hours*, NBC *News*, ABC *One Life to Live*, MSNBC *The News w/Brian Williams*, *The Village Voice*, *Good Housekeeping*, *The New Yorker*, *Essence*, Children's Television Workshop, *Good Morning America*, MTV, HarperCollins Publishing, *Maxim Magazine*, MTV Online International

## Other Off-Campus Programs

### Capital Semester

William Rosen, Ph.D., director

Combine a full semester of 15 Cornell credits with a paid internship and a reduction in tuition. Students intern directly for a New York State legislator (Senate or Assembly) in Albany to explore their policy interests in greater depth. Interns attend hearings and legislative sessions, meet with lobbyists and constituents, write reports for legislation and possible publication, and generally help conduct the work of their legislator. All Cornell students, regardless of major, are encouraged to apply. The program is available during the spring semester only, and it is open to sophomores, juniors, and seniors. Interns benefit greatly when subsequently applying for future employment, law school, graduate school, or business school. Information is available from the Career Development Center (162 MVR), and applications and further information can be obtained from William Rosen (259 MVR, wr14@cornell.edu).

### Cornell in Washington

Students take courses from Cornell faculty, conduct individual research projects, and work as externs while taking advantage of the rich resources of the nation's capital. For more information, visit the program office (471 Hollister Hall).

### Courses at Ithaca College and Wells College

Full-time undergraduate students at Cornell may petition to enroll in courses at Ithaca or Wells College. Students pay regular full tuition to Cornell and only special fees to either Ithaca or Wells where applicable. Students are allowed to register for one course per semester and a maximum of 12 credits in four

years. Exceptions will be granted to Cornell students enrolled in methods and practice teaching courses at Ithaca and Wells, and those students pursuing a concentration in exercise science through a specially arranged program with Ithaca College.

Cornell students are eligible to register only for Ithaca and Wells College courses that are relevant to their program and that do not duplicate Cornell courses. Ithaca and Wells College credit counts as Cornell credit but not as Human Ecology credit. Students are accepted on a space-available basis. Participation in this program is not guaranteed, and both Ithaca and Wells have the right to accept or reject students for any reason deemed appropriate. The program is available only during the fall and spring semesters. For further information, contact the college registrar (145 MVR, 255-2235).

## Double-Registration Programs

Cornell undergraduates from PAM and other fields across the college and campus are eligible to apply to the Sloan Program in their junior year for a five-year accelerated B.S./M.P.S. degree in health administration. In their senior year, these students will take the first-year Sloan courses, which will be counted twice to satisfy both undergraduate as well as graduate requirements. At the end of their senior year, students will graduate with a B.S. degree. Students whose grades are competitive will be notified during the spring semester of their senior year that they are invited to continue for the final year of Sloan as a graduate student. Those students accepted for the five-year program will participate in a health care administrative internship during the summer after earning their B.S. degree and following the first year of Sloan academic course work. The following graduate year they will complete the second year of required Sloan courses and electives and will earn a master in professional studies, with Cornell certifying completion of the requirements for a graduate degree in health administration.

Students applying to the accelerated M.P.S. program need to complete the initial application to the Sloan five-year program through PAM in their junior year. In general, at the time of application, most of their undergraduate requirements will have been met. This application must include the GRE general test score, along with recommendations from the faculty advisor and at least one other source, as well as transcripts and the statement of purpose. During their final senior undergraduate year they also will have to submit a formal application to the graduate school. A sample schedule of the two-year curriculum for Sloan can be viewed at [www.human.cornell.edu/pam/sloan/2005curric.cfm](http://www.human.cornell.edu/pam/sloan/2005curric.cfm).

## Double-Registration Program for Law

A small number of highly qualified applicants may be admitted to the Cornell Law School after only three years of undergraduate education. The requirements for admission under these circumstances are more stringent than for acceptance after four years of undergraduate study. Applicants must present outstanding qualifications and strong professional motivation. The junior year applicant follows the ordinary application procedures for Cornell Law School admission.

Interested students should contact the Law School director of admissions (Myron Taylor Hall, 255-5141) to discuss the admissions criteria. Because students accepted to this program will be spending their senior year away from Human Ecology, they need to plan ahead to ensure that distribution and major requirements for the B.S. degree will be met. Successful applicants need the approval of the college registrar in Human Ecology.

## ACADEMIC ADVISING AND STUDENT SERVICES

### Faculty Advisors

Students who choose to major in a particular department are assigned an advisor whose special interests match their need. Students may change advisors as their own interests change by working with the director of undergraduate studies (DUS).

Faculty advisors are available to discuss course requirements and sequences, useful electives inside or outside the college, as well as future goals and career opportunities. Although advisors must provide the advisor key number (PIN) during course enrollment each semester, it is the student's responsibility to make sure that his or her course selections meet graduation requirements for the major, the college, and the university. Directors of undergraduate studies in each department are available to answer questions about the advising system and the undergraduate major. Students who are exploring alternative majors should work closely with college counselors in the Office of Admission, Student, and Career Services.

### Office of Admission, Student, and Career Services

The Office of Admission, Student, and Career Services (ASCS) (170-172 MVR) is a center for undergraduate freshman and transfer admission activities; student orientation activities; academic, personal, and career advising; study abroad; and multicultural student programs.

Personal counseling, including exploration of problems or concerns of a personal nature, is available to all students. These ASCS counselors, however, are not psychiatrists or therapists; they are available to help students understand and navigate the Cornell system, and to offer support, assistance, and referral. Discussions are completely confidential. Appointments may be made through the receptionist in ASCS or by calling 255-2532.

In addition, ASCS provides support for several student organizations, including Human Ecology Ambassadors, the Mature Students Association, the Association for Students of Color, the Pre-professional Association toward Careers in Health, the Pre-law Undergraduate Society, the Orientation Committee, and Human Ecology Voices. Primary responsibilities of the office are listed below:

**Academic advisement.** This service is provided to all students as an adjunct to faculty advising. Counselors can assist in course scheduling, academic planning, selection of a major, graduation requirements, and related issues.

**Undeclared majors.** Students who have not yet declared a major are urged to work closely with student services staff to plan their program of study. For the period a student is undeclared, counselors will provide assistance during course enrollment.

**Career counseling.** Career counseling is designed to help students clarify the relationship between personal skills, abilities, and career goals. Services are offered on an individual or group basis. Counselors assist in identifying career outcomes of the majors, developing networking skills, suggesting course work appropriate to various career goals, and assisting students in their general internship and job searches.

**Post-graduate advisement.** Material pertaining to graduate and professional schools, graduate entrance examinations, courses of study, and career outcomes is readily available.

**Students with disabilities.** The college is committed to assisting students with disabilities. Students who have special needs are urged to contact Student Disability Services (420 CCC) when they arrive on campus.

**Financial aid.** Students who encounter financial difficulty or anticipate running short of funds may discuss their needs with a counselor. Complete information is available from the Office of Financial Aid, 203 Day Hall.

**The Human Ecology Alumni Association Cash Award Fund.** This fund provides small emergency grants to students in the college who have unexpected financial problems. Applications may be made through ASCS.

### Office of the Registrar

The Office of the University Registrar (B7 Day Hall) maintains the official academic records for the university and provides students with their official university transcripts. Additional information is available on the university registrar's web site: [www.sws.cornell.edu/our](http://www.sws.cornell.edu/our). The college registrar (145 MVR) maintains students' official academic records, including the audit of progress toward the degree. The college registrar also provides services such as adding and dropping courses, correcting student records, and approving the transfer of credit from other institutions. Additional information is available on the HE registrar's web site: [www.human.cornell.edu/registrar](http://www.human.cornell.edu/registrar).

### Multicultural Programs

The College of Human Ecology at Cornell University believes that a diverse community enriches the educational process for all members of the college community. Consequently, the college focuses particular efforts on a broad range of services for students of color. This includes not only recruitment but also services for students already on campus. Additionally, the college collaborates with university and New York State programs to assure that Human Ecology students have access to the vast array of services available here.

The professional staff of Human Ecology's Office of Admission, Student, and Career Services includes a director of multicultural programs who assists in the recruitment, admission, and enrollment of the most qualified and appropriate EOP (a program for New York State residents), African American, Native American, Hispanic American, and

Asian American students to the college. All EOP students are invited to a special university-wide pre-freshman summer program that introduces accepted students to the Cornell campus and its classrooms. Services for current students include EOP/COSEP; academic, career, and personal counseling; recommendation letters for employment or graduate schools; and advising and support for student activities and programs.

**The Human Ecology Partnership Program** provides mentorship through a network of faculty and upperclass students to all incoming students of color, particularly during their first year. In addition, this office serves as a liaison to the Office of Minority Educational Affairs (COSEP), State Programs (EOP), and the Learning Strategies Center. Students are also encouraged to visit the college's Career Development Center to enhance personal career exploration and decision making.

Selected programs include the following:

**BBMTA** (Black Biomedical and Technical Association). A university organization that provides enrichment activities for minority students interested in pursuing medical careers. For more information, contact Janice Turner (55 Goldwin Smith Hall, 255-9497).

**ASC** (Association for Students of Color). With the motto "Yesterday's vision, today's reality, and tomorrow's hope," the ASC was created to bring together Human Ecology students to provide a supportive foundation for enrollment, retention, graduation, and career placement for students of color. The goals of the ASC are to increase communication between students of color, administration, and faculty; assist in increasing enrollment of students of color in Human Ecology; and assist in increasing the retention of students of color in Human Ecology and in their selected majors. ASC's two committees are recruitment/retention and career development. For more information, contact Verdene Lee (172 MVR, 255-2532).

**Human Ecology Peer Partnership Program** helps incoming students of color transition to the college and university. Small groups of freshmen, usually about six to eight students, are paired with faculty and upperclass students. They meet weekly for discussions, guidance, and explorations of the Cornell campus and the Ithaca community. For more information, contact Verdene Lee (172 MVR, 255-2532); or Gary Evans (E306 MVR, 255-4775); or Lorraine Maxwell (E310 MVR, 255-1958), both in the Department of Design and Environmental Analysis.

**CSTEP.** The Collegiate Science and Technology Entry Program is the New York State program that provides enrichment activities for pre-med and pre-law New York State residents. Services are targeted at populations who are historically underrepresented in scientific, technical, health-related, or licensed professions and/or who are economically disadvantaged and who demonstrate interest in, and potential for, a CSTEP-targeted profession. For more information, contact Verdene Lee (172 MVR, 255-2532).

### Multicultural Education

Multicultural education broadens understanding of the world's many different societies as well as the various cultures of this country. Students take courses in the

Cornell programs listed below that may be used to meet degree requirements. The college encourages students to incorporate courses from these cultural programs and from study abroad experiences in their degree programs. See information on study abroad opportunities.

Africana Studies and Research Center

American Indian Program

Asian American Studies Program

East Asia Program

Feminist, Gender, and Sexuality Studies Program

Gender and Global Change

Institute for European Studies

Languages and Linguistics

Latin American Studies Program

Latino Studies Program

Peace Studies Program

Program for Contemporary Near Eastern Studies

Program in Jewish Studies

Religious Studies

South Asia Program

Southeast Asia Program

### International Students

The International Students and Scholars Office (ISSO, B50 Caldwell Hall, 255-5243) provides a broad range of services to international students. All international students should maintain contact with the ISSO. Counselors in ASCS are also available for assistance.

International students in the College of Human Ecology are encouraged to meet with the college registrar to discuss any questions or concerns that they have about their academic record.

### Career Planning, Graduate and Professional School, and Job Search Services

**Counseling.** The Office of Admission, Student, and Career Services (ASCS, 172 MVR, 255-2532) provides career counseling and resources to help students explore career options through employment and internship opportunities and professional and graduate school advising. Individual assistance is available as well as group programming, workshops, panels, and field trips. Career development is strongly encouraged and supported, including skill development in résumé writing, networking, and interviewing. Students also are instructed in the use and protocol of online résumé submissions and on-campus recruiting. The office works in conjunction with Cornell Career Services (103 Barnes Hall, 255-5221) to facilitate access to university-wide programs.

**The Career Development Center** (CDC, 162 MVR) is a starting point for students looking for career information. Selected resources about career planning and job search techniques, general directories to begin job or graduate school searches, and information for alumni networking are housed there. Also available are Cornell Career Services handouts and registration forms, graduate and professional school testing booklets and

registration packets, study abroad, and Urban Semester program materials. Computers provide access to web-based information regarding internship and employment opportunities, as well as graduate/professional schools.

The CDC is open weekdays during the regular school semester. Student career assistants are available to provide résumé and cover letter critiques, conduct mock interviews on video, and help navigate the library resources. Final critiques can be provided by a career counselor once the student review has been completed.

Former Urban Semester Program participants comprise a portion of the CDC student staff and are available daily to answer questions about the program and its application process.

Selected services are listed below. They will help students investigate their interests, skills, and values as they relate to career options, provide useful information and tips for a successful summer or full-time job search, and provide access to employment opportunities. In addition, please refer to the college's career services web site: [www.human.cornell.edu/student](http://www.human.cornell.edu/student).

**Pre-law or Pre-med.** Students who consider themselves pre-law or pre-med are encouraged to join a student group affiliated with ASCS. Those interested in a law career can join PLUS (PreLaw Undergraduate Society), which provides information on applying to law school, preparing for the LSAT, and examining career opportunities in law. Students interested in pursuing a health-related career are welcome to join PATCH (Pre-professional Association Toward Careers in Health), which serves as a link to the university health careers network and provides guidance as students prepare for the MCAT, apply to medical school, and explore the various specialties of medicine.

**Extern Program.** Students can spend one day to one week over winter break shadowing an alum in a career field of their choice. They observe day-to-day activities, discuss specific jobs and careers, and sometimes obtain limited hands-on experience. This service is available to sophomores, juniors, and seniors.

**Fresh Program.** This service is similar to the Extern Program but is available to freshmen only. Students can spend one day to one week over spring break shadowing an alum in a career field of their choice. In addition to career explorations, the Extern and Fresh programs provide excellent networking opportunities.

**Internship and Employer Files.** The CDC keeps files of more than 300 internships and hundreds of potential employers for student review.

**Student Jobs and Internships.** This is an electronic listing of information about internships and career-related summer and academic year employment that is exclusive to Cornellians.

**Alumni Career Presentations.** Alumni from the college come back to campus throughout the year to discuss their postgraduate or professional experiences. These meetings are ideal for exploring career outcomes of specific majors.

**AlumNet.** Students have access to Human Ecology alumni who can provide information on their careers and offer suggestions on a job search in their particular field or location. Students can query alumni on a host of variables and review selected alumni résumés to learn more about specific careers.

**Job Search Workshops.** The college hosts approximately 10 workshops every semester. These workshops are designed to help students market themselves for either summer or full-time job opportunities. Students learn how to conduct an effective job search, write a résumé and cover letter, and interview successfully.

**CornellTRAK.** Exclusively for Cornell students, CornellTRAK provides a listing of job opportunities available. Most are full-time jobs, although some summer opportunities are listed. Search by career field, geographic location, or both.

**InterviewTRAK.** This service provides access to on-campus interviews with employers interested specifically in Cornell students. Interviews occur primarily in banking and financial services, retail sales and management, facilities planning and management, and consulting, along with a few nonprofit organizations.

**New York Recruiting Consortium.** Available exclusively to Human Ecology and Arts and Sciences students, the New York Recruiting Consortium happens in New York City over winter break. It offers interviews for full-time employment with employers involved in banking and financial services, retail sales/management, advertising, law, health care, and consulting.

**NFP in New York City and NFP in Washington, D.C.** Speak with representatives from dozens of New York City or Washington, D.C., not-for-profit/public service agencies about work or internship opportunities in health, education, advocacy, government, and more (held only during the spring semester).

**Communications Consortium.** Interview with organizations in advertising, public relations, film and radio, and print media. National organizations come to Syracuse, N.Y., to meet with students for individual appointments. During the spring semester, a job fair is held the evening before.

## GRADUATION REQUIREMENTS AND POLICIES

It is important for students to track their graduation progress by comparing their current transcript with an appropriate curriculum sheet. Official transcripts may be obtained at the Office of the University Registrar (B07 Day Hall). Curriculum sheets are available in the Human Ecology registrar's office (145 MVR). Students are responsible for planning course selections to ensure that graduation requirements are fulfilled in eight semesters. Transfer students are allowed fewer semesters based on the number of transferable credits granted at admission. Students requiring additional semesters to fulfill their graduation requirements must meet with a Human Ecology counselor (172 MVR) and request to petition for an extension.

## Grade Point Average (GPA) Requirement for Graduation

- Students must earn a minimum cumulative GPA of 2.0 (C) or better to graduate. Note: Students matriculating before spring 2004 may continue to follow the older cumulative GPA standard of a 1.7 (C-) or better.

## Cornell Credit Requirements

- To graduate, a student must earn a minimum of 120 academic credits. Physical education credits and "00" courses do not count toward the 120 required credits. An unlimited number of credits may be taken in Cornell's statutory colleges.
- Of the 120 credits required to graduate, at least 60 credits must be earned at Cornell University (applicable to transfer students).
- As of fall 2003, students who matriculate as freshmen may apply a maximum of 15 non-Cornell credits earned before matriculation (including AP, IB, and college credits) toward the 120 credits required for graduation. For all students, an additional pre-approved 15 in absentia credits earned after matriculation may be applied. AP, IB, and transfer courses may be applied toward fulfillment of specific requirements regardless of whether the credit is transferred (i.e., required courses may be waived). Refer to "Advanced Placement Credit" for full details.
- No college credit earned before matriculation and used to meet Cornell's minimum admission requirements may be counted in the 120 credits required for graduation. This policy does not apply to transfer students.
- Courses taught by a college in the high school setting or counted toward high school graduation are not allowed to count for either credits or fulfillment of requirements (i.e., Syracuse Project Advance).
- Cornell extramural credit (defined below) is limited to 15 credits toward the 120 required.
- Strict limitations exist on the number of credits that can be applied toward the 120-credit minimum for special studies courses (400, 401, 402), for 403 courses, and for courses taken with an optional S-U grade. Details follow.

## Human Ecology Credit Requirements

- The college divides the 120 minimum required academic credits into four general categories. *(Students should refer to curriculum sheets for their major for specific details on course selections. These sheets are available in the Office of the Registrar (145 MVR) and in the Office of Admission, Student, and Career Services (172 MVR) as well as on the college web site at [www.human.cornell.edu](http://www.human.cornell.edu).)*



a. Category I—College distribution requirements

Natural sciences

Social sciences

First-year writing seminars

Humanities

Quantitative and analytical courses (math and statistics)

b. Category II—Requirements for a major

c. Category III—Elective credits

d. Category IV—Physical education

These categories are detailed below.

- **Students must complete 40 Human Ecology (HE) credits from Categories II and III.** (HE credits from Category I may not be applied toward this requirement.) A maximum of 3 credits from the 401–403 special studies series courses may be used toward this requirement. *Additional course-specific rules are listed below.*

S-U grading rules for this requirement are as follows:

1. If a course is a requirement in Category I or II, the course may *not* be taken for an S-U grade (unless it is the only grade option offered for the course).
2. Courses used to count toward Category III (electives) that are taken for an S-U grade *may* also count toward the 40-credit requirement.
3. Students should refer to the section on S-U grading rules for full S-U grading details.

- **Students must complete 9 Human Ecology (HE) credits from outside their major department from Categories I, II, or III.** Note: Biology and society majors are exempt from this requirement. A maximum of 3 credits from the 400–402 special studies series may be applied to this requirement. *Other course-specific rules for this requirement are listed below.*

S-U grading rules for this requirement are as follows:

1. If a course counting toward the 9-credit outside-the-major requirement is also a requirement in Category I or II, the course may *not* be taken for an S-U grade unless it is the only grade option offered for the course.
2. Courses used to count toward Category III (electives) that are taken for an S-U grade may also count toward the 9-credit outside-the-major requirement.
3. Students should refer to the section on S-U grading rules for full S-U grading details.

**Course-specific rules that apply to both the 40 Human Ecology credit requirement and the 9 Human Ecology credit outside-the-major requirement:**

1. Effective fall 2004, Human Ecology (prefix "HE") courses below the 300 level (e.g., HE 100, 101, 120, and 201) do not count toward either the 40-credit requirement or the 9-credit outside-the-major requirement. These HE-prefix courses that are below 300 level may be used as elective credit.

2. ECON 101 and 102 are considered Human Ecology credit courses and may be used to fulfill Human Ecology's 40- and 9-credit-outside-the-major requirements. If either or both courses are taken to fulfill a Category I or II requirement, they must be taken for a letter grade.

3. Experiential credit is applied to Human Ecology's 40- and 9-credit-outside-the-major requirements as follows:

- a. Urban Semester (HE 470, 480, 490/495). Effective fall 2004, students in all Human Ecology majors earn:

- 15 Human Ecology credits and 6 credits toward the 9-credit outside-the-major requirement.

- b. Capital Semester (PAM 392). Effective fall 2004, PAM majors earn:

- 15 Human Ecology credits and 7 credits as PAM credits.

Non-PAM majors earn:

- 15 Human Ecology credits and 7 credits toward the 9-credit outside-the-major requirement.

- c. Cornell in Washington (PAM 406). For this entire semester, PAM majors earn:

- 8 credits toward the 40-credit requirement, which also count as 8 PAM credits.

Non-PAM majors earn:

88 credits toward the 40-credit requirement, **which also** count as 8 credits toward the 9-credit outside-the-major requirement. The remainder of the credits counts as elective credit.

## Elective Credits

Students have individual objectives in choosing courses beyond the minimum requirements of the major. The university is diverse; the departments, centers, and special programs numerous; the fields of study almost unlimited. Counselors and faculty advisors are available to discuss which courses may interest students and best round out their education.

Students should consult the index in this catalog to learn where different subjects are taught in the university. Some subjects are taught in more than one division.

Elective credits can be earned in the endowed and statutory divisions of Cornell.

## Endowed Colleges

Africana Studies and Research Center

College of Architecture, Art, and Planning

College of Arts and Sciences

College of Engineering

School of Hotel Administration

Johnson Graduate School of Management

## Statutory Colleges

College of Agriculture and Life Sciences

College of Human Ecology

School of Industrial Relations

College of Veterinary Medicine

**An unlimited number of credits may be taken in the statutory colleges of Cornell.**

Human Ecology students will be billed for courses taken at endowed colleges if credits taken exceed the following limits:

- Students are allowed 21 credits of endowed courses in their major (category II) or as electives (category III); they may take more than 21 but then will be billed at the endowed rate of tuition for the extra credits (even if the endowed courses are required for the major).
- To the extent possible, courses taken in the endowed colleges will be counted to meet distribution requirements in category I. More than 40 endowed credits taken in category I, however, will count against the 21 allowed endowed elective credits.
- Elective credits in category III earned in Cornell's endowed divisions during summer session, study abroad credits, in absentia credits, and transfer credits do not count against the 21 credits allowed in the endowed divisions.
- Required credits listed in the requirements charts for categories I and II are the minimums; credits taken in excess of those minimums count toward the additional credits required in category III to make a total of 120 credits (00 courses and physical education courses do not count toward this 120-credit requirement). Students may choose to take additional courses and graduate with more than 120 credits.

## Physical Education Requirements for Graduation

1. Students must earn 2 credits of physical education within their first two semesters. These 2 credits do not count as part of the 60 Cornell credits, or as part of the 120 total credits required for a degree, or toward full-time status. Students who matriculate at Cornell with 12 or more credits must complete only 1 credit of physical education. Students who transfer more than 25 credits (excluding AP credits) are not required to take physical education at Cornell, regardless of whether they took physical education at their previous college.
2. Students must pass the university's swim test. Students who transfer more than 25 credits (excluding AP credits) are exempt. Refer to "University Requirements for Graduation—Physical Education—Swim Test" in this catalog for specifics.

## Minimum Semester Requirements

1. Students enrolling in the college as freshmen must complete at least 12 credits of Human Ecology courses by the end of the fourth semester, and at least 5 credits of Human Ecology courses must be taken in the freshman and 7 credits in the sophomore years (ECON 101 and 102 may be used to fulfill this requirement).
2. Students must carry 12 credits each semester, excluding physical education, to be matriculated as full-time students. Mature students must carry 6 credits each semester (see "Mature Student Guidelines" for details).
3. In special cases, a student may petition to carry between 8 and 12 credits. Forms for petitioning this exception and advice on how to proceed are available in the Office of Admission, Student, and Career Services (172 MVR).

## Special Studies

- Students may use only 12 credits of 400, 401, 402, or 403 courses toward graduation.
- Additional credits of 400, 401, 402, or 403 courses can be taken but will not be applied toward graduation.

## "00" Courses

- "00" courses do not count toward graduation requirements but do count toward full-time semester status.

## Requirements for Majors

- Students must fulfill the requirements specified for a major that are in effect at the time of their matriculation or thereafter. The requirements are detailed in curriculum sheets that are maintained for each academic year.

## S-U Grade Options

- The S-U grading option may *not* be used for courses in category I or required courses in category II unless it is the only grade option offered for those courses. S-U grades *may* be used for the 9 credits of Human Ecology course work outside of one's major and for electives in category III.
- Students may apply no more than 12 credits of S-U toward the 120 credits required for graduation. If a required course is offered only S-U, it will not count toward this limit. Also, Honors Research 499 taken S-U does not count against the 12 minimum limit. Students may take more S-U's if they choose, but the additional credit may not be applied toward graduation.

## First-Year Writing Seminars

In each of their first two semesters of matriculation at the College of Human Ecology, students are required to take a Knight Program First-Year Writing Seminar. This policy also applies to transfer students. One or more of the seminars may be waived for transfer students if the college registrar grants credit for equivalent course work taken before matriculation at Cornell.

Those who do not fulfill this requirement on time will be referred to the Committee on Academic Status. Refer to "Criteria for Good Standing" for specifics on warning statuses that the committee applies to students who do not complete this requirement.

First-year writing seminars must be taken at Cornell and **may not be taken in absentia**. Students who receive a score of 5 on either the English Literature and Composition or English Language and Composition Advanced Placement (AP) exams can be exempt from *one semester* of their first-year writing seminar requirements. No other AP scores will allow a student this exemption (even if a lower score allows the student to use the course as elective credit toward graduation.) Students should be aware that the add/drop period for first-year writing seminars may be shorter in duration than the add/drop period for most Cornell classes.

## Wells, Ithaca College, and Study Abroad Credits

Any credits earned with the Wells or Ithaca College exchange program are considered Cornell credits for the purpose of fulfilling the 60 Cornell credit graduation requirement. They may not be used for Human Ecology credit. Study abroad courses may also count as Cornell credit (but not for Human Ecology credit). Refer to "Cornell Credit Requirements" for details on how many advanced placement (AP) credits can be applied toward the 120 credits needed for graduation.

## Advanced Placement Credit

Students can earn advanced placement credit from one of the following:

1. The requisite score on a departmental examination at Cornell (usually given during orientation week) or on a College Entrance Examination Board (CEEB) achievement test. The requisite scores for the CEEB exams are determined by the relevant department at Cornell, vary by subject, and are listed in the beginning of this catalog. College-specific rules apply toward many AP courses such as biology, English literature, English composition, and statistics. Details may be found at <http://human.cornell.edu/registrar/regdata/ap.cfm>.
2. A regular course taught at an accredited college to college students and approved by the relevant department at Cornell. Some departments have delegated the review of courses to college staff according to guidelines they have formulated. Some departments review each request individually. Some departments accept credit from virtually all accredited colleges; some do not.
3. Credit from the International Baccalaureates (IB) is evaluated individually.
4. Refer to "Cornell Credit Requirements" for details on how many Advanced Placement (AP) credits can be applied toward the 120 credits needed for graduation.

Note: Cornell does not accept credit for courses sponsored by colleges but taught in high schools to high school students, at colleges if enrollment is targeted at high school students, or if the course was used toward high school credit. This is true even if the college provides a transcript of such work. These courses also may not be used to fulfill college requirements. Students who have taken such courses may, however, take the appropriate CEEB test to qualify for credit as in paragraph 1 above. For further information and limitations on Advanced Placement credit, see the front pages of this catalog and the Human Ecology registrar's web site ([www.human.cornell.edu/registrar/ap.cfm](http://www.human.cornell.edu/registrar/ap.cfm)).

## Foreign Language Study and Placement

Students who studied a foreign language before coming to Cornell and who want to continue must take either the CEEB test in that language or a Cornell departmental language placement test. The latter is given during orientation week in September and again in December, January, and May. Human Ecology students who plan to work with non-English-speaking people in this country or abroad often find it necessary to be proficient

in another language. Many study abroad programs in non-English-speaking countries require the equivalent of two years of college-level language study.

## Extramural Credit

Extramural credit is administered by the Office of Continuing Education and Summer Sessions (B20 Day Hall, 255-4987). Extramural credit is charged by the credit hour at the endowed tuition rate. Students may count only 15 credits of extramural credit toward their degree requirements. A student may enroll for extramural credit during the fall or spring semester only if he or she is not registered in the College of Human Ecology. For example, some students enroll for extramural credit before matriculating at Cornell.

An exception to this rule is credit earned in the Ithaca College or Wells College exchange programs. Students enrolled in these programs simultaneously maintain their status as students registered in the College of Human Ecology.

## Humanities

Only certain classes will count for Category I, Humanities. To determine eligibility the college uses the following definition: "The humanities include the study of literature, history (including art and design history), philosophy, religion, and archaeology. Critical, historical, and theoretical studies of the arts and design are considered humanities. Languages and creative or performing arts such as the writing of fiction or poetry, painting, sculpting, designing, composing or performing music, acting, directing, and dance are not considered humanities." Additionally, social science courses such as sociology, government, anthropology, and psychology are not considered humanities.

Specifically, courses in the following list will count as humanities:

Africana Studies (literature and history)  
 Archaeology  
 Asian American Studies  
 Asian and Near Eastern Studies (literature and history)  
 Classics (literature and history)  
 Comparative Literature  
 Development Sociology 175, 318  
 English (literature only)  
 History  
 History of Art/History of Architecture  
 Landscape Architecture 282  
 Music and Theatre Arts (theory, literature, and history only)  
 Natural Resources 407, 411  
 Philosophy  
 Policy Analysis and Management 631, 634, 652  
 Religious Studies  
 Science and Technology Studies 205, 206, 233, 250, 281, 282, 286, 292, 358, 360, 389, 433, 444, 447, 472, 481, 490

## Math Requirement

Students have an opportunity to take the math assessment exam during orientation. Use the information below to decide whether you should take the exam.

1. Students must meet the minimum competency level of mathematics, equivalent to EDUC 115 (pre-calculus mathematics). This requirement can be met in any of the following ways:
  - Advanced Placement credit (a score of 3 or better on either the AB or the BC Mathematics exam). Be sure that we get your score!
  - Performance on the math assessment exam at the level of EDUC 115.
  - The math assessment exam is offered during New Student Orientation each semester. See schedule for details.
  - Students are allowed three hours to complete the exam, which covers high school-level mathematics including algebra, geometry, trigonometry and other pre-calculus topics. No calculators may be used.
  - Completion of EDUC 115 or a higher-level mathematics course at Cornell. Students choosing this option must take the math assessment exam (offered during orientation) in order to choose the appropriate level course. See above for details.
  - Completion of a course acceptable to the College of Human Ecology as equivalent to EDUC 115 (or higher) at another institution. If you have already taken such a course, please submit the description to the Office of the Registrar in 145 MVR for evaluation.
  - If you would like to take a course at another college or university at some point in the future, you must request permission and course approval by filing the Petition to Study In Absentia, available in the Office of the Registrar, 145 MVR.
2. Students must take 3 credits of statistics or advanced mathematics (calculus or above), or logic; departments may specify which courses they require to fulfill this requirement. Consult your director of undergraduate studies or printed curriculum materials for your department's requirements.

**Summary:** Don't take the math assessment if you have earned AP credit, and don't take it if you already have college credit for a math course at the pre-calculus level or higher. If you would like to use the math assessment to demonstrate knowledge equivalent to pre-calculus, go ahead and sit for the exam during orientation.

## PROCEDURES

### Registration and Course Enrollment

#### Registration Requirements

University registration is the official recognition of a student's relationship with the university and is the basic authorization for a student's access to services and education. Completion of registration is essential to

enable the university to plan for and provide services and education, guided by the highest standards for efficiency and safety. Unauthorized, unregistered persons who use university services and attend classes have the potential to use university resources inappropriately and to displace properly registered students. In addition, the university assumes certain legal responsibilities for persons who participate as students in the university environment. For example, policy states that New York State health requirements must be satisfied. Because these requirements are intended to safeguard the public health of students, the university has a responsibility to enforce the state regulations through registration procedures.

The policy on university registration is intended to describe clearly the meaning of and the procedures for registration so that students can complete the process efficiently and be assured of official recognition as registered students. With the clear communication of the steps for registration, it is hoped that compliance will occur with a minimum of difficulty.

To become a registered student at Cornell University, a person must complete course enrollment according to individual college requirements; settle all financial accounts including current semester tuition; satisfy New York State health requirements; and have no holds from the college, the Office of the Judicial Administrator, Gannett Health Center, or the Bursar's office.

Individuals must become registered students by the end of the third week of the semester. Cornell University does not allow persons who are not registered with the university in a timely manner to attend classes. The university reserves the right to require unauthorized, unregistered persons who attend classes or in other ways seek to exercise student privileges to leave the university premises.

#### Verification of Registration

Many insurance companies or scholarship funds require verification of full-time registration at Cornell. Should students need such verification, they should use the official university verification service at <http://certification.cornell.edu> or request an official letter from the Office of the University Registrar (B-7 Day Hall). Students who need letters of good standing should contact the Human Ecology registrar's office (145 MVR).

#### Bursar Bill

A bursar bill is sent to each student over the summer and winter breaks; it summarizes what is owed to the university. The bursar bill can also be viewed through Just the Facts. Any questions regarding the bursar bill can be directed to the Bursar's office (260 Day Hall, 255-2336). Initial New York State residency eligibility is determined during the admissions process, but the Bursar's office will handle any request for a status change after matriculation.

#### Late University Registration

A student clearing his or her financial obligations after the deadline date on the bursar's bill is considered late. **Late registrants are assessed a finance charge on the bursar's bill starting from the date the bill is due.** According to university policy, all students must be registered before the end of the third

week of classes. If for any reason a student registers after that time, the Bursar's office will charge a late fee. **Students who fail to register by the third week of the semester may be withdrawn from the university.** Human Ecology students who do not arrange payment agreements satisfactory to the university bursar by the last day of classes for a semester will be withdrawn from the university. Furthermore, credit for any classes attended for the semester will not be awarded regardless of the letter grade received for a class. Should withdrawn students wish to return, they must reapply through the college admissions office.

#### Proration of Tuition

Except for mature students, it is seldom possible to have tuition prorated if a student carries fewer than 12 credits during a semester. See the college registrar (145 MVR) or counselors (Office of Admission, Student, and Career Services, 172 MVR) for more information. Students of mature status may carry 6 to 11 credits without petitioning but must request that their tuition be prorated. Prorated tuition will be considered only for requests of between 3 and 10 credits. All requests should be made to the college registrar (145 MVR) by the end of the pre-enrollment period in the prior semester.

### Course Enrollment

#### Initiating the Process

"CoursEnroll" selections are only "requests" for seats in classes. Between the end of the course enrollment period and the beginning of the next semester, course requests are evaluated by the offering college department. Students can determine if their requests have been successful when final schedules are published before the add/drop period. Students are expected to make course requests for the subsequent semester during a specified time in the current semester. Those dates are advertised publicly and available on the University Registrar's web site ([www.sws.cornell.edu/our](http://www.sws.cornell.edu/our)). "CoursEnroll" takes place electronically, using software available through Just the Facts. During this time, each student must meet with his or her faculty advisor to discuss academic plans and to obtain the advising PIN code required for finalizing course requests. A student may enter and hold requests for courses before entering his or her PIN. Once the PIN number is entered, however, the schedule is locked and it is not possible to change until the add/drop period of the next semester. Important: students who fail to finalize the CoursEnroll process by not entering their PIN code by published deadlines **will lose all** course requests.

Information on courses is readily available in this catalog and in the *Course and Time Roster* for each semester. Both of these publications can be accessed on the web through CUInfo.

Incoming students will receive tentative schedules upon their arrival to campus, and will meet with faculty advisors during the orientation period.

#### Course Loads

Full-time matriculated students must carry at least 12 credits (exclusive of physical education courses) to maintain full-time status. Refer to the preceding section, "Minimum Semester Requirements," for details. The normal course load in the college ranges from 12 to 18 credits, although there is no limit to

the number of statutory credits a student may take each semester. Nonetheless, students should avoid planning excessive workloads; the time required to keep abreast of courses tends to increase as the semester progresses. Students may not withdraw from courses after the seventh week of classes without petitioning and by substantiating extenuating circumstances. Students should avoid the need to drop courses by taking on a reasonable workload and using the drop period to make changes in their program.

### Late Course Enrollment

Students who do not complete course enrollment during the CoursEnroll period usually must wait until the beginning of the next semester's add/drop period to enroll. Extensions are rarely granted and usually only for documented illness.

Students who do not meet the deadline for any reason should see the college registrar in 145 MVR as soon as possible. The college registrar can explain available options and course enrollment procedures under such circumstances.

**Note:** Students can review their course schedule via computer using Just the Facts. Students are responsible for checking their course schedule for accuracy of course numbers, credit hours, grade options, and other data. Errors must be corrected immediately. Procedures for correcting enrollment errors as well as for making any other changes are described in the following section.

### Course Enrollment Changes

It is to the student's advantage to make any necessary course enrollment changes as early in the semester as possible. Adding new courses early makes it easier for the student to keep up with course work. Dropping a course early makes room for other students who may need it for their academic programs.

Ideally, students evaluate their course load carefully at the beginning of the semester. If, in the first week or two, the instructors do not discuss the amount of material to be covered and the extent of student assignments, students need to ask about course requirements.

In addition to the procedures listed below for course enrollment changes, all add/drop forms for nutritional science majors must be signed by a faculty advisor.

### Deadlines for Add/Drop and Grade Option Changes

**Note:** Brief add/drop periods exist for first-year writing seminars and half-semester courses.

1. During the first three weeks of the semester, courses may be added, dropped, or the grade option changed. Special status courses (400, 401, 402) may be added through the 11th week of classes. 403 Teaching Apprentice courses must be added during the first three weeks of the semester.
2. From the fourth through the seventh week of the semester, courses may be dropped. **Grade option changes may not be made at this point regardless of instructor's permission.**
3. After the seventh week of the semester, any requests for course changes must

be made through the petition process. Students should request an appointment with an Admission, Career and Student Services counselor in 172 MVR to initiate the process.

4. After the seventh week of the semester, any student granted permission to drop a course after petitioning will automatically receive a grade of W (Withdrawn), and the course and grade will remain on the official transcript even if repeated in a later semester.

### Deadlines for Half-Semester Courses

Students may drop half-semester courses within the first three-and-one-half weeks of the course. Students may add a course after the first week of classes only with the permission of the instructor. After the first three-and-one-half weeks, students must petition to drop the course.

### Time and Place for Add/Drop and Grade Option Changes

All students may adjust their schedules and grading options during the first three weeks of each semester. **To make course changes after the seventh week of the semester, a student must file a general petition form** (see "Petition Process.") Students are expected to attend classes and to do assigned work until the petition has been formally approved or denied.

### Permission of Instructor

Certain courses may be taken only with the permission of the instructor as indicated in this catalog or on the official course description on the web. Undergraduates must obtain permission of the instructor to take any graduate course. Students must request the instructor's permission during the course enrollment period by placing their name on a list maintained by the departmental advising assistant.

Students interested in taking a course in the Department of Art in the College of Architecture, Art, and Planning are required to register with the departmental secretary (100 Olive Tjaden Hall) before enrolling in the course. Seniors who want to take an elective course in the Johnson Graduate School of Management are required to obtain permission of the instructor on a course authorization form that the student then files with that school's registrar in Sage Hall.

### Course Enrollment while Studying Abroad

Students who plan to study abroad have several options available to enroll for their returning semester at Cornell. Students can consult with their faculty advisor before departure to consider the schedule of classes that they will take upon their return to campus. Once abroad, the student can use the web to access *Courses of Study* and the *Course and Time Roster* for the coming semester. The roster is available on the web in approximately the first week of October and the first week of March. Using these resources, the student can e-mail the course requests to the student's faculty advisor for approval; the faculty advisor can then e-mail them to the college registrar. A student who does not have access to the Internet while abroad can wait for the *Course and Time Roster* to arrive via airmail from the Cornell Abroad office. The student can then e-mail, fax, or mail the

course requests to their faculty advisor and ask the faculty advisor to submit the course requests to the college registrar. The *Course and Time Roster* becomes available only the day that pre-enrollment begins; thus, students who depend on receiving the mailed copy will experience some delay in submitting their course requests. Requests must be submitted within the published deadlines. Because the faculty advisor submits requests for the students, the students do not have to finalize selections with a PIN number.

### Oversubscribed Courses

Enrollment in many human ecology courses is limited. When a course is overenrolled, students are generally assigned on the basis of seniority or by criteria defined for each course as listed in this book. Students' professional goals may be considered. Those students not admitted to a course may be placed on a waiting list maintained by the professor or the department offering the course. Course instructors are responsible for determining the criteria to fill their classes from waiting lists. Waiting lists are maintained only for the first three weeks of each semester.

### Limited-Enrollment Classes

Students who do not attend the first two class sessions of courses with limited enrollment may be dropped from the course list. Students can avoid being dropped from a class by notifying the instructor that unavoidable circumstances have prevented their attendance.

### Cross-listed Courses

To apply a cross-listed course to graduation requirements, students must enroll in the department for which they need the credits. If changes in department designations need to be made, this must be done during the official course add period for the semester. To do so, students must complete a special form, which can be obtained in the registrar's office in 145 MVR.

### Courses with Duplicate Content

Students should scrutinize course descriptions for details about other Cornell courses with duplicate content that would preclude a student from receiving full credit for duplicate courses. For example, students may not receive 6 credits toward graduation requirements if they take D SOC 101 and SOC 101. Because both are introduction to sociology courses, only 3 credits would be allowed. To aid students in this evaluation, the college maintains a partial list (those that are commonly required in Human Ecology curricula) of Cornell courses that have duplicate content. Other courses with similar content may be found at [www.human.cornell.edu/registrar/forbiddenoverlaps.cfm](http://www.human.cornell.edu/registrar/forbiddenoverlaps.cfm).

### Special Studies Courses

Each department in the College of Human Ecology (DEA, HD, NS, PAM, and TXA) offers special studies courses that provide opportunities for students to do independent work not available in regular courses. One of those courses, designated 300 Special Studies for Undergraduates, is intended primarily for students who have transferred from another institution and need to make up certain course work.

The other special studies courses are 400 Directed Readings; 401 Empirical Research;

and 402 Supervised Fieldwork. Juniors and seniors normally take those courses, and a faculty member in the department in which the course is offered supervises work on an individual basis. It is important for students to use the appropriate course number (300, 400, 401, or 402) for a special project.

To register for a special studies course, a student obtains a special studies form from the departmental office where he or she plans to take the course. The student discusses the proposed course with the faculty member under whose supervision the study would be done and then prepares a plan of work. If the faculty member agrees to supervise the study, the student completes a special studies form and obtains signatures from the instructor, faculty advisor, and department chair before submitting the form to the college registrar's office (145 MVR). Special studies forms are available in 145 MVR or in departmental offices.

Semester credits for special studies courses are determined by the number of contact hours the student has with the supervising faculty member (or a person designated by the faculty member). To earn 1 credit, a student must have the equivalent of three to four hours of contact time per week for 15 weeks (a total of 45 contact hours). For additional credit, multiply the number of credits to be earned by 45 to determine the number of contact hours needed for the course. **Strict limitations exist on the number of special studies credits that can apply toward graduation and how these credits may be applied toward Category II requirements in the major. Refer to "Human Ecology Credit Requirements" for details.** To register in a special studies course taught in a department outside the college, follow the procedures established by that department.

## Changes in Status

### General Petition Process

The petition process permits students to request exceptions to existing regulations. Petitions are considered individually, weighing the unique situation of the petitioning student with the intent of college and university regulations. In most cases, extenuating circumstances are needed for a petition to be approved if it involves waiving a deadline. These are situations beyond a student's control, such as a documented medical emergency.

Students can avoid the necessity to petition by carefully observing the deadlines that affect their academic program. See "Course Enrollment Changes" above for some of the important deadlines. If unsure of a deadline, check with a counselor in the Office of Admission, Student, and Career Services (172 MVR) or with the staff in the college registrar's office (145 MVR).

A general petition may be needed to carry fewer than 12 credits, withdraw from a class after the seventh-week deadline, add a course after the third-week deadline, change a grade option after the third-week deadline, be exempt from one or more of the college's graduation requirements, substitute a required course in one's major with another course, or stay an additional semester to complete the graduation requirements.

Although many kinds of requests can be petitioned in the college, options other than petitioning may be preferable in some cases. To explore whether a petition is appropriate, the student may discuss the situation with a college counselor or the college registrar.

If a student decides to submit a general petition, the form is available in the registrar's office (145 MVR) and in the Office of Admission, Student, and Career Services (172 MVR) or on the web at [www.human.cornell.edu/student/forms/](http://www.human.cornell.edu/student/forms/). After completing the form and obtaining the required signatures, the student must turn the form in to the registrar. Once a decision is made, a letter is placed in the student's college mail folder indicating approval or denial of the petition.

Students may appeal the college registrar's decision to the Committee on Academic Status. Students who elect to appeal have the option of appearing in person before the committee to state their case. A member of the counseling staff can guide a student through this process.

### In Absentia Study

Under certain conditions, credit toward a Cornell degree may be given for in absentia study, that is, study done at an accredited institution away from Cornell after the student matriculates in the College of Human Ecology. In absentia study can be done during any semester: fall, winter, spring, or summer. First-year writing seminars may not be taken in absentia.

To be eligible for in absentia study, a student must be in good academic standing and must receive permission in advance from the college registrar. A student not in good standing may study in absentia but will not receive transcript credit until the Committee on Academic Status has returned the student to good standing. Students not in good academic standing who wish to finish their degree in absentia must seek pre-approval from the college's Committee on Academic Status via the general petition process. In some cases, students may petition for in absentia credit after the work has been completed, but there is no guarantee that such credit will be awarded without advance approval.

In absentia petition forms are available in the Human Ecology registrar's office (145 MVR) or on the web at [www.human.cornell.edu/student/forms/](http://www.human.cornell.edu/student/forms/). The student submits the form to the Human Ecology registrar's office (145 MVR). In absentia study during the fall or spring semester carries a nominal administrative fee. (Contact the Bursar's office, 260 Day Hall, for the current amount.) Students will receive a letter in their college mail folder from the college registrar notifying them of the petition decision.

**Note:** Students seeking pre-approval for in absentia course work should do so well in advance as turnaround time for the approval process can be variable.

A student may take up to 15 credits in absentia as long as the courses do not duplicate courses already taken and the in absentia courses are applicable to the requirements of the college. Students who study abroad during the summer or winter term are limited to a maximum of 9 in absentia credits. Study abroad during the fall or spring semester must be done through the

Study Abroad office and is not considered in absentia study. **Students studying while on a leave of absence during the spring or fall semesters may not receive credit for nondomestic campus programs.**

On the following rare occasions a student's petition for more than 15 credits in absentia may be allowed: (1) the work taken represents a special educational opportunity not available at Cornell, (2) it relates to the student's particular professional goals, and (3) those goals are consistent with the focus of the college. The in absentia petition form is used to request more than 15 credits in absentia. Wells and Ithaca College credit are not considered in absentia credit and are not included in the 15-credit limit.

The college registrar requests approval from the appropriate department if a student wants to apply in absentia credit to requirements in his or her major. Students seeking in absentia credit for a modern foreign language in which they have done work must obtain the approval of the Department of Modern Languages and Linguistics (College of Arts and Sciences). The department will recommend the number of credits the student should receive and may require the student to take a placement test after returning to Cornell.

The student is responsible for having the registrar of the institution where in absentia study is taken send transcripts of grades directly to the Human Ecology registrar's office (145 MVR). Only then will credit be officially assessed and applied to the Cornell degree. Credit for in absentia study will be granted *only* for those courses with grades of C- or better. Courses may not be taken for S-U grades unless it is the only grade option offered. In absentia courses appear on the Cornell University transcript, but the grades are not calculated in the student's GPA.

A student who holds a Regents' or Children of Deceased or Disabled Veterans Scholarship may claim that scholarship for study in absentia if the study is done in a college in New York State and if it is for a maximum of 15 credits acceptable to the College of Human Ecology.

The rules regarding study in absentia apply to transfer students with the additional stipulation that at least 60 credits must be taken at Cornell. At least 40 of the 60 credits must be in the College of Human Ecology at Cornell unless the student has transferred equivalent human ecology credit. (No more than 20 credits of equivalent credit may be applied to the 40 credits required in human ecology course work.)

### Leaves of Absence

A student may request a leave of absence before the beginning of the semester or during the first seven weeks of the semester for which a leave is sought. A leave may be extended for a second semester by making a written request to the Office of Admission, Student, and Career Services (172 MVR).

**Note:** In absentia study status and leave of absence status are not the same; however, students may petition to earn credits with either status. Students on leave must notify the college registrar (145 MVR), in writing, of their intention to return to campus at least one month before the beginning of the semester. **Those whose leave period has expired will be withdrawn from the college after the seventh week of the semester they were due back.**



Students considering a leave of absence should discuss their plans with a counselor in the Office of Admission, Student, and Career Services. The counselor can supply the necessary forms for the student to complete and file with the Human Ecology registrar's office (145 MVR). Leaves initiated after instruction begins will be charged a percentage of the semester tuition. (Refer to "Bursar Information" in this catalog for a billing schedule.)

Requests for a leave of absence received after the first seven weeks of the semester, or requests for a leave of absence from students who have already had two semesters' leave of absence, will be referred for action to the Committee on Academic Status. The committee may grant or deny such requests, attaching conditions to the leave as it deems necessary. Leaves of absence after the first seven weeks are generally granted only when there are compelling reasons why a student is unable to complete the semester, such as extended illness.

A student who requests a leave of absence after the first seven weeks is advised to attend classes until action is taken on the petition. A student whose petition for a leave of absence is denied may choose to withdraw or to complete the semester. If the petition for leave is approved the student's courses will remain on the transcript with W grades.

The academic records of all students who are granted a leave of absence are subject to review, and the Committee on Academic Status may request grades and other information from faculty members to determine whether the student should return under warning or severe warning or in good academic standing.

Under certain documented medical circumstances a student may be granted a **medical leave of absence**. Medical leaves are initiated by the student with Gannett Health Center. If Gannett Health Center recommends a medical leave for the student, the college registrar may grant the leave. A medical leave is for an indeterminate period of time not to exceed five years. Students who are granted a medical leave of absence should maintain contact with a counselor in the Office of Admission, Student, and Career Services (172 MVR, 255-2532) to arrange their return to campus. The counselor will advise the student on procedures to obtain a recommendation from Gannett Health Center to the college registrar for the student's return. Students should plan sufficiently in advance to assure time for Gannett Health Center and the college registrar to consider their request.

### Withdrawal

A withdrawal is a termination of student status at the university. Students may withdraw voluntarily at any time by notifying a counselor in the Office of Admission, Student, and Career Services and filing a written notice of withdrawal in the Human Ecology registrar's office. A student considering such an action is urged to first discuss plans with a counselor in the Office of Admission, Student, and Career Services (172 MVR, 255-2532).

In some instances a student may be given a withdrawal by the college registrar. Students who leave the college without an approved leave of absence, or do not return after the leave has expired, will be given a withdrawal

after the seventh week of the semester in which they fail to register.

A student who has withdrawn from the college or who has been given a withdrawal by the college registrar and who wishes to return at a later date must reapply through the Office of Admission for consideration along with all other applicants for admission. If the student was in academic difficulty at the time of the withdrawal, the request for readmission will be referred to the Committee on Academic Status (CAS) for consideration, and that committee may stipulate criteria under which the student may be readmitted to the college.

## GRADES AND EXAMINATIONS

### Grade Definitions and Equivalents

The official university grading system uses a system of letter grades ranging from A+ to D-, with F denoting failure. An INC grade is given for incomplete work and R is given at the end of the first semester of a two-semester course. If a student is given permission to withdraw from a course after the seventh week of the semester a "W" is automatically assigned. Students can view their grades on Just the Facts after the semester has ended. See "Grading Guidelines" for more information on the official university grading policies.

To compute a semester grade point average (GPA), first add up the products (credit hours X grade quality points) and divide by the total credit hours taken. Grades of INC, R, S, SX, U, UX, and W should not be included in any GPA calculations. A grade of F has no quality points, but the credits are counted, thereby lowering the average. A cumulative GPA is simply the sum of all semester products divided by all credits taken. Refer to "Repeating Courses" for details on how GPA is affected if a student repeats a course. For further help on calculating a GPA ask at the college registrar's office (145 MVR).

These are the quality point equivalents:

A+ = 4.3	C+ = 2.3
A = 4.0	C = 2.0
A- = 3.7	C- = 1.7
B+ = 3.3	D+ = 1.3
B = 3.0	D = 1.0
B- = 2.7	D- = 0.7
	F = 0.0

### Repeating Courses

Students are allowed to register a second time for a course they have already passed or in which they received an F. If a student has previously passed a course he or she is taking a second time, the second registration will not count toward the degree requirements, and the grade received will not be included in the cumulative GPA.

If a student enrolls in a course in which he or she previously received an F, the credits from the second registration will count toward the graduation requirements and the grade will be included in the cumulative GPA. The F will also remain on the record and will be included in the GPA.

### S-U Grades

Some courses in the college and in other academic units at Cornell are offered on an S-U basis (see course descriptions in this book and on the Cornell web site). Courses listed as SX-UX are available only on an S-U basis and may not be taken for a letter grade. University regulations concerning the S-U system require that a grade of S be given for work equivalent to a C- or better; for work below that level, a U must be given. **No grade point assignment is given to a grade of S, and S or U grades are not included in the computation of semester or cumulative averages.** A course in which a student receives a grade of S is, however, counted for credit. No credit is received for a U. Both the S and U grades appear on a student's record. A student who is attempting to qualify for the semester's Dean's List must take at least 12 credits of course work graded non-S-U. See "Awards and Honors" for more details about the Dean's List.

**No more than 12 S-U credits will count toward a student's 120-credit graduation requirement.** However, a student may take more than one S-U course in any one semester. **S-U courses may be taken only as electives or in the 9 credits required in the college outside the major** unless the requirements for a specific major indicate otherwise. Freshmen enrolled in ENGL 137 and 138 (offered for S-U grades only) are permitted to apply those courses to the first-year writing seminar requirement. If a **required** course is offered only S-U, it will not count toward the 12-credit limit.

To take a course for an S-U grade, a student must check the course description to make sure that the course is offered on the S-U basis; then either sign up for S-U credit during course enrollment, or obtain and file an add/drop form in the Human Ecology registrar's office before the end of the third week of the semester. After the third week of the semester, students cannot change grade options.

### Grades of Incomplete

A grade of incomplete is given when a student does not complete the work for a course on time but when, in the instructor's judgment, there was a valid reason. A student with such a reason should discuss the matter with the instructor and request a grade of incomplete. Students are at risk of going under the minimum semester requirement if an INC grade in a course puts the total number of credit hours under 12 for the semester. For more information, refer to "Minimum Semester Requirements."

**A grade of incomplete may remain on a student's official transcript for a maximum of two semesters and one summer after the grade is given,** or until the awarding of a degree, whichever is the shorter period of time. The instructor has the option of setting a shorter time limit for completing the course work.

If the work is completed within the designated time period, the grade of incomplete will be changed to a regular grade on the student's official transcript. **If the work is not completed within the designated time period, the grade of incomplete automatically will be converted to an F.**

When a student wants to receive a grade of incomplete, the student should arrange a conference with the instructor (preferably before classes end and the study period begins) to work out the agreement. A form,

called Explanation for Reporting a Final Grade of F or Incomplete, which must be signed by both the instructor and the student, needs to be submitted by the instructor to the Human Ecology registrar's office. This form is submitted with the final grade sheets whenever a grade of incomplete is given. This form is for the student's protection, particularly in the event that a faculty member with whom a course is being completed leaves campus without leaving a record of the work completed in the course. If circumstances prevent a student from being present to consult the instructor, the instructor may, if requested by the student, initiate the process by filling out and signing the form without the student's signature and turning the form in to the Human Ecology registrar's office with the grade sheet. Before a student will be allowed to register for succeeding semesters, he or she must go to the Human Ecology registrar's office to fill out and sign the remainder of the form.

If the work is completed satisfactorily within the required time, the course appears on the student's official transcript with an asterisk adjacent to the final grade received for the semester in which the student was registered for the course. A student who completes the work in the required time and expects to receive a grade must take the responsibility for checking with the Human Ecology registrar's office (about two weeks after the work has been handed in) to make sure that the grade has been received. Any questions should be discussed with the course instructor.

## Grade Disputes

Students who find themselves in disagreement with an instructor over grades have several options:

1. Meet with the instructor and try to resolve the dispute.
2. Meet with the chair of the department in which the instructor has their appointment.
3. Meet the associate dean for undergraduate studies of the college in which the course was taught.
4. Meet with the university ombudsman (118 Stimson Hall, 255-4321).

A student may also seek advice from his or her faculty advisor or with a counselor in the Office of Admission, Student, and Career Services (172 MVR).

## Examinations

Both the preliminary and final examination schedules are printed every semester in the *Course and Time Roster*. The current exam information is also available on the university registrar's web page at [www.sws.cornell.edu/our](http://www.sws.cornell.edu/our).

### Final Examinations

The following is quoted from the *Cornell University Faculty Handbook*, 1990, pages 66-67:

"The University Faculty long ago established, and has never reversed, the policy that each course should require a final examination or some equivalent exercise (e.g., a term paper, project report, final critique, oral presentation, or conference) to be conducted or due during the period set aside for final examinations.

"Although not specifically prohibited, it is University policy to discourage more than two examinations for a student in one 24-hour time period and especially on any one day. It is urged that members of the faculty consider student requests for a make-up examination, particularly if their course is the largest of the three involved and thus has the strongest likelihood of offering a makeup for other valid reasons, e.g., illness, death in the family, etc.

Legislation of the University Faculty governing study period and examinations is as follows:

1. No final examinations can be given at a time other than the time appearing on the official examination schedule promulgated by the Registrar's Office without prior written permission of the Dean of the Faculty.
2. No permission will be given, for any reason, to schedule final examinations during the last week of classes or the designated study period preceding final examinations.
3. Permission will be given by the Dean of the Faculty to reschedule examinations during the examination period itself if requested in writing by the faculty member, but only on condition that a comparable examination also be given for those students who wish to take it at the time that the examination was originally scheduled. The faculty member requesting such a change will be responsible for making appropriate arrangements for rooms or other facilities in which to give the examination. This should be done through the Registrar's Office.
4. No tests are allowed during the last week of scheduled classes unless such tests are part of the regular week-by-week course program and are followed by an examination (or the equivalent) in the final examination period.
5. Papers may be required of students during the study period if announced sufficiently far in advance that the student did not have to spend a significant segment of the study period completing them.
6. Faculty can require students to submit papers during the week preceding the study period.
7. Take-home examinations should be given to classes well before the end of the regular semester and should not be required to be submitted during study period but rather well into the examination period.

Students have a right to examine their corrected exams, papers, and the like, in order to be able to question their grading. They do not, however, have an absolute right to the return thereof. Exams, papers, etc., as well as grading records, should be retained for a reasonable time after the end of the semester preferably until the end of the following semester, to afford students such right of review."

### Preliminary Examinations

The following is quoted from the *Cornell University Faculty Handbook* (1990), pages 65-66:

"Preliminary examinations are those given at intermediate times during a course. It is common to have three of these in a semester to encourage review and integration of major segments of the course, to provide students with feedback on how well or poorly they are progressing, and to contribute to the overall basis for a subsequent final grade.

The most convenient times and places for "prelims" are the normal class times and classrooms. But many courses, particularly large ones with multiple sections, choose to examine all the sections together at one time and to design an examination that takes more than one class period to complete. In such cases the only alternative is to hold the prelim in the evening. This practice creates conflicts with other student activities, with evening classes and laboratories, and among the various courses that might choose the same nights.

To eliminate direct conflicts, departments offering large multisection courses with evening prelims send representatives annually to meet with the dean of the University Faculty to lay out the evening prelim schedule a year in advance. Instructors of smaller courses work out their own evening prelim schedules, consulting their students to find a time when all can attend. Room assignments are obtained by the faculty member through the contact person in his or her college or the Central Reservations Coordinator.

The policy governing evening examinations is as follows:

1. Evening examinations may be scheduled only on Tuesday and Thursday evenings and only after 7:30 P.M. without prior permission from the Office of the University Faculty.
  - a. Such prior permission is not, however, required for examinations or makeup examinations involving small numbers of students (generally 30 or fewer) provided that the scheduled time is acceptable to the students involved and that an alternate examination time is provided for those students who have academic, athletic, or employment conflicts at the time scheduled.
2. Permission from the Office of the University Faculty to schedule on evenings other than Tuesdays and Thursdays or at a time before 7:30 P.M. will be granted only on the following conditions:
  - a. Conditions such as the nature of the examination, room availability, large number of conflicts, etc., justify such scheduling.
  - b. An alternate time to take the exam must be provided for those students who have academic, athletic, or employment conflicts at the time scheduled.
3. If there is a conflict between an examination listed on the schedule developed at the annual evening prelim scheduling meeting and an examination not on the schedule, the examination on the schedule shall have a priority, and the course not on the schedule must provide an alternate time to take the examination for those students faced with the conflict.

4. If there is a conflict between examinations, both of which are on the schedule developed at the annual evening prelim scheduling meeting or both of which are not on the schedule, the instructors of the courses involved must consult and agree on how to resolve the conflict. Both instructors must approach this resolution process with a willingness to provide an alternative or earlier examination.
5. Courses using evening examinations are strongly urged to indicate this in the course description listed in *Courses* and must notify students of the dates of such examinations as early as possible in the semester, preferably when the course outline is distributed."

## ACADEMIC STANDING

### Criteria for Good Standing

The College of Human Ecology has established a set of **minimum academic standards** that all students must meet or exceed each semester. These standards are as follows:

1. A student must maintain a semester and cumulative grade point average of 2.0 or higher.
2. A student must successfully complete at least 12 credits per semester, excluding physical education courses. Mature students must carry at least 6 credits each semester, also excluding physical education.
3. Students enrolling in the college as freshmen must complete at least 12 credits of Human Ecology courses by the end of the fourth semester such that at least 5 credits must be taken by the end of the second semester (ECON 101 and 102 may be used to fulfill this requirement).
4. A student must be making "satisfactory progress" toward a Human Ecology bachelor's degree.
5. All students must complete their requirements for first-year writing seminars (FWS) during their first two semesters at Cornell. Students who do not take a required first-year writing seminar in the first semester that they matriculate at the College of Human Ecology will be placed on a warning status.

Students who have completed the second or subsequent semesters of matriculation at the college who have not taken both of the required writing seminars will be placed on a severe warning with danger of being withdrawn status. In these cases, if the student has not pre-enrolled for a FWS for the upcoming semester, a hold will be placed on the student's semester registration status until he or she is actually enrolled in an FWS. **If this requirement is not completed by the end of that semester, the student will be withdrawn from the college.**

At the end of each semester, the Committee on Academic Status (CAS) reviews each student's academic record to ensure that the **minimum academic standards** listed above are met. The committee then takes appropriate action for students whose academic

achievement is considered unsatisfactory as defined by these criteria. CAS considers each case individually before deciding on a course of action. In an effort to support every student's success, the committee may take any of the following actions:

1. Place a hold on a student's university registration status for the current or upcoming semester.
2. Withdraw the student permanently from the college and Cornell University.
3. Require the student to take a leave of absence for one or more semesters.
4. Issue a warning to the student at one of the following levels:
  - a. Severe warning with danger of being withdrawn
  - b. Severe warning
  - c. Warning

These imply that if the student does not show considerable improvement during the semester, the committee may withdraw the student.

5. Add the student's name to a review list; students with this status are monitored by the committee throughout the semester.
6. Return the student to good standing.

Students placed on a required leave must appeal to CAS to return. This appeal occurs at the end of the required leave period. Students who have been withdrawn may appeal the decision before the committee during the pre-semester appeals meeting. Students who have been placed on a warning status owing to incomplete or missing grades may request that their status be reviewed for possible updating to good standing once the grade records reflect the updates or corrections. These requests should be made using the general petition process and submitted to the college registrar.

All students with an academic warning status automatically will be reviewed for specific criteria at the end of the subsequent semester. In most cases, students put on warning, severe warning, or severe warning with danger of being withdrawn status will be informed of conditions that they are expected to fulfill to return to good standing. In general, these conditions are that a student must earn a minimum semester GPA of 2.0, complete 12 credits (exclusive of physical education), and not have any incomplete, missing, F, or U grades on his or her most recent semester record.

If a student who has been previously placed on a required leave wishes to return to the college, he or she must submit a plan of study to the committee before being rejoined.

Students who have been withdrawn from the college by CAS may request that they be readmitted. Such students have three years from the date they were withdrawn to make this appeal with assistance from a counselor in the Office of Admission, Student and Career Services (172 MVR). After three years, a former student must apply for readmission through the college's Office of Admission. A student applying for readmission should discuss his or her situation with a counselor in the Office of Admission, Student and Career Services. The student also should also talk with others who may be able to help—faculty

advisors, instructors, or a member of the university medical staff. Any information given to the committee is held in the strictest confidence.

### Academic Integrity

Academic integrity is a critical issue for all students and professors in the academic community. The University Code of Academic Integrity states that (1) a student assumes responsibility for the content and integrity of the academic work he or she submits, such as papers, examinations, or reports and (2) a student shall be guilty of violating the code and subject to proceedings under it if he or she:

- a. Knowingly represents the work of others as his or her own.
- b. Uses or obtains unauthorized assistance in any academic work.
- c. Gives fraudulent assistance to another student.
- d. Fabricates data in support of laboratory or field work.
- e. Forges a signature to certify completion or approval of a course assignment.
- f. Uses an assignment for more than one course without the permission of the instructor involved.
- g. Uses computer hardware and/or software to abuse privacy, ownership, or user rights of others.
- h. In any manner violates the principle of absolute integrity.

The college's Academic Integrity Hearing Board, which consists of a chairperson, three faculty members, and three students, hears appeals from students who have breached the code. It also deals with cases brought directly to it by members of the faculty.

### Academic Records

Students may obtain their Cornell academic record in several ways. The **Cornell transcript**, which is the official record of the courses, credits, and grades that a student has earned can be ordered with no charge at the Office of the University Registrar (B7 Day Hall) or online at <http://transcript.cornell.edu>. For more information, call 255-4232. Students may also access their grades and course schedules electronically using **Just the Facts**. **Students should be in the habit of checking Just the Facts by the second week of every semester to confirm that their schedule and grade options are correct.** Adjustments must be made before published enrollment deadlines.

The college also maintains a **graduation progress worksheet** for each student showing progress toward the degree. At the beginning of fall semester continuing students should check their updated worksheet at <http://human.cornell.edu/student/>. It is important to check this document and bring any errors to the attention of the staff in the college registrar's office (145 MVR). Disclaimer: These worksheets are unofficial tally tools used by the college registrar and in no way substitute for a student's responsibility for tracking the progress toward completing degree requirements as outlined in the curriculum sheet for each major.

## Access to Records

The Family Educational Rights and Privacy Act of 1974 assures students of privacy of their records. The law also assures students' access to their records. Information concerning a student's relationship with the university is considered restricted and may be released only at the student's specific written request. Restricted information includes the courses elected; grades earned; class rank; academic and disciplinary actions by appropriate faculty, student, or administrative committees; and financial arrangements between the student and the university. Letters of recommendation are restricted information unless the student has specifically waived right of access.

Students who want additional information on access to their records may contact the Office of the College Registrar (145 MVR) or the Office of the University Registrar (B7 Day Hall). An inventory of those student records maintained by Cornell University offices in Ithaca, their location, and cognizant officer are available in the Office of the Dean of Students (401 Willard Straight Hall).

For specific information, refer to the university's policy "Access to Student Information" at [www.univco.cornell.edu/policy/ASI.html](http://www.univco.cornell.edu/policy/ASI.html), or talk with the college registrar.

## ACADEMIC HONORS AND AWARDS

The college encourages high academic achievement and recognizes outstanding students in several ways.

### Honors

**Dean's List.** Excellence in academic achievement is recognized each semester by placing on the Dean's List the names of students who have completed satisfactorily at least 12 credits of letter grades and who have a semester GPA of 3.7 or above. No student who has received an F or U in an academic course will be eligible.

**Kappa Omicron Nu** seeks to promote graduate study and research and to stimulate scholarship and leadership toward the well-being of individuals and families. As a chapter of a national honor society in the New York State College of Human Ecology, it stimulates and encourages scholarly inquiry and action on significant problems of living—at home, in the community, and throughout the world.

Students are eligible for membership if they have attained junior status and have a cumulative average of B or higher. Transfer students are eligible after completing one year in this institution with a B average.

Current members of Kappa Omicron Nu elect new members. No more than 10 percent of the junior class may be elected to membership and no more than 20 percent of the senior class may be elected. Graduate students nominated by faculty members may be elected. The president of Kappa Omicron Nu has the honor of serving as First Degree Marshall for the college during May commencement.

**Bachelor of science with honors** recognizes outstanding scholastic achievement in an academic field. Programs leading to a degree with honors are offered to selected students by the Department of Human Development

and the Division of Nutritional Sciences. Information about admission to the programs and their requirements may be obtained from the appropriate department or division. Students in other departments who wish to qualify for honors should contact the Office of Admission, Student, and Career Services (172 MVR) during their sophomore year or the first semester of their junior year. Honors candidates must have a minimum GPA of 3.3 and have demonstrated potential for honors-level research. To graduate with honors a student must take approved courses in research methodology and evaluation, attend honors seminars, complete a written thesis, and successfully defend it in front of a committee.

**Bachelor of science with distinction** recognizes outstanding scholastic achievement. Distinction is awarded to students in the top 10 percent of the graduating class based on the last 60 credits earned at Cornell. The graduating class includes students who will complete requirements for bachelor of science degrees in January or May of the same academic year or the prior August. Names of seniors who meet these requirements are presented to the faculty of the college for approval.

The primary objectives of the honor society, **Phi Kappa Phi**, are to promote the pursuit of excellence in higher education and to recognize outstanding achievement by students, faculty, and others through election to membership. Phi Kappa Phi is unique in that it recognizes scholarship in all academic disciplines. To be eligible for membership students must rank in the top 10 percent of the senior class, or in the top 5 percent of the junior class. Provisions also exist for the election of faculty members and graduate students whose work merits recognition.

### Awards

**The Elsie Van Buren Rice Award in Oral Communication** is awarded for original oral communication projects related to the college's mission by undergraduate students in the College of Human Ecology. The contest is held each year in February and awards prizes totaling \$1,500.

**The Flora Rose Prize** is given biennially to a Cornell junior or senior whom, in the words of the donor, "shall demonstrate the greatest promise for contributing to the growth and self-fulfillment of future generations." The recipient receives a cash prize of \$500.

**The Florence Halpern Award** is named for the noted psychologist, Dr. Florence Halpern, in recognition of her lifelong interest in "innovative human service, which better the quality of life." In that spirit the award is presented to an undergraduate in the College of Human Ecology who has demonstrated, through supervised fieldwork or community service, creativity in the search for solutions to human problems. The award carries a \$500 cash prize.

## COLLEGE COMMITTEES AND ORGANIZATIONS

### Student Groups and Organizations

Following are brief descriptions of some of the organizations that offer valuable experiences to human ecology students. Information about many other student activities on campus may be obtained from the Office of the Dean of Students (401 Willard Straight Hall).

The **Cornell Design League** was formed to give students interested in apparel a chance to express their creativity outside of the classroom by producing a fashion show every spring. It has become concerned with all aspects of a professional presentation. Consequently, it also provides a creative outlet for those interested in graphics, photography, illustration, or theater production. Although many of its designers are part of the Department of Textiles and Apparel, the Design League welcomes people of all majors and schools.

Students have opportunities to work throughout the community in a variety of service capacities. They volunteer in day care centers, youth programs, health-related agencies, services for elderly people and people with disabilities, as well as nutrition programs, arts organizations, and Ithaca schools. For further information, contact the **Public Service Center** (200 Barnes Hall). Call 255-1148 for information about volunteer work or 255-1107 for information about work-study arrangements.

The **Human Ecology Ambassadors** is a group of Human Ecology undergraduates who assist the Office of Admission in the area of new student recruitment and yield. Ambassadors participate in group conferences with prospective students to provide information from a student's perspective, conduct high school visits, assist with on-campus programs for high school students and potential transfer students, and help with prospective students, phonathons, and letter writing. In addition, ambassadors attend regular meetings and serve as coordinators for activities in the Office of Admission.

For information, contact the Office of Admission, Student, and Career Services (172 MVR, 255-5471).

The mission of the **Human Ecology Voices** is to build unity among students, faculty, and staff in the College of Human Ecology. Membership consists of all representatives of all other Human Ecology student organizations and other interested students. Patti Papapietro in the Office of Admission, Student, and Career Services (172 MVR, 255-2532), serves as Voices advisor.

The **Human Ecology Mature Students Association** is an organization of students who are 24 years of age or older at the time of matriculation. Many mature students need to balance family, work, and other concerns with their academic efforts. The Mature Students Association strives to help by providing a forum for resource exchange and referral, support, socializing, and special projects depending upon expressed interest. These goals are pursued through seminars and informational meetings, the mature students listserv, supplementary orientation activities, liaison with other university offices, and the



encouragement of informal networking. For more information, contact Patti Papapietro in the Office of Admission, Student, and Career Services (172 MVR).

Students interested in the relationship between the physical environment and human behavior may join the **Human-Environment Relations Students Association (HERSA)**. For more information, contact the Department of Design and Environmental Analysis.

The **International Facility Managers Association (IFMA)** also has a student chapter. Membership information is available from the Department of Design and Environmental Analysis.

The **Association for Students of Color (ASC)** unites Human Ecology students of color to provide a supportive foundation for their enrollment, retention, graduation, and career placement. ASC members work toward these goals by

1. participating in admissions hosting programs and conducting high school visitations.
2. sponsoring presentations on career and graduate school outcomes of a Human Ecology education.
3. providing volunteer services to the Cornell and Ithaca communities.
4. attending regular meetings and hosting annual fall and spring forums.

For more information, contact Verdene Lee in the Office of Admission, Student, and Career Services (172 MVR, 255-2532).

The **PreLaw Undergraduate Society (PLUS)** is sponsored by Human Ecology and welcomes members from the Cornell community. Meetings provide information and support for students considering careers in law. Programs include information on the law school admission process, law school applications, and LSAT preparations. Additionally, PLUS offers tours of the Cornell Law School and information panels with current law students. Guest speakers include practicing attorneys, law faculty, and current law school students. For more information, contact Kelly Deasy in the Office of Admission, Student, and Career Services (172 MVR, 255-2532).

The **Preprofessional Association Toward Careers in Health (PATCH)** provides support, advising, and up-to-date information to students pursuing careers in health care. Programs include academic advising, guest speakers from allopathic and alternative medicine, information on medical school admissions, exposure to complementary health care career options, MCAT preparation tips, information on research and internship opportunities, and a visit to a local medical school. This student-run organization is sponsored by Human Ecology and is open to the Cornell community. For more information, contact Paula Jacobs in the Office of Admission, Student, and Career Services (172 MVR, 255-2532).

The **Orientation Committee** consists of students and advisors interested in planning and implementing programs to acquaint new students with the College of Human Ecology. The committee is particularly active at the beginning of each semester and is always eager for new members. For more information, contact Patti Papapietro in the

Office of Admission, Student, and Career Services (172 MVR, 255-2532).

Membership in the **Sloan Student Association** is open to students interested in health care and related fields. For more information, contact the president of the association (122 MVR, 255-7772).

The **Students for Gerontology (SFG)** is composed of students from a wide variety of majors who are interested in career and internship opportunities that contribute to the well-being of our aging population. Programs sponsored by this organization focus on developing linkages with community organizations and other student gerontology groups. SFG meets monthly. For more information, contact Nancy Wells, faculty advisor, Bronfenbrenner Life Course Center (E220 MVR, 254-6330).

The **Health and Nutritional Undergraduate Society (Health NUTS)** promotes nutritional well-being through education, communication, and research. Members of the student chapter organize programs such as Food and Nutrition Day in March, and host on-campus speakers in nutrition and health-related fields. The student chapter is open to all students interested in nutrition education. For more information, contact Gail Canterbury (335 MVR, 255-2628).

### Committees and Councils

Several official organizations exist within the college to deal with matters of policy and to provide leadership in college planning. Most include elected student and faculty representatives; the actions of these various groups affect all students directly or indirectly.

The **Educational Policies Committee (EPC)** has two student members, one graduate and one undergraduate, who vote along with the faculty members on all matters relating to college academic policy. Recommendations are submitted to this committee regarding revisions in degree requirements, new curriculum changes, and new course approval.

Students also have the opportunity to serve on the **Admissions Policy Subcommittee**, and the **Academic Integrity Hearing Board**.

The **Selection Committee for the Chancellor's Award for Excellence in Teaching or Professional Service** handles the nomination and selection process for this prestigious yearly award. The committee consists of three teaching faculty members, one professional staff member, and three undergraduate members.

The **Human Ecology Alumni Association Board of Directors** includes two student board members—one junior and one senior. One student is selected each spring to begin a two-year term as student representative. The two students co-chair the board's Student Activities Committee, which works to increase the visibility of the Alumni Association among the student body by funding a variety of activities. The student members also bring an important perspective to board deliberations about programming and annual goals.

The **Committee on Academic Status** does not include student representatives but does have a faculty representative from each department. This committee is responsible for upholding the academic standards of the college and takes action when appropriate. The committee

also hears appeals regarding student petitions and requests to be readmitted to the college.

## INTERDEPARTMENTAL COURSES

### HE 100(1000) Critical Reading and Thinking

Fall, spring, or summer. 2 credits (credit toward graduation depends on individual college). Limited enrollment. Prerequisite: freshman or sophomore standing; juniors and seniors by permission of instructor. Letter or S-U grades.

Enables students to increase critical reading and thinking abilities. Examines theory and research associated with a wide range of reading, thinking, and learning skills. Emphasis is placed on developing and applying analytical and evaluative skills. Laboratory instruction is individualized and provides the opportunity to focus intensively on increasing comprehension, reading rate, and vocabulary.

### HE 101(1010) College Achievement Seminar

Summer, six-week session. 2 credits (credit toward graduation depends on individual college). Prerequisite: Pre-freshman Summer Program students. Letter or S-U grades.

Improves the study and learning skills of incoming freshmen. Emphasis is placed on acquisition of skills necessary to achieve academic success. Topics include time management, note-taking, mapping, textbook comprehension, exam preparation, and exam strategies. The application of theory to the demands of Cornell course work is stressed. In addition, students are introduced to library and computing resources through hands-on projects.

### HE 301(3010) Collaborative Leadership

Fall. 4 credits. Includes required retreat beginning Fri. afternoon, Aug. 25, and ending when bus returns to campus about 4 P.M. Sun., Aug. 27. Priority given to sophomores and juniors. Letter grades only. Lec and sec. B. Bricker.

Introduces the principles of leadership theory and practice of leadership. Serves as the introduction to leadership for a new leadership certificate but is also appropriate for students who simply want to understand leadership better. Assignments are diverse, including individual and group projects, journaling, the creation of case studies, an in-depth team project, several presentations, and a variety of other activities. More information on this course is available at the Courses of Study web site: <http://cuinfo.cornell.edu/Academic/Courses/>. Complete syllabus available on request.

### HE 405(4050) Mentoring for Advanced Leadership

Spring and fall. 2 credits. Capstone course for Leadership Certificate Program. Prerequisite: permission of instructor. Letter grades only. B. Bricker.

Supports advanced leadership students through critical months of their junior-senior project development. Taught in a small seminar format. Emphasizes reflection on the leadership experience and planning for individual projects. Reviews leadership themes and principles. With carefully selected readings and assignments, students



learn to write effective grant proposals, to design evaluation programs appropriate for their leadership programs, write press releases, and think about what makes for successful lobbying for policy change. Students work together to provide critical feedback and support for one another through important challenges in their own leadership development.

#### **HE 407(4070) Leadership in the Nonprofit Environment**

Fall and spring. 2 credits. Limited to 30 students. Letter grades only. Staff. The nonprofit sector contributes nearly 10 percent of U.S. GNP and employs 11 to 12 percent of citizens. This economic sector touches all our lives—as volunteers, donors, receivers of service, employees, or board members. This course provides an opportunity to explore the challenges and opportunities of the nonprofit sector. After becoming familiar with the issues and complications of strategic charitable giving, students will consider actual grant applications from community organizations and make decisions to award \$10,000 in grant aid. HE 407 is made possible by a generous gift of \$10,000 from the Sunshine Lady Foundation. Students learn to read, evaluate, and write effective grant proposals. They create a Request for Proposal (RFP) to invite community nonprofits to apply for funding. They study organizational missions, the strengths and challenges of private, not for profit organizations, the motivation for giving time and money, and many related themes.

### **THE URBAN SEMESTER PROGRAM IN MULTICULTURAL DYNAMICS IN URBAN AFFAIRS**

Cornell in New York City provides students with many study options that focus on multicultural dynamics in urban affairs. The options available include internships, individual and group community service projects, research, independent study, collaborative learning, and mentorships. Students must enroll concurrently in the three courses HE 470, 480, and 490 or 495. Students learn through reflection and action. Program options are possible throughout the academic year, during winter break, and in the summer.

Courses of study enable students to seek out the relationship between theory and practice, apply theory to practice, identify and acquire professional practice skills, and learn about the impact of diversity on New York City. By applying ethnographic research techniques and methods, students learn to think conceptually, reflect on their actions, and be agents of change.

#### **HE 406(4060) Fieldwork in Diversity and Professional Practice**

Summer, eight-week session. Variable credit. Students participate in a community-based medical center hospital or clinic member of New York Presbyterian Hospital and Weill Medical College of Cornell University. This is a four-day internship and one day of seminars per week.

#### **HE 470(4700) Multicultural Issues in Urban Affairs**

Fall and spring. 3 credits. Students must take course during semester they participate in Urban Semester Program. Uses New York City as a classroom. The landscapes, built environments, and people in them are the texts. In the beginning, students study the formation of this multicultural city by traversing lower Manhattan and imagining New Amsterdam as it became New York City. Then they investigate a number of neighborhoods and speak with local leaders about diversity issues in context, in practice, and in use, to learn how multicultural issues are experienced by people and how they make sense of them.

#### **HE 480(4800) Communities in Multicultural Practice**

Fall and spring. 6 credits. Students must take course during semester they participate in Urban Semester Program. Concerns urban children and youth in communities of color. Each week of the semester, students participate one day in the school lives of children pre-K through eighth grade in selected neighborhoods in New York City. Students keep journals of their reflections on their experiences and observations.

#### **HE 490(4900) Multicultural Practice**

Fall and spring. 6 credits. Students must take either HE 490 or 495 during semester they participate in Urban Semester Program; which is appropriate depends on student's placement and is determined by Urban Semester director.

Students explore the intersection of organizational culture with issues of diversity. They investigate the nature of organizational culture and how it engages and includes or does not include diversity. Students report back in seminars their understanding and analysis of their internship organizations and their industry's role in creating conditions and environments of inclusion or exclusion. The course explores the conditions and processes that have brought about inclusion or exclusion.

#### **HE 495(4950) Culture, Medicine, and Professional Practice in a Diverse World**

Fall and spring. 6 credits. Students must take either HE 490 or 495 during semester they participate in Urban Semester; which is appropriate depends on student's placement and is determined by Urban Semester director.

Students participate in several experiential learning environments related to medicine over the course of the semester. Students rotate in a four-week unit, supported by Pastoral Care and ER, as well as several other choices through the semester. Medical and health-related practitioners make presentations throughout the semester.

### **DESIGN AND ENVIRONMENTAL ANALYSIS**

F. Becker, chair (E-106 MVR, 255-1950); J. Jennings, director of undergraduate studies; L. Maxwell, director of graduate studies; A. Basinger, S. Danko, J. Elliott, P. Eshelman, G. Evans, K. Gibson, R. Gilmore, A. Hedge, J. Jennings, J. Laquatra, W. Sims, N. Wells

Note: A minimal charge for photocopied course handouts may be required.

#### **DEA 4+1 Master's Degree Program**

Outstanding students who complete their four-year undergraduate degree in DEA may apply for a master of arts/M.A. (interior design) or a master of science/M.S. (human environment relations) degree that typically requires one additional year of graduate study.

Through careful planning by the beginning of their junior year, many of the courses required in the M.A. or M.S. programs can be taken during the undergraduate years, creating an opportunity to focus the fifth year of study on completing graduate courses and thesis requirements. Typically, students will take four to five courses in their fall semester as a graduate student, and two to three courses plus their thesis research in the spring semester. Students should expect to complete their thesis by the end of the summer term of their fifth year.

**Admission to the 4+1 Master's program is not automatic.** Students must meet with their advisors early in their undergraduate programs to plan carefully for this possibility. In the fall of the senior year, interested students must submit an application to the Graduate School. The GRE exam and a portfolio are not required for admission, but students must submit a statement of intent, letters of reference, and transcripts. Students who have compiled a strong undergraduate record in the department are usually good candidates for admission into the graduate program in Design and Environmental Analysis.

#### **DEA 101(1010) Design Studio I**

Fall. 3 credits. Limited to 20 students per sec. Prerequisite: DEA majors; permission of instructor for nonmajors; priority given to interior design majors. Option I majors must take DEA 101 in fall of first year. B- or higher in DEA 101 required to take DEA 102 and 115. Must complete incomplete grade in DEA 101 before taking 102 and 115. Cost of materials: approx. \$200. J. Elliott.

Introduces the fundamental vocabulary and principles of two- and three-dimensional design. Students experiment with the development of image and form through problem-solving activities. Visit <http://instruct1.cit.cornell.edu/courses/dea101/>

#### **DEA 102(1020) Design Studio II**

Spring. 3 credits. Prerequisite: Option I DEA majors only. Option 1 majors must take DEA 102 and 115 concurrently. B- or higher in DEA 101 required to take DEA 201. Must complete incomplete grade in this course before taking DEA 201. Cost of materials: approx. \$200; shop fee: \$10. P. Eshelman.

Studio course in three-dimensional design with an interior design emphasis. Explores problems in spatial organization through drawings and models.

**DEA 111(1110) Making a Difference: By Design**

Fall. 3 credits. Limited to 130 students. Lab fee: \$25. S. Danko.

This course focuses on issues of leadership, creative problem-solving, and risk-taking through case study examination of leaders in business, education, medicine, human development, science, and other areas who have made a difference using design as a tool for positive social change. Using a micro to macro framework, students examine how design affects their daily lives and future professions from the person to the planet. Additional topics include nurturing creativity, visual communications, socially responsible design and business, culture, and ecological issues.

**DEA 115(1150) Design Graphics and Visualization**

Spring. 3 credits. Limited to 18 students. Prerequisite: Option I DEA majors only; DEA 101 with grade of B- or higher. Corequisite: DEA 102. B- or higher in DEA 115 required to take DEA 201. Must complete incomplete grade in this course before taking DEA 201. Minimum cost of materials: \$200; technology fee: \$10. K. Gibson.

Introductory studio course for interior designers. Emphasizes orthographic and perspective drawing and formal and conceptual presentation methods. Reinforces graphic and design concepts through projects, readings, and field trips. Visit <http://instruct1.cit.cornell.edu/courses/dea115>.

**DEA 150(1500) Introduction to Human-Environment Relations**

Spring. 3 credits. G. Evans.

Human-Environment Relations is an interdisciplinary field concerned with how the physical environment and human behavior interrelate. Most of our attention will be focused on what role the physical environment plays in human health and well-being. Our focus will be on residential environments, urban settings, and work environments. We will also take a look at human attitudes and behaviors affect environmental quality. Hands-on projects plus exams. Visit <http://instruct1.cit.cornell.edu/courses/dea150>.

**DEA 201(2010) Design Studio III**

Fall. 4 credits. Limited to 18 students. Prerequisites: Option I DEA students; DEA 101, 102, 111, 115, and 150 (minimum grades of B-); must complete incomplete in 201 before taking 202. Corequisites: DEA 251, DEA 215, DEA 460. Minimum cost of materials: \$150; lab fee: \$40; required field trip: approx. \$130. J. Jennings.

Third semester in the studio sequence of eight semesters. The theme and objectives focus on design as critical thinking, introducing means by which students can think, draw, write, and build their way critically through design. Taken concurrently with DEA 251, the course applies historical theory to contemporary design projects. Also includes a collaborative project with a professor and students from another design discipline. Visit <http://instruct1.cit.cornell.edu/courses/dea201>.

**DEA 202(2020) Design Studio IV**

Spring. 4 credits. Prerequisites: Option I DEA students; DEA 201 and 203. Pre- or corequisite: DEA 204. Must complete incomplete grade in this course before registering for DEA 301. Minimum cost of materials: \$120; field trip fee: R. Gilmore.

Based on programmatic criteria from real clients, students learn how to design several types of interior environments, from health care facilities to local nonprofit agencies. Emphasis is on space planning, lighting design, construction of custom light fixtures, and service learning, where students use design to transform the facilities of social service agencies in the community.

**DEA 203(2030) Digital Communications**

Spring. 2 credits. Limited to 27 students. Priority given to DEA majors. Lab fee: \$10. J. Elliott.

Digital information technologies for designers of the built environment. Students explore issues in relation to text and image through analysis and composition of form and content. Through a series of weekly projects the students work toward the development of a professional web-based portfolio of self-promotional materials. The primary objective is to reinforce principles of visual communications while learning the rudiments of vector, raster, and html graphic software. Visit <http://instruct1.cit.cornell.edu/courses/dea203/>.

**DEA 204(2040) Introduction to Building Technology**

Spring. 2 credits. W. Sims.

Introduction to building technology for interior designers and facility managers. Emphasizes developing basic understanding of buildings and building systems and their implications for interior design and facility management. Covers basic building types; structural systems; construction materials and methods; HVAC systems; plumbing, electrical, lighting, fire, and security systems; and telephone, computer, and other communication systems. Visit <http://courseinfo.cit.cornell.edu/courses/dea204>.

**DEA 215(2150) Digital Graphics**

Fall, first seven weeks of semester. 1 credit. Prerequisites: none. Letter grades only. S. Curtis.

This course will be an investigation into use of computer graphic software programs for the purpose of design, visualization, and presentation. The course will investigate the inherent differences between raster and vector graphics and how to use a variety of computer graphics programs such as Adobe Photoshop, Illustrator, InDesign, and Acrobat to achieve a desired end result. Lab-based course providing technical illustration in Adobe Illustrator and Photoshop.

**DEA 241(2410) Introduction to Computer-Aided Design (CAD)**

Spring, first seven weeks of semester. 1 credit. Prerequisites: DEA majors, DEA 101, or permission of instructor. Letter grades only. Minimum cost of materials: \$50. S. Curtis.

This course provides an understanding of, and experience with, electronic drafting on the microcomputer. It includes a basic understanding of the features, limitations, and considerations associated with the operation of the latest release of AutoCAD. By the end of the course, the student will be proficient enough with the AutoCAD software to draw

and plot most projects required by their course of study as they relate to architecture and interior design.

**DEA 242(2420) Advanced Computer-Aided Design (CAD)**

Spring, second seven weeks of semester. 1 credit. Prerequisites: DEA majors, DEA 101 or 241, or permission of instructor. Letter grades only. Minimum cost of materials \$50. S. Curtis.

This course provides a thorough understanding of the 2-D features, limitations, and considerations associated with the operation of the latest release of AutoCAD. This course builds on knowledge gained in DEA 241 and requires DEA 241 as a prerequisite. Commands and concepts such as multi-sheet plotting, xreference drawings, blocks and attributes, OLE, raster images, user coordinate systems, and customization of AutoCAD are covered. This course will give the student a high level of proficiency with the AutoCAD software as they relate to architecture and interior design.

**DEA 250(2500) The Environment and Social Behavior**

Fall. 3 credits. Limited to 16 students. Priority order: DEA seniors, juniors, sophomores, freshmen. Prerequisite: DEA 150 and written permission of instructor. Field trip fee: \$65. G. Evans.

This course is about architecture and human behavior. It is centered around two key principles: 1. the complex interplay of social and personal factors with the physical environment largely determines how the built environment influences human well-being; 2. aesthetics is not sufficient in judging design—we must also consider how the built environment affects health, interpersonal relationships, and performance along with preference. Two major projects, one in collaboration with a design studio and a real community client.

**[DEA 251(2510) History and Theory of the Interior**

Fall. 3 credits. Limited to 35 students. Priority given to DEA majors. Not offered 2006–2007. J. Jennings.

A historic study of interior architecture and design with an emphasis on the concepts of design theory. Overarching themes encompass several time periods from the classical to the 20th century and isolate cultural patterns, spatial ideas, dialectics, design elements, and theorists. Reading, discussion, analytical exercises, essays, and a field trip are included. Visit <http://instruct1.cit.cornell.edu/courses/dea251/>.

**DEA 300(3000) Special Studies for Undergraduates**

Fall or spring. Credit TBA. Department faculty.

Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the college registrar's office. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

**DEA 301(3010) Design Studio V**

Fall. 5 credits. Prerequisites: DEA 111, 150, 201, 202, 203, and 204. Corequisites: DEA 303 and 459. Must complete incomplete grade in this course before registering for DEA 302. Minimum cost of materials: \$150; shop fee: \$10; optional field trip: approx. \$10. P. Eshelman.

This intermediate-level interior design studio focuses on design for a special population inclusive of young children, older adults, and people of any age living with a congenital or hereditary condition, injury, or disease. The course is organized around a semester-long project broken into four phases: pre-design, design, full-scale model construction, and design documentation and presentation. Collaboration with students in DEA 250/660 provides experience in the application of evidence-based information in the design process.

**DEA 302(3020) Design Studio VI**

Spring. 5 credits. Limited to 18 students. Prerequisites: DEA 301 and 303 or permission of instructor. Corequisite: DEA 305. Must complete incomplete grade in this course before registering for DEA 407. Minimum cost of materials: \$200; shop fee: \$10; field trip fee: \$20. K. Gibson.

Sixth semester in the studio sequence of eight semesters. Emphasizes use of the microcomputer as a creative tool in the design process. Explores social, cultural, and physical factors related to the interior environment through assignments, readings, and a field trip. Design and problem-solving skills are reinforced according to project type. Visit <http://instruct1.cit.cornell.edu/courses/dea302>.

**DEA 303(3030) Interior Materials and Sustainable Elements**

Fall. 3 credits. Approx. cost of materials: \$10. R. Gilmore.

A sustainable approach to the evaluation and selection of materials, finishes, and furnishings for the built environment has the potential to protect our planet. This course provides an introduction to sustainable sources and asks students to manipulate materials, understand performance testing, use building codes, create a life-cycle cost analysis, and complete interior specifications. Field trips provide an overview of the manufacturing process, and group projects culminate in the presentation of research on current "green" products and resources.

**DEA 304(3040) Introduction to Professional Practice of Interior Design**

Spring. 1 credit. Limited to 18 students. Prerequisite: Option I DEA students. A. Basinger.

Introduction to organizational and management principles for delivery of interior design and facility management services. Covers basic organizational structures and basic management functions within interior design and facility management organizations, work flow and scheduling, business practices, legal and ethical responsibilities and concerns, contracts, basic contract documents such as working drawings and specifications, supervision of construction and installation, and cost estimation.

**DEA 305(3050) Construction Documents and Detailing**

Spring. 2 credits. Prerequisites: DEA 301 and 303. Corequisite: DEA 302. Minimum cost of materials: \$50; required field trips: \$10. R. Gilmore.

A continuous dialogue between the idea for an interior space and the reality of its final built form is contained within construction documents, also known as working drawings and specifications. Students study the history of architectural documentation, the organization of construction drawings, schedules, and specifications, and the detailing of interior elements and construction methods by touring a local millwork shop. Each student completes a comprehensive set of construction documents for the renovation of an existing conference facility located on the Cornell campus.

**DEA 325(3250) Human Factors: Ergonomics-Anthropometrics**

Fall. 3 credits. Recommended: DEA 150. Undergraduate sec of DEA 651; shares lec but meets for an additional hour. DEA 651 has additional readings and projects.

A. Hedge.

Implications of human physical and physiological characteristics and limitations on the design of settings, products, and tasks. An introduction to engineering anthropometry, biomechanics, control/display design, work physiology, and motor performance. Includes practical exercises and field project work. Visit <http://ergo.human.cornell.edu>.

**DEA 350(3500) Human Factors: The Ambient Environment**

Spring. 3 credits. Recommended: DEA 150. Undergraduate sec of DEA 652; shares lec but meets for an additional hour. DEA 652 has additional readings and projects.

A. Hedge.

Introduces human-factor considerations in lighting, acoustics, noise control, indoor air quality and ventilation, and the thermal environment. Views the ambient environment as a support system that should promote human efficiency, productivity, health, and safety. Emphasizes the implications for planning, design, and management of settings and facilities. Visit <http://ergo.human.cornell.edu>.

**DEA 354(3540) Facility Planning and Management Studio**

Spring. 4 credits. Prerequisite: DEA 459 or permission of instructor. Letter grades only. Minimum cost of materials: \$200. W. Sims.

For advanced undergraduates interested in facility planning and management. Purpose is to provide basic tools, techniques, and concepts useful in planning, designing, and managing facilities for large, complex organizations. Covers strategic and tactical planning for facilities, organizing to deliver facility management services, project management, space forecasting, space allocation policies, programming, relocation analysis, site selection, building assessment, space planning and design, furniture specifications, and moves. Considers sociopsychological, organizational, financial, architectural, and legal factors. Visit [http://courseinfo.cit.cornell.edu/courses/dea354\\_654](http://courseinfo.cit.cornell.edu/courses/dea354_654).

**DEA 400-401-402-403(4000-4010-4020-4030) Special Studies for Undergraduates**

Fall or spring. Credit TBA. S-U grades optional. DEA faculty.

For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of DEA not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department office. This form must be signed by the instructor directing the study and the department head and filed at course registration or within the change-of-registration period in the college registrar's office, 145 MVR, along with an add/drop slip. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the department head is necessary. Students, in consultation with their advisor and the instructor should register for one of the following subdivisions of independent study.

**DEA 400(4000) Directed Readings**

For study that predominantly involves library research and independent reading.

**DEA 401(4010) Empirical Research**

For study that predominantly involves data collection and analysis or laboratory or studio projects.

**DEA 402(4020) Supervised Fieldwork**

For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

**DEA 403(4030) Teaching Apprenticeship**

For study that includes teaching methods in the field and assisting faculty with instruction. Students must have demonstrated a high level of performance in the subject to be taught and in the overall academic program.

**DEA 407(4070) Design Studio VII**

Fall. 5 credits. Prerequisites: DEA 302, 303, 304, and 305. Must complete incomplete grade in this course before registering for DEA 408. Minimum cost of materials: \$150; field trip: \$50. R. Gilmore.

Comprehensive historic preservation design studio in which students complete each phase of the adaptive reuse of a historic structure. Working with real buildings and real clients, students research the market, complete a building assessment, and then design new uses for viable, yet older structures. Lecture topics range from professional practice strategies, to the history of preservation, to the secretary of the interior's Standards for Rehabilitation. Components of the work include program document, code compliance, concept development, schematic and design development presentations, and construction documents.

**DEA 408(4080) Design Studio VIII**

Spring. 5 credits. Prerequisites: DEA 301, 302, 303, and 304. Minimum cost of materials: \$150. S. Danko.

Design problem-solving experiences involving completion of advanced interior design problems. Problems are broken into five phases: programming; schematic design and evaluation; design development, including material and finish selection; design detailing; and in-process documentation and the preparation of a professional-quality design presentation.

**[DEA 410(4100) Facility Planning and Design in a Diverse Society]**

Spring. 3 credits. Prerequisites: DEA 150, 111, 250, 653, or permission of instructor. Letter grades only. Not offered 2006-2007. L. Maxwell.

This course is an upper level undergraduate course appropriate for undergraduate and graduate students in facility planning and management, human environment relations and interior design students in DEA as well as students outside of DEA who are interested in how the built environment should respond to a diverse society. The course will examine facility planning and design issues in a diverse society. Specifically, the role of culture, gender, stage in the life cycle, and disability in planning facilities of various types will be studied. This course will examine the issues of diversity from two perspectives. One, how are the implicit and explicit assumptions about the user expressed in various aspects of the built environment in our society; and two, how do we purposely plan facilities in a diverse society.]

**[DEA 415(4150) Strategic Planning for Healthcare and Educational Facilities]**

Spring. 3 credits. Prerequisites: DEA 150, 250, 459, or permission of instructor. Letter grades only. Not offered 2006-2007.

This is an upper level undergraduate course appropriate for undergraduate and graduate students in facility planning and management, the Sloan program, urban planning, and design/architecture students interested in facility planning and design issues for healthcare and educational institutions. The course will examine the facility planning and management issues that affect the education and health care industries. The course will specifically look at how these facilities respond to changes in 1) the needs of their target population, 2) technology and communications, 3) sustainability, 4) pedagogy and health care delivery practices, 5) regulatory and policy issues related to the healthcare or educational industry, and 6) daily operational and maintenance issues.]

**[DEA 422(4220) Ecological Literacy and Design (also ARCH 461[4601])]**

Spring. 3 credits. Prerequisite: junior or senior standing. Letter grades only. Cost of field trips: approx. \$25. J. Elliott.

Lecture/seminar course for advanced undergraduates interested in learning about the effects of designing the built environment of the biophysical world. Course objectives are to develop sensitivities to environmental issues, construct conceptual frameworks for analysis, and demonstrate how ecological knowledge can be applied to the practice of design through participatory approaches to learning. Visit <http://instruct1.cit.cornell.edu/courses/dea422/>.

**[DEA 423(4230) Restaurant Design Charrette]**

Spring. 1 credit. Limited to 18 students. Prerequisite: permission of instructor. Letter grades only. Minimum cost of materials: \$50. R. Gilmore and S. Robson.

This intensive weekend-long course pushes the boundaries of current restaurant design by developing a concept plan for an innovative restaurant in a nontraditional setting. Students work in teams to develop design solutions and prepare design presentations for review

by course instructors and visiting design professionals.

**[DEA 430(4300) Furniture as a Social Art]**

Spring. 3 credits. Limited to 15 students. Prerequisite: permission of instructor. Cost of building materials: \$150. (Additional shop hours are made available.) P. Eshelman.

The focus is on how innovation in furniture design is inspired. Three sources of inspiration explored are: aesthetic interpretation; material and manufacturing technologies; and users' needs. The interplay among these three sources of inspiration will be examined with emphasis on the role of users' needs as form givers in furniture design. Assignments involve both analyzing a furniture product currently on the market and designing and constructing a furniture piece for a special population inclusive of young children, older adults, and people of any age living with a congenital or hereditary condition, injury, or disease.

**[DEA 451(4510) Introduction to Facility Planning and Management]**

Fall. 1 credit. Letter grades only. F. Becker. Introduction to the field of facility planning and management. Focuses on how the planning, design, and management of an organization's physical facilities can help it meet its business objectives. Topics include the history of the field, strategic planning, space planning and design, project management, building operations, workplace change management, real estate, and computer-aided facility management systems.

**[DEA 453(4530) Planning and Managing the Workplace]**

Fall. 3 credits. Prerequisite: junior or senior standing. F. Becker.

Through lectures, readings, and a field studies project, this course explores how the planning, design and management of health care facilities affects the experience of patients and care-giving staff; and the relationship of these outcomes to quality of health measures. Invited lecturers from around the country and world (via videoconferencing) provide a broad-based perspective into different approaches to hospital planning and design, and how the form of hospitals is changing in response to new information and medical technologies, changing work patterns, and shifting demographic patterns. Students' field projects involve analysis of an actual health care setting, and the development of innovative solutions to improve the quality of health care provided in it.

**[DEA 454(4540) Computer-Aided Facilities Management]**

Fall, second seven weeks of semester. 1 credit. Prerequisites: none. Letter grades only. S. Curtis.

This course will be an investigation into the use of computer-aided facilities management software in facilities management. Emphasis will be placed initially on understanding how FM CAD systems work. Topics such as Building a Space Inventory Database, Adding Occupancy Data, AutoCAD commands, Reports, Asset Management, and Strategic Planning and Stacking will be learned and discussed.

**[DEA 455(4550) Research Methods in Human-Environment Relations]**

Fall. 3 credits. Prerequisite: DEA majors or permission of instructor; statistics course. N. Wells.

Develops students' understanding and competence in the use of research and analytical tools to study the relationship between the physical environment and human behavior. Emphasizes selection of appropriate methods for specific problems and the policy implications derived from research. Topics include research design, unobtrusive and obtrusive data-collecting tools, the processing of qualitative and quantitative data, and effective communication of empirical research findings.

**[DEA 459(4590) Programming Methods in Design]**

Fall. 3 credits. Letter grades only. Minimum cost of materials: \$100. L. Maxwell.

Introduction to facility programming. Emphasizes formulation of building requirements based on user characteristics and potential constraints. The course presents diverse methods for determining characteristics that will enable a particular environmental setting to support desired behaviors of users. The course emphasizes selection of appropriate methods to suit the specific user/client needs. Students will work with an actual client to prepare a program document.

**[DEA 460(4600) Design City]**

Fall. 1 credit; may be repeated for credit.

Prerequisite: DEA majors. Not open to freshmen for credit. Students are required to take this course in order to participate in field study trip to a major city. Field trip fee of \$115 covers cost of hotel and chartered bus; trip fee will be billed to student's bursar account. S-U grades only. Not offered 2006-2007. K. Gibson and J. Jennings.

Field study of historic and contemporary interiors with guided tours to architectural and interior design firms, installations, exhibits, and showrooms in New York City, Toronto, or other major cities. Topics and themes change yearly. Visit <http://instruct1.cit.cornell.edu/courses/dea460/>.

**[DEA 470(4700) Applied Ergonomic Methods]**

Spring. 3 credits. Prerequisite: DEA 325. Undergraduate sec of DEA 670; shares lec but meets for an additional hour. DEA 670 has additional readings and projects. A. Hedge.

Covers physical and cognitive ergonomics methods and techniques and their application to the design of modern work environments. Emphasizes understanding key concepts. Covers conceptual frameworks for ergonomic analysis, systems methods and processes, a repertoire of ergonomics methods and techniques for the analysis of work activities and work systems.

**[DEA 472(4720) Environments for Elders: Housing and Design for an Aging Population]**

Fall. 3 credits. Field trip fee: \$20. N. Wells.

Through seminars, lectures, field trips, and service learning opportunities, students examine the relationship between older adults and the physical environment. Students gain understanding of the relevance of design characteristics to the well-being of older people; an appreciation of late-life social, cognitive, and physiological changes; as well as familiarity with a variety of housing options for late life. Visit <http://instruct1.cit.cornell.edu/courses/dea472/>.



**DEA 499(4990) Senior Honors Thesis**

Fall or spring. Variable credit. Prerequisite: permission of thesis advisor and DEA director of undergraduate studies. Letter grades only.

Opportunity for DEA majors to undertake original research and scholarly work leading to the preparation of a thesis. Students work closely with their thesis advisor on a topic of interest.

**DEA 600-603(6000-6030) Special Problems for Graduate Students**

Fall or spring. Credit TBA. S-U grades optional. Department faculty.

Independent advanced work by graduate students recommended by their special committee chair and approved by the head of the department and instructor.

**600(6000): Special Problems.** For study of special problems in the areas of interior design, human environment relations, or facilities planning and management.

**601(6010): Directed Readings.** For study that predominantly involves library research and independent study.

**602(6020): Graduate Empirical Research.** For study that predominantly involves collection and analysis of research data.

**603(6030): Graduate Practicum.** For study that predominantly involves field experiences in community settings.

**[DEA 645(6450) Dancing Mind/Thinking Heart: Creative Problem-Solving Theory and Practice**

Spring. 3 credits. Limited to 24 students. Prerequisite: graduate or advanced undergraduate standing; undergraduates must have permission of instructor. Not offered 2006-2007. S. Danko.

Focuses on thinking processes and techniques that support creative problem solving. Examines theories of creative behavior and critical thinking. The course is highly participatory and experiential by design. Weekly discussions include hands-on applications of theories on short problems tailored to the backgrounds of the students. The primary goal is to demonstrate perceptual, emotional, intellectual, cultural, and environmental blocks to creative thinking and expand the student's repertoire of creative problem solving strategies for use in day-to-day professional practice. Case studies of creative individuals and organizations from a variety of fields are presented.]

**DEA 648(6480) Virtual Design, Analysis, and Representation**

Fall. Variable credit; max. 4. Limited to 15 students. Prerequisite: graduate or advanced undergraduate standing; for undergraduates, DEA 302 or permission of instructor. Minimum cost of materials: \$150; lab fee: \$35. K. Gibson.

Advanced use of computer technology to create and analyze interior environments. Emphasizes the use of 3-D modeling, animation, photorealistic rendering, and emerging technologies to investigate dynamic design issues.

**DEA 650(6500) Programming Methods in Design**

Fall. 4 credits. L. Maxwell.

Intended for graduate students who want a more thorough introduction to programming methods than is provided by DEA 459. Each student is required to attend DEA 459 lectures,

complete all required readings, meet with the instructor and with other graduate students. An additional programming project will be required for all graduate students.

**DEA 651(6510) Human Factors: Ergonomics-Anthropometrics**

Fall. 4 credits. Recommended: DEA 150 and 3-credit statistics course. A. Hedge.

Intended for graduate students who want a more thorough grounding in human factors than is provided by DEA 325. Each student is required to attend DEA 325 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. For more detail, see DEA 325.

**DEA 652(6520) Human Factors: The Ambient Environment**

Spring. 4 credits. Recommended: DEA 150. A. Hedge.

Intended for graduate students who want a more thorough grounding in human factors considerations than is provided by DEA 350. Each student is required to attend DEA 350 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. For detailed description, see DEA 350.

**DEA 653(6530) Planning and Managing the Workplace**

Fall. 4 credits. Prerequisite: graduate standing. Letter grades only. F. Becker.

Through lectures, readings, and a field studies project, this course explores how the planning, design, and management of health care facilities affects the experience of patients and care-giving staff; and the relationship of these outcomes to quality of health measures. Invited lecturers from around the country and world (via videoconferencing) provide a broad-based perspective into different approaches to hospital planning and design, and how the form of hospitals is changing in response to new information and medical technologies, changing work patterns, and shifting demographic patterns. Students' field projects involve analysis of an actual health care setting and the development of innovative solutions to improve the quality of health care provided in it.

**DEA 654(6540) Facility Planning and Management Studio**

Spring. 4 credits. Prerequisite: graduate students in facility planning and management; DEA 459/650 or permission of instructor. Letter grades only. Minimum cost of materials: \$200. W. Sims. Visit <http://courseinfo.cit.cornell.edu/courses/dea354-654>.

For description, see DEA 354.

**DEA 656(6560) Research Methods in Human-Environment Relations**

Fall. 4 credits. Prerequisite: DEA majors or permission of instructor; statistics course. N. Wells.

Intended for graduate students who want a more thorough understanding of the use of research to study the relationship between physical environment and human behavior than is provided by DEA 455. Each student is required to attend DEA 455 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. For more detail, see DEA 455.

**DEA 659(6590) Introduction to Facility Planning and Management**

Fall. 1 credit. For graduate students interested in careers in facility planning and management. Letter grades only. F. Becker.

Introduction to the field of facility planning and management. Focuses on how the planning, design, and management of an organization's physical facilities can help it meet its business objectives. Topics include the history of the field, strategic planning, space planning and design, project management, building operations, workplace change management, real estate and computer-aided facility management systems.

**DEA 660(6660) The Environment and Social Behavior**

Fall. 4 credits. Prerequisite: DEA 150 and written permission of instructor. Field trip fee: \$65. G. Evans.

This course is about architecture and human behavior. It is centered around two key principles: 1. the complex interplay of social and personal factors with the physical environment largely determines how the built environment influences human well-being; 2. aesthetics is not sufficient in judging design—we must also consider how the built environment affects health, interpersonal relationships, and performance along with preference. Two major projects, one in collaboration with a design studio and a real community client.

**DEA 661(6610) Environments and Health**

Spring. 3 credits. N. Wells.

Examines the impact of the physical environment on human health and well-being through the life course. Environmental factors examined include characteristics of the built and natural environment, housing, and neighborhood as well as sprawl, the dominance of the automobile, and patterns of American landscape development. Health outcomes include physical health, obesity, mental health, and cognitive functioning. Working within the life course perspective, the course focuses particularly on environmental factors that may act as either protective mechanisms fostering the long-term resilience of individuals or risk factors contributing to long-term vulnerability.

**DEA 668(6680) Design Theory and Criticism Seminar**

Spring. 4 credits. Limited to 15 students. J. Jennings.

For advanced undergraduate and graduate students. The seminar explores two methods of design thinking: theoretical and critical. One method stems from a desire to understand historical theory and to assess the relevance of theory as an intellectual basis for contemporary design. The other approach involves learning to write critically. Within this construct is the notion that every design is an argument a designer makes.

**DEA 670(6700) Applied Ergonomics Methods**

Spring. 4 credits. Limited to 20 students. Prerequisite: DEA 651. A. Hedge.

Intended for graduate students who want a more thorough understanding of applied ergonomics methods than is provided by DEA 470. Each student is required to attend DEA 470 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. For further detail, see DEA 470.



**DEA 899(8990) Master's Thesis and Research**

Fall or spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional. DEA graduate faculty.

**HUMAN DEVELOPMENT**

R. Savin-Williams, chair; B. Koslowski, director of graduate studies; E. Wethington, director of undergraduate studies; C. Brainerd, J. Brumberg, M. Casasola, S. Ceci, M. Cochran, S. Cornelius, R. Depue, J. Eckenrode, G. Evans, M. Goldstein, S. Hamilton, J. Haugaard, C. Hazan, B. Lust, J. Mikels, A. Ong, K. Pillemer, V. Reyna, S. Robertson, J. Ross-Bernstein, E. Temple, Q. Wang, W. Williams. Emeritus: J. Doris, L. C. Lee, H. Ricciuti

**HD 115(1150) Human Development**

Fall or summer. 3 credits. S-U grades optional. C. Schelhas-Miller.

Provides a broad overview of theories, research methods, and current knowledge of human development from conception into adulthood. Covers infancy, childhood, and adolescence. Topics include biological, intellectual, linguistic, social, and emotional development as well as the cultural, social, and interpersonal contexts that affect the developmental processes and outcomes of these domains.

**HD 216(2160) Adolescence and Emerging Adulthood**

Spring. 3 credits. Prerequisite: HD 115 or PSYCH 101 or permission of instructor. S-U grades optional. C. Schelhas-Miller.

Broad overview of theories, research, and issues in the study of human development during adolescence and emerging adulthood. Focuses on the major biological, cognitive, and social changes during adolescence; the psychosocial issues of adolescence, including identity, autonomy, intimacy, sexuality, achievement, and problems; and the contexts in which adolescent development occurs, particularly families, peer groups, schools, work, and popular culture. Discusses empirical research, theories, case studies of the lives of real adolescents, and, to a lesser degree, public policies.

**HD 218(2180) Human Development: Adulthood and Aging**

Fall. 3 credits. Prerequisite: HD 115. S-U grades optional. A. Ong.

General introduction to theories and research in adult development and aging. Discusses psychological, social, and biological changes from youth through late adulthood. Emphasizes both individual development within generations and differences among generations.

**HD 220(2200) The Human Brain and Mind: Biological Issues in Human Development (also COGST 220(2200))**

Fall. 3 credits. Prerequisite: HD 115 or PSYCH 101. S-U grades optional. E. Temple.

Introduces the biology that underlies human behavior and cognitive processes such as language, reasoning, decision making, and emotion. Begins by studying fundamental concepts in neurobiology and neuroanatomy, then explores a variety of topics, including how our brain underlies our perception,

thought, language, emotions, memories, and desires. Relevant human clinical disorders are discussed throughout.

**[HD 230(2300) Cognitive Development (also COGST 230(2300))]**

Spring. 3 credits. Prerequisite: HD 115 or PSYCH 101. Not offered 2006-2007.

Q. Wang.

Surveys current theory and research on various aspects of cognitive development across the life span, with emphasis on infancy and early childhood. Topics include perception, representation and concepts, reasoning and problem solving, social cognition, memory, metacognition, language and thought, and academic skills. Students develop a broad understanding of the mechanisms, processes, and current issues in cognitive development and learn to critically assess developmental research. The course is a combination of lecture, seminar, and fieldwork.]

**[HD 233(2330) Children and the Law]**

Spring. 3 credits. Prerequisites: HD 115 and introductory statistics course. Not offered 2006-2007. S. Ceci.

Examines psychological data and theories that shed light on the practical issues that arise when children enter the legal arena. Attempts to integrate theories, research, and methodology from several areas of psychology, including developmental, cognitive, social, and clinical. Also attempts to examine the degree to which basic research can (and should) be used to solve applied issues. Selected topics include memory development, suggestibility, theory of mind, childhood amnesia, expectancy formation, symbolic representational ability, and finally, what can (or should) an expert witness tell the court. Several actual cases involving child witnesses are presented to illustrate the application of scientific data to the courtroom. Because of the heavy use of case materials and video and textual coverage of actual trials, it is expected that students will devote more than the usual number of hours to this course.]

**[HD 238(2380) Thinking and Reasoning (also COGST 437)]**

Fall. 3 credits. Prerequisite: HD 115 or PSYCH 101. Not offered 2006-2007. B. Koslowski.

Examines problem solving, transfer, and creativity; pre-causal and causal reasoning; models of good thinking based on formal logic, pragmatic syllogisms, and probability theory; expert-novice differences; cognition and attitudes; extra-rational and magical beliefs; and putative racial and social class differences in intelligence. Two general themes run through the course: (1) the extent to which children and adults approximate the sorts of reasoning that are described by various psychological models; (2) the extent to which various models accurately describe the kind of thinking that actually is required by the problems and issues that arise and must be dealt with in the real world.]

**[HD 250(2500) Families and the Life Course (also SOC 250(2500))]**

Spring. 3 credits. S-U grades optional. Not offered 2006-2007. Staff.

Introduction to social scientific research on family roles and functions in American society. Topics include the history of the family, family change over the life course, and the influence of cultural and economic forces on families.]

**HD 251(2510) Social Gerontology: Aging and the Life Course (also SOC 251(2510))**

Spring. 3 credits. S-U grades optional. E. Wethington.

Analyzes the social aspects of aging in contemporary American society from a life course perspective. Topics include (1) an introduction to the field of gerontology, its history, theories, and research methods; (2) a brief overview of the physiological and psychological changes that accompany aging; (3) an analysis of the contexts (e.g., family, friends, social support, employment, volunteer work) in which individual aging occurs, including differences of gender, ethnicity, and social class; (4) and the influences of society on the aging individual.

**HD 260(2600) Introduction to Personality (also PSYCH 275(2750))**

Spring. 3 credits. Limited to 600 students (300 HD 260, 300 PSYCH 275).

Recommended: introductory psychology or human development course. Staff.

Introduction to theory and research in the area of personality psychology, with special emphasis on personality development. Covers the major influences—including genetic, environmental, and gene-environment interactions—and involves in-depth study of the major theories. Examines and compares assumptions and models of human behavior that form the basis of each theoretical orientation, and reviews and evaluates the relevant empirical evidence. In addition, basic psychometric concepts and the methods for measuring and assessing personality are covered, as are the major related debates and controversies.

**HD 261(2610) The Development of Social Behavior**

Fall. 3 credits. Highly recommended: HD 115 or PSYCH 128. J. Mikels.

Views issues in the development of social behavior from the perspective of theory and research. Likely topics include bases of social behavior in infancy and early childhood, the role of parents, siblings, and peers, the development of prosocial and aggressive behavior, the development and functioning of attitude and value systems, and the function and limits of experimental research in the study of social development.

**HD 266(2660) Emotional Functions of the Brain**

Spring. 3 credits. Prerequisites: HD 220, PSYCH 223/460, BIONB 420, or several PSYCH courses. Letter grades only. R. Depue.

After an presenting an overview of the gross neuroanatomy of the primate brain, this course focuses on networks of brain regions that are organized around the integration of processes related to emotion and motivation. First, general features of the brain in relation to emotional evaluation and expression processes are discussed, and then the brain organization related to several specific types of emotional systems is presented,

including incentive-reward motivation, social bonding, fear versus anxiety and affective aggression. Emotion, memory, and conscious awareness of emotional feelings are also discussed. Neurobiological modulation of emotional processes by neurotransmitters and neuropeptides of wide distribution in the brain are detailed as well. The latter lay the groundwork for understanding the nature of individual differences in much of our social and emotional behavior as explored in HD 366.

**HD 282(2820) Community Outreach (also PSYCH 282[2820])**

Fall. 2 credits. Prerequisites: HD 115 or PSYCH 101. Students may not register concurrently with HD 327/PSYCH 327 or 328. Letter grades only. H. Segal.  
For description, see PSYCH 282.

**HD 284(2840) Gender and Sexual Minorities (also FGSS 285[2850])**

Fall. 3 credits. Prerequisite: social science course. S-U grades optional. K. Cohen.  
Introduces students to theories, empirical scholarship, and current controversies regarding lesbian, gay, bisexual, transgender, sexually questioning, and other gender and sexual minority populations. The major focus is on sexual development, lifestyles, and communities with additional coverage of ethnic, racial, and gender issues. Videos supplement readings and lectures.

**HD 313(3130) Problematic Behavior in Adolescence (also PSYCH 313[3130])**

Spring. 3 credits. Prerequisite: HD 115 or PSYCH 101. J. Haugaard.  
Explores several problematic behaviors of adolescence, including depression, drug abuse, eating disorders, and delinquency. Presents various psychological, sociological, and biological explanations for the behaviors. Reviews appropriate research; explores treatment and prevention strategies. Lectures are supplemented by several novels and movies that focus on troubled adolescents.

**HD 320(3200) Human Developmental Neuropsychology**

Spring. 3 credits. Prerequisites: HD 220 or PSYCH 223 or BIONB 222. S-U grades optional. Offered alternate years.  
E. Temple.  
Human neuropsychology explores the relationship between the brain and mind with a focus on the effects of disease, disorder, and injury. As a discipline, neuropsychology seeks to gain an understanding of not only specific disorders but also the nervous system through analysis of the effects of these disorders. This course takes that approach as well, exploring issues from both perspectives. It also explores the developmental neurobiology of different human diseases, clinical disorders, disabilities, and injuries. Topics include learning disabilities, autism, ADHD, Tourette's syndrome, Down syndrome, mental illnesses, Alzheimer's disease, Parkinson's disease, and epilepsy.

**HD 327(3270) Field Practicum I (also PSYCH 327[3270])**

Fall. 3 credits. Limited to 30 students. Students must commit to taking HD 328 in spring semester. Prerequisites: HD 370 or PSYCH 325 and permission of instructor. Letter grades only. H. Segal.  
For description, see PSYCH 327.

**HD 328(3280) Field Practicum II (also PSYCH 328[3280])**

Spring. 3 credits. Limited to 30 students. Prerequisites: HD 327/PSYCH 327 taken previous semester, PSYCH 325 or HD 370 and permission of instructor. Letter grades only. H. Segal.  
For description, see PSYCH 328.

**[HD 334(3340) The Growth of the Mind (also COGST 334[3340])**

Spring. 4 credits. Recommended: course in human experimental psychology, statistics, or HD 115 or equivalent, or permission of instructor. S-U grades optional. Not offered 2006–2007. B. Lust.

Introduces the fundamental issues of cognition. Students are asked to consider several questions. What is the nature of human intelligence? How are knowledge and understanding acquired and represented in the human mind? What is the nature of mental representation? What are the cognitive characteristics of the mind at birth? What is the relation of the acquisition of knowledge and understanding to their final representation? What are the relations between language and thought? In the study of those issues, how can epistemology and experimental psychology be related through the experimental method? Basic debates within the study of cognition are introduced and discussed throughout. The course analyzes Piaget's comprehensive theory of cognitive development and experimental results. Current research in cognitive development is contrasted.]

**[HD 336(3360) Connecting Social, Cognitive, and Emotional Development**

Fall. 3 credits. Prerequisites: HD 115 or PSYCH 101 and HD 230 and either HD 260 or 261. S-U grades optional. Not offered 2006–2007. M. Casasola.  
Provides an integrated view of development from infancy through middle childhood. Students gain an understanding of how aspects of social, emotional, and cognitive abilities interact and play integral roles in each other's development.]

**HD 337(3370) Language Development (also COGST 436[4360], PSYCH 436[4360], LING 436[4436])**

Spring. 4 credits. Open to undergraduate and graduate students. Supplemental lab course available (HD 437, PSYCH 437, COGST/LING 450). Graduate students also should enroll in HD 637/LING 700, supplemental graduate seminar.  
Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, neurobiology, biology, or linguistics. S-U grades optional. B. Lust.  
Surveys basic issues, methods, and research in the study of first-language acquisition. Considers major theoretical positions in the field in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental issues of relationships between language and thought are discussed, as are the fundamental linguistic issues of "Universal Grammar" and the biological foundations for language acquisition. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child.

**HD 342(3420) Participation with Groups of Young Children**

Fall. 4 credits. Limited to 25 students. Prerequisites: HD 115 and contact with instructor to arrange placement hours. S-U grades optional. J. Ross-Bernstein.

Designed to integrate developmental theories with supervised experience in local care and educational contexts for young children, the intention being to enhance the student's abilities to understand and to relate effectively to young children. Students are required to participate six hours per week in a setting with young children. Placements are in local pre-kindergarten and kindergarten programs, day care centers, nursery schools, and Head Start programs.

Note: Six hours of placement per week (completed in two 3-hour blocks of time) is required. For your information: students select ONE of the following placement options: M W (8–11 or 9–12), M F (8–11 or 9–12), T R (8–11 or 9–12), M F (11–2), T R (11–2). A few late-afternoon placements are available M F (2:30–5:30), T R (2:30–5:30).

**[HD 344(3440) Infant Behavior and Development**

Fall. 3 credits. Limited to 60 students. Not open to freshmen. Prerequisites: HD 115, biology course, and statistics course. Not offered 2006–2007. S. Robertson.  
Examines behavior and development from conception through the first two years of life in traditional areas (e.g., perception, cognition, socioemotional theory, language, motor function). Strongly emphasizes the fundamental interconnectedness of these aspects of development as well as their relation to the biology of fetal and infant development. Emphasizes topics with implications for general theories of development (e.g., the functional significance of early behavior, the nature of continuity and change, and the role of the environment in development). Also describes conditions that put infants at risk for poor development (e.g., premature birth, exposure to environmental toxins, maternal depression) and topics with current social, ethical, or political implications (e.g., infant day care, fetal rights). Research methodology in the study of early behavior and development is emphasized throughout the course.]

**HD 346(3460) The Role and Meaning of Play**

Fall. 3 credits. Limited to 45 students. Prerequisite: junior or senior standing; HD 115. J. Ross-Bernstein.  
Examines the play of children ages three through seven. Through seminar discussions, workshops, videos, and individualized research students explore the meaning and validity of play in the lives of young children, the different ways that children play and the value of each, and the effect of the environment in enhancing and supporting play.

**HD 347(3470) Human Growth and Development: Biological and Behavioral Interactions (also B&SOC 347[3471], NS 347[3470])**

Spring. 3 credits. Limited to 150 students. Prerequisites: BIO G 101 or 109 or equivalent, and HD 115 or PSYCH 101. Offered alternate years. S. Robertson and J. Haas.

Concerned with the interrelationships of physical and psychological growth and development in humans during infancy. Considers intrinsic and extrinsic causes of variations in growth, including various forms of stimulation. Also examines the consequences of early growth and its variations for current and subsequent behavioral, psychological, and physical development are examined. The interaction between physical and behavioral or psychological factors is emphasized throughout the course.

**HD 353(3530) Risk and Opportunity Factors in Childhood and Adolescence**

Fall. 3 credits. Limited to 100 students. Prerequisites: HD 115 and 250. S-U grades optional. J. Whitlock.

Explores the meaning of risk and opportunity in the lives of children and youth. Begins with understanding risk accumulation and resilience as they relate to social policy, professional practice, and community development. The concept of "social toxicity" is a central theme of the course. Assignments include writing research-based editorials and participating in a simulated public policy debate.

**[HD 362(3620) Human Bonding**

Fall. 3 credits. Limited to 600 students. Recommended: introductory psychology or human development course. S-U grades optional. Not offered 2006-2007. C. Hazan.

Covers the science of interpersonal relationships. Examines the basic nature of human affectional bonds, including their functions and dynamics. Covers such topics as interpersonal attraction and mate selection, intimacy and commitment, love and sex, jealousy and loneliness, the neurobiology of affiliation and attachment, and the role of relationships in physical and psychological health.]

**HD 366(3660) Psychobiology of Temperament and Personality**

Fall. 3 credits. Limited to 20 students. Prerequisite: permission of instructor. Letter grades only. R. Depue.

For students who have an interest in the neurobiology of behavior, in general, and in temperament and personality, in particular. The course material is presented within an evolutionary biology perspective, where the development of neurobehavioral systems as a means of adapting to critical stimuli is explored as the basis of emotional traits in humans. The nature of temperament and personality is explored from psychometric, social, genetic, and biological points of view. There is a focus on the general role played by the biogenic amines (dopamine, norepinephrine, and serotonin), corticotropin hormone and opiates in determining individual differences in temperament and personality. Implications for modeling several forms of personality disorders and psychopathology are also discussed. Finally, the manner in which environmental influences across the life span may be coded in the brain

and influence the development of personality is explored.

**[HD 368(3680) Children's Development in Different Cultures**

Spring. 3 credits. Prerequisites: HD 115 or PSYCH 101 and college-level statistics course. Letter grades only. Not offered 2006-2007. Staff.

Examines the influence of ecological, cultural, and ethnic factors on the social and cognitive development of children in different cultures. Gives particular attention to research methodologies that guide us in making comparisons about parent-child development across cultures. Topics include family origin and universality, parental roles, child-family interaction, patterns of kinship, and economic and health issues.]

**HD 370(3700) Adult Psychopathology (also PSYCH 325[3250])**

Spring. 3 credits. Prerequisites: sophomore, junior, or senior standing; any course in psychology or human development. H. Segal.

For description see PSYCH 325.

**[HD 371(3710) Child Development and Psychopathology (also PSYCH 371[3710])**

Fall. 3 credits. Priority given to HD and psychology majors. Prerequisites: HD 115 or PSYCH 209; HD 220 or PSYCH 223; HD 260 or PSYCH 275. Letter grades only. Not offered 2006-2007. J. Haugaard.

Explores the development and process of mental, emotional, and behavioral disorders in children such as mental retardation, autism, depression, and attention deficit disorder. Topics include (1) the classification of mental disorders; (2) biological, psychological, and sociological theories regarding the development and maintenance of mental disorders; (3) prevalence and etiology of childhood mental disorders, and (4) therapeutic and preventive interventions. If there is sufficient enrollment, an optional discussion section will be available to students who would like an opportunity to discuss readings and lecture material in greater depth.]

**HD 382(3820) Research Methods in Human Development**

Spring. 3 credits. Prerequisite: HD 115. Highly recommended: background in statistics. Letter grades only. M. Casasola.

Students learn about a variety of research methodologies and gain firsthand experience in conducting all aspects of a research project. Students design and conduct one descriptive and one experimental study. They also gain experience in using statistical software to analyze data.

**HD 400-401-402-403(4000-4010-4020-4030) Special Studies for Undergraduates**

Fall or spring. Credit TBA; 1-4. Prerequisite: permission of instructor. S-U grades optional.

For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of HD not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake, on a form available from the department office in G77 MVR. This form must be signed by the instructor directing the study and the student's faculty advisor

and submitted to G77 MVR, the Office of Undergraduate Education. After the form is approved, the student takes it to the college registrar's office, 145 MVR. To ensure review before the close of the periods, early submission of the special studies form to the Office of Undergraduate Education is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study.

**400(4000): Directed Readings.** Prerequisite: permission of instructor. For study that predominantly involves library research and independent study.

**401(4010): Empirical Research.** Prerequisite: permission of instructor. For study that predominantly involves data collection and analysis, or laboratory or studio projects.

**402(4020): Supervised Fieldwork.** Prerequisite: permission of instructor. For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

**403(4030): Teaching Assistantship.** Prerequisites: permission of instructor; juniors and seniors with minimum 3.0 GPA; either HD 115, or PSYCH 101, and two intermediate-level HD courses, or equivalent courses in psychology or sociology. Students must have taken course and received B+ or higher. For study that includes assisting faculty with instruction.

**HD 414(4140) Social and Psychological Aspects of the Death Penalty**

Spring. 3 credits. Limited to 20 students. Prerequisites: junior or senior standing and HD 115 and HD 233 or PSYCH 265. S-U grades optional. C. Brainerd.

This course will focus on how the field of human development contributes to death penalty cases through the creation of social history reports on death-qualified defendants and will provide training in how to prepare such reports. Students will study relevant areas of death penalty law (e.g., *Wiggins v. Smith*, mitigation law, pre- vs. post-conviction). Students will also study specific areas of human development research that figure centrally in social history reports (e.g., intelligence testing, educational disability, mental illness and the DMS-IV, social and family environment, prediction of future dangerousness, anti-social personality).

**[HD 418(4180) Aging: Contemporary Issues**

Spring. 3 credits. Limited to 20 students. Prerequisites: junior or senior standing; HD 218, 250, or 251 or permission of instructor. Letter grades only. Not offered 2006-2007. J. Mikels.

Seminar addressing major issues and controversies in the field of aging. Designed for upper-level students who wish to pursue an in-depth analysis of concepts such as "successful" aging and wisdom, as well as controversies surrounding issues of generational equity and the right to die. Although these issues are addressed primarily from a psychological viewpoint, interdisciplinary perspectives are considered and incorporated in both readings and discussions. Also designed for advanced undergraduates who have completed an introductory course in adulthood and aging and wish to pursue such issues in more

depth. Class time is devoted primarily to discussion of assigned readings.]

#### **HD 419(4190) Midlife Development**

Spring. 3 credits. Limited to 20 students. Prerequisites: junior or senior standing; HD 218, 250, or 251 or permission of instructor. Letter grades only. Offered alternate years. A. Ong.

This seminar-style course examines the burgeoning research literature on adult development during midlife. Focuses on research and theory examining psychological changes during middle adulthood such as relativistic and dialectical thinking, personality, identity, and sense of control. Also considers the social and physical changes that occur at this time of life especially regarding issues such as empty nest anxieties, divorce, career transitions, menopause, and cardiovascular disease. Oral presentations, class participation, and an integrative paper are required.

#### **HD 420(4200) Laboratory in Risk and Rational Decision Making**

Spring. 3 credits. Limited to 20 students. Prerequisites: junior or senior standing and HD 115 and HD 233 or PSYCH 265 or PSYCH 280. S-U grades optional. V. Reyna.

This laboratory course will offer a hands-on introduction to research and laboratory techniques that address topics in risk and rational decision making in human development from multiple disciplinary perspectives. The course will include activities such as scientific presentations, collaborative work, peer review, and designing research on topics in decision-making under risk and uncertainty, as well as discussion of scientific methods and interpretation of data. Topics in decision-making may include war, terrorism, cancer control and prevention (e.g., screening tests), personal behaviors that involve risk (e.g., HIV-prevention), and other public health risks (e.g., vaccinations), law enforcement (e.g., use of a weapon) and legal decision-making (e.g., jury deliberations).

#### **[HD 431(4310) Mind, Self, and Emotion**

Fall. 3 credits. Limited to 20 students. Prerequisites: upperclass undergraduate or graduate standing; HD 115 or PSYCH 101. Letter grades only. Offered alternate years; not offered 2006–2007. Q. Wang.

Examines current data and theory concerning memory, self, and emotion from a variety of perspectives and at multiple levels of analysis, particularly focusing on the interconnections among these fields of inquiry. The "scale of observation" is viewed as occurring within the person (brain mechanisms, including genetics), at the level of the person (e.g., content—goals, beliefs, desires), and between persons (relationships, and group interaction—including culture).]

#### **HD 432(4320) Cognitive, Social, and Developmental Aspects of Scientific Reasoning (also COGST 432[4320])**

Fall. 3 credits. Limited to 20 students (14 HD 432, 6 COGST 432). Prerequisites: junior or senior standing; HD 115 or PSYCH 101 or permission of instructor. S-U grades optional. B. Koslowski.

The basic premise of this course is that scientific reasoning is not restricted to scientists, but is continuous with good reasoning in general. We will examine not only how people reason, but also the extent to which their reasoning is either flawed or appropriate. The seminar will discuss issues related to how we identify the causes of

phenomena, especially in situations in which we cannot conduct an experiment; the limits of covariation data and how it interacts with information about theory; generating, evaluating, and deciding between competing explanations; dealing with anomalous or inconsistent data; confirmation bias and disconfirmation; the role of theory and culturally available information in generating and evaluating alternative hypotheses; and whether age and cultural differences in reasoning result from different reasoning strategies or from differences in the sorts of background information that are available and the different explanations that are treated as legitimate.

#### **[HD 433(4330) Developmental Cognitive Neuroscience**

Spring. 3 credits. Limited to 20 students. Prerequisites: junior or senior standing; HD 220 or PSYCH 223, BIONB 222. S-U grades optional. Offered alternate years; not offered 2006–2007. E. Temple.

What are the brain mechanisms underlying human behavior and cognition? How do those underlying brain mechanisms develop? These are the questions that developmental cognitive neuroscience tries to address and those explored in this course. The course explores methods used in the field (including brain imaging techniques), recent findings on the development of brain mechanisms underlying human behaviors such as, language, attention, and memory, as well as the brain mechanisms that may underlie various developmental disorders such as developmental dyslexia, autism, and attention deficit (hyperactive) disorder (AD(HD)). Emphasis is on reading primary research literature and acquiring the skills to understand, critique, discuss, and write about primary research. The format includes lecture and discussion.]

#### **[HD 434(4340) Current Topics in Cognitive Development**

Spring. 3 credits. Limited to 20 students. Prerequisites: HD/COGST 334 or permission of instructor. S-U grades optional. Not offered 2006–2007. B. Lust.

This course will supplement survey course HD/COGST 334 with additional discussion of current research in the area of cognitive development. Selected current papers which debate issues discussed in HD/COGST 334 will be read and discussed in parallel with the HD/COGST 334 survey course. Modern interpretations and challenges to Piaget's theory will be evaluated in light of current literature in the field. A small-group format will be adopted to encourage discussion.]

#### **HD 437(4370) Lab Course: Language Development (also COGST/LING 450[4500], PSYCH 437[4370])**

Spring. 2 credits. Limited to 20 students. Prerequisite: HD 337/COGST/PSYCH/LING 436 or equivalent. B. Lust.

For description, see COGST 450.

#### **HD 440(4440) Internship in Educational Settings for Children**

Fall or spring. 8–12 credits. Prerequisites: HD 115, 342, and 348; permission of instructor. Recommended: HD 346. S-U grades optional. J. Ross-Bernstein.

Offers an opportunity to integrate theory with practice at an advanced level and to further develop understanding of children ages 2 to 10 and their families. Interns function as participants in varied settings and participate in curriculum planning, evaluation, staff

meetings, home visits, parent conferences, and parent meetings. Supervision by head teacher and instructor. Students are expected to define their own goals and to assess their progress, to do assigned and self-directed readings, and to keep a critical incident journal.

#### **HD 448(4480) Advanced Participation with Children**

Spring. 4–8 credits. Limited to 20 students (depending on availability of placements and supervision). Prerequisites: HD 115 and 342 and permission of instructor. Recommended: HD 346. S-U grades optional. J. Ross-Bernstein.

Supervised field-based course designed to help students deepen and consolidate their understanding of children. Students are expected to define their own goals and assess progress with supervising teachers and the instructor; to keep a journal; and to plan, carry out, and evaluate weekly activities for children within their placement. Conference groups and readings focus on the contexts of development and on ways to support children's personal and interpersonal learning. Each student is expected to do a presentation and paper on a self-selected topic within the scope of the course. Participation is in settings that serve typical and/or special needs children from three to eight years of age and provide education, care, or special-purpose interventions for them.

#### **[HD 451(4510) Nontraditional Families and Troubled Families**

Spring. 3 credits. Limited to 20 students. Prerequisites: HD juniors and seniors; HD 115 or PSYCH 209; HD 260 or PSYCH 275. Letter grades only. Offered alternate years; not offered 2006–2007. J. Haugaard.

Advanced course designed to explore the functioning of families. The first part of the course examines family system theory and how it relates to our understanding of all families. The second part examines four types of families: two nontraditional families (e.g., adoptive families) and two troubled (e.g., families with a chronically ill child).]

#### **[HD 452(4520) Culture and Human Development (also COGST 452[4520])**

Fall. 3 credits. Limited to 20 students. Prerequisite: HD 115 or PSYCH 101. Open to undergraduate and graduate students. Letter grades only. Offered alternate years; not offered 2006–2007. Q. Wang.

This seminar takes an interdisciplinary approach to address the central role of culture in human development. It draws on diverse theoretical perspectives, including psychology, anthropology, education, ethnography, and linguistics, to understand human difference, experience, and complexity. It takes empirical reflections upon major developmental topics such as cultural aspects of physical growth and development; culture and cognition; culture and language; culture, self, and personality; cultural construction of emotion; culture issues of sex and gender; and cultural differences in pathology.]



**[HD 456(4560) Families and Social Policy]**  
Spring. 3 credits. Limited to 20 students.  
Prerequisite: junior or senior standing; one course in the family or sociology. S-U grades optional. Not offered 2006-2007.  
Staff.

Examines the intended and unintended family consequences of governmental policies, using case studies in areas such as social welfare, day care, and employment. Also considers the policy implications of changes in the structure and composition of families.]

**[HD 457(4570) Health and Social Behavior (also SOC 457(4570))]**

Fall. 3 credits. Limited to 20 students.  
Prerequisites: junior or senior standing; statistics course and one of the following: HD 250, SOC/D SOC 101, or SOC 251.  
Letter grades only. Offered alternate years; not offered 2006-2007. E. Wethington.

Critically examines theories and empirical research on the relationships among social group membership, social status, and physical and mental health. Lectures focus on social stress, social support, and socioeconomic status, all of which are associated with variations in physical health, mental health, and health maintenance behaviors. Students are expected to read widely from current literature in medical sociology, health psychology, public health, and epidemiology.]

**[HD 458(4580) Parent-Child Development in African American Families]**

Fall. 3 credits. Limited to 20 students.  
Prerequisites: junior or senior standing; HD 115, 250, and college-level statistics course.  
Letter grades only. Not offered 2006-2007.  
Staff.

Examines parent-child relationships in African American families. Topics include historical influences on contemporary parenting behaviors, the impact of societal forces on African American families' socialization practices, and the influence of parental child rearing beliefs, strategies, and practices on African American children's development. Particular attention is given to the relevance of mainstream theoretical formulations of African Americans' parental and familial functioning.]

**[HD 464(4640) Adolescent Sexuality (also FGSS 467(4670))]**

Spring. 3 credits. Limited to 20 students.  
Prerequisites: junior or senior standing; permission of instructor. Not offered 2006-2007. R. Savin-Williams.

Covers topics selected by students regarding theoretical, research, and applied issues on adolescent sexuality. In the second half of the course, students lead a class that focuses on a research topic of their choosing. The success of the course depends on students feeling personally engaged and committed to the course content. Students are expected to participate fully in class discussions. Because of the multidisciplinary nature of the course, students from a variety of backgrounds in academic disciplines, gender, sexual orientation, ethnicity, race, class, and religious affiliation attend.]

**[HD 468(4680) Stress in Childhood and Adolescence]**

Spring. 3 credits. Limited to 20 students.  
Prerequisite: junior or senior standing.  
Recommended: HD 115 and a statistics course. Letter grades only. J. Eckenrode.

Advanced seminar that reviews research related to the nature and consequences of stressful experiences in childhood and

adolescence, particularly those arising in the family. Topics represent common stressors in the lives of children (e.g., divorce of parents) that have potentially damaging consequences for development. Also covers topics in which Cornell faculty members have conducted significant research (e.g., child abuse and neglect). In addition to considering the negative effect of stress on development, also considers issues of individual differences in stress reactivity, including the concepts of coping and resilience. These topics lead naturally into discussions of practice and policy.

**[HD 478(4780) Attention Deficit/Hyperactivity Disorder in Children]**

Spring. 3 credits. Limited to 15 students.  
Prerequisites: HD 115 or equivalent, introductory biology, statistics course. S-U grades optional. Offered alternate years.  
S. Robertson.

This seminar examines in detail the nature, diagnosis, epidemiology, causes, and treatment of ADHD through a critical evaluation of the recent scientific and medical literature. Also considers implications for families, schools, and society.

**[HD 483(4830) Early Care and Education in Global Perspective]**

Fall. 3 credits. Limited to 20 students.  
Prerequisites: junior or senior standing; HD 115 and 250. S-U grades optional. Not offered 2006-2007. M. Cochran.

Examines American child care and early education policies and programs, broadly defined, in the context of policies and programs in Africa, Asia, Europe, and Latin America. Comparison and analysis are guided by several complementary conceptual frameworks. Gives particular attention to the synthesis of child care with early intervention and family support. Policy-related topics include parental leave, developmentally appropriate practices, universal pre-kindergarten, cultural diversity, parent involvement, teacher preparation, and financing the ECE system. Students specialize in the child care policies and programs of another country, work in teams to analyze a contemporary policy issue, and apply course content to an ECE issue of their choice in a final paper.]

**[HD 498(4980) Senior Honors Seminar]**

Fall and spring. 1 credit. Requirement for and limited to seniors in HD honors program. S-U grades only. M. Casasola.  
Discussion and presentation of honors theses being completed by HD seniors.

**[HD 499(4990) Senior Honors Thesis]**

Fall or spring. Credit TBA. Prerequisite: permission of thesis advisor and coordinator of honors program. S-U grades optional. HD faculty.

## The Graduate Program

HD graduate courses are open to undergraduates only by permission of instructor.

### General Courses

**[HD 602(6020) Research in Risk and Rational Decision Making]**

Spring. 3 credits. Limited to 5 students.  
Corequisite: HD 420. S-U or letter grades.  
V. Reyna.

This hands-on laboratory course will inculcate research skills in the context of

risk and rational decision making in human development from multiple disciplinary perspectives and with respect to different kinds of decision-making under risk and uncertainty. Such decisions concern war, terrorism, cancer control and prevention (e.g., screening tests), personal behaviors that involve risk (e.g., HIV-prevention), and other public health risks (e.g., vaccinations), law enforcement (e.g., use of a weapon), and legal decision-making (e.g., jury deliberations). Students will read the research literature, and discuss the latest empirical findings and scientific theories of risk and rationality, engaging in group work and peer review to hone their skills. Students will then design research projects based on that material as well as additional references tailored to their interests.

**[HD 614(6140) Social and Psychological Aspects of the Death Penalty]**

Spring. 3 credits. Limited to 5 students.  
Prerequisite: Cornell doctoral students. S-U grades optional. C. Brainerd.

This course will focus on how the field of human development contributes to death penalty cases through the creation of social history reports on death-qualified defendants and will provide training in how to prepare such reports. Students will study relevant areas of death penalty law (e.g., *Wiggins v. Smith*, mitigation law, pre- vs. post-conviction) and design relevant research. Students will also study specific areas of human development research that figure centrally in social history reports (e.g., intelligence testing, educational disability, mental illness and the DMS-IV, social and family environment, prediction of future dangerousness, anti-social personality).

**[HD 617(6170) Adolescence]**

Fall. 3 credits. Not offered 2006-2007.  
R. Savin-Williams.

Critically examines seminal theoretical and empirical writings on adolescent development. Considers empirical research on specific questions chosen by students in the light of these approaches.]

**[HD 620(6200) First-Year Proseminar in Human Development]**

Yearlong. 1 credit. Prerequisite: first-year HD graduate students. S-U grades only.  
B. Koslowski.

Designed as an orientation to the department and the university. Activities include attendance at research presentations, visits to departmental research laboratories, relevant informational sessions (e.g., University Committee on Human Subjects, College Grants), and guidance in preparing a public research presentation to be made at the end of spring semester.

**[HD 621(6210) Seminar on Autobiographical Memory]**

Spring. 3 credits. Prerequisites: graduate standing required; seniors by permission of instructor. Letter grades only. Not offered 2006-2007. Q. Wang.

This graduate seminar is designed to give an overview as well as in-depth analysis of topics related to autobiographical memory and its development. Readings focus heavily on current theories and empirical research on a wide range of topics including childhood amnesia, reminiscence bump, emotion and memory, memory accuracy, development and disruption, neurological perspectives, memory functions, and memory across cultures.]



**[HD 631(6310) Proseminar on Cognitive Development]**

Fall. 3 credits. Letter grades only. Not offered 2006–2007. Q. Wang.

Designed to help students develop a broad understanding of the mechanisms, processes, and current issues in cognitive development and learn to do critical, in-depth analyses of developmental research. Discusses how children's thinking changes over the course of development and evaluates psychological theories and research on various aspects of cognitive development. Topics include perception, representation and concepts, reasoning and problem solving, social cognition, memory, metacognition, language and thought, and academic skills.]

**HD 632(6320) Cognitive Neuroscience Seminar: Applications of Brain Science to Behavioral Research**

Spring. 3 credits. Limited to 25 students. Prerequisite: doctoral students; master's students and undergraduate students who are actively doing research by permission of instructor. S-U grades optional. E. Temple.

Gives graduate students the opportunity to learn about current methods of cognitive neuroscience and explore the ways cognitive neuroscience methods and current findings may affect their field of research. Initial meetings include foundational lectures on the fundamentals of cognitive neuroscience. Subsequent meetings cover current topics in cognitive neuroscience that vary year to year depending on the research fields of the graduate students enrolled. Sample topics include cognitive neuroscience of false memory formation, sexual orientation, effects of trauma, and bilingualism. Students do not need to have had previous course work in neurobiology or cognitive neuroscience but rather to be actively engaged in planning or implementing their thesis research. Class format is graduate seminar with reading and discussion of research, student presentations, and papers.

**HD 633(6330) Language Acquisition Seminar (also COGST 633[6330], LING 633[6330])**

Fall. 1–4 credits. Prerequisite: 337 or equivalent or permission of instructor. S-U or letter grades. B. Lust.

This seminar reviews and critiques current theoretical and experimental studies of first language acquisition, with a concentration on insights gained by cross-linguistic study of this area. Attention is also given to the development of research proposals.

**[HD 634(6340) Judgment, Decision Making, and Scientific Reasoning]**

Fall. 3 credits. Prerequisite: human development or psychology course. Letter grades only. Not offered 2006–2007. B. Koslowski.

Seminar based on selected chapters from *The Cognitive Basis of Science*, ed. by Carruthers, Stich, and Siegal (Cambridge U. Press, 2002), an anthology that resulted from a conference of the same name. Most of the authors treat scientific reasoning very broadly, as an instance of good thinking in general. The book addresses issues of innateness and cross-cultural commonalities, modularity, the role of cognition in science, social and emotional factors in science and scientific thinking, and the role of the broader social context in scientific reasoning. Appropriate course

for someone interested in current cross-disciplinary thinking about scientific reasoning as an instance of good reasoning.]

**HD 636(6360) Connecting Social, Cognitive, and Emotional Development**

Spring. 3 credits. S-U or letter grades. M. Casasola.

Opportunity for graduate students to explore several current areas of research from both a cognitive and a social-emotional perspective. Although the traditional approach to the study of development has centered on studying cognitive development as separate from social and emotional development, the current course focuses on how cognitive and socio-emotional development are integrated and how each influences the development of the other. Thus the course is intended to provide a more integrated view of development. As one example, language acquisition, which traditionally has been viewed as a cognitive achievement, depends not only on social interactions but also on achievement in social understanding and awareness. Likewise, acquiring language that describes emotional states plays an important role in developing children's understanding of others' emotional states. Topics are determined by the interests of the graduate students who enroll.

**HD 637(6370) First-Language Acquisition**

Spring. 1–4 credits. Prerequisites: HD 337/LING/PSYCH/COGST 436 and permission of instructor. S-U and letter grades. B. Lust.

This seminar supplements the survey course (HD 337/LING/PSYCH/COGST 436) with more advanced discussion of central issues and materials covered there. Graduate students who are taking the survey course (or who have taken it or an equivalent previously) may also enroll for this seminar.

**[HD 640(6400) Infancy]**

Fall. 3 credits. Not offered 2006–2007. S. Robertson.

Examines development in infancy through a critical review of key research and theory in selected aspects of neurobehavior, perception, cognition, language, emotion, and social relationships. Theoretical issues considered include the role of experiences in early development, sensitive periods, continuity and discontinuity in development, and the functional significance of early behavior. Some of the conditions that put infants at risk for poor development are also considered, such as premature birth, perinatal medical complications, and exposure to environmental toxins. Combines perspectives from developmental psychology and psychobiology.]

**[HD 660(6600) Social Development]**

Fall. 3 credits. Letter grades only. Not offered 2006–2007. Staff.

This seminar examines literature relevant to early childhood determinants and developmental processes of personality and social behavior. Addresses current research, theories, and methodological issues. Special emphasis is placed on possible interrelations between the quality of relationships with parents and with peers, and on the meaning of risk, vulnerability, and resilience in children's lives.]

**HD 666(6660) Emotions and the Brain**

Spring. 3 credits. Prerequisite: HD 266. Letter grades only. R. Depue.

Concerns networks of brain regions that are organized around the integration of processes related to emotion and motivation. Explores (1) the basic brain mechanisms for recognizing and evaluating emotionally relevant stimuli; (2) the brain mechanisms involved in emotional expression, including hormonal and behavioral variables; (3) the special nature of emotional feelings. Extends all of these basic processes by placing them within larger brain networks that support phylogenetically old emotional-motivational systems that help us to adapt to critical stimuli in the environment. Neurobiological modulation of emotional processes by several neurotransmitters of wide distribution in the brain is detailed. The manner in which emotion influences learning and memory concludes the discussion. There are two take-home essay exams.

**[HD 686(6860) Graduate Seminar in Research Methods]**

Spring. 3 credits. S-U grades optional. Not offered 2006–2007. M. Casasola.

This course will provide an examination of a variety of basic research methods used in the study of the life course development of individuals and families. The focus of the course is on providing a conceptual understanding of experimental, quasi-experimental, survey, longitudinal, observational, and qualitative methodologies. Faculty who are experts in the use of particular methodologies will be invited to lead class discussions and will recommend readings on the use of a particular methodology. Each semester the course is offered, the specific methodologies covered will be tailored to meet the needs and interests of the students in the course. Nonetheless, we will cover topics that are relevant to all research methodologies, such as the role of theory in research, formulating a specific and testable research hypothesis, measurement, research design, sampling, data analysis, ethics, and scientific writing.]

**[HD 687(6870) Issues in Professional Development]**

Spring. 3 credits. Prerequisite: at least one semester of graduate-level course work. S-U grades optional. Not offered 2006–2007. S. Ceci.

The goal of this seminar is to provide graduate students with essential information about professional activities that are related to careers in the academy, such as publishing in journals, applying for grants, ethical dilemmas in teaching and research, human subjects issues, academic job search issues, career milestones and evaluations, nonacademic positions, values and mores of the professoriate.]

**HD 691(6910) Poverty, the Life Course, and Public Policy (also DEA 691[6910])**

Fall. 3 credits. Limited to 15 students. Prerequisite: graduate standing. Letter grades only. G. Evans.

For description, see DEA 691.

**[HD 692(6920) Seminar in Translational Developmental Science]**

Spring. 3 credits. Prerequisite: two semesters of graduate-level statistics. S-U or letter grades. Not offered 2006–2007. S. Ceci.

Provides graduate students with the knowledge and opportunities to translate developmental research into public interest

positions. A secondary goal is to provide students with essential information about professional activities that are related to translational research, such as publishing in journals and applying for grants.]

**HD 711(7110) Psychological Expert Testimony in the Courts (also LAW 711(7110))**

Fall. 3 credits. Prerequisite: permission of instructor. S-U or letter grades. J. Haugaard and A. Mooney.

The goals of this course include (1) providing law students and graduate students with the opportunity to work together on a case in which expert testimony from a psychologist will be given, (2) increasing law students' understanding of the strengths and limitations of psychological research, psychological testing, and clinical interviewing, (3) increasing graduate students' understanding of the limits that are imposed on psychological research, testing, and interviewing when it is presented in court, (4) providing law students the opportunity to conduct an examination and a cross-examination of a psychologist expert witness, and (5) providing graduate students with the opportunity to act as an expert witness.

**Individualized Special Instruction**

**HD 700-806(7000-8060) Special Studies for Graduate Students**

Fall or spring. Credit TBA; 1-15 (3 hours work per week per credit). S-U grades at discretion of instructor.

Independent advanced work by graduate students recommended by their Special Committee chair with permission of the instructor.

**HD 700(7000): Directed Readings.** For study that predominantly involves library research and independent study.

**HD 701(7010): Empirical Research.** For study that predominantly involves collection and analysis of research data.

**HD 702(7020): Practicum.** For study that predominantly involves field experience in community settings.

**HD 703(7030): Teaching Assistantship.** For students assisting faculty with instruction. Does not apply to work for which students receive financial compensation.

**HD 704(7040): Research Assistantship.** For students assisting faculty with research. Does not apply to work for which students receive financial compensation.

**HD 705(7050): Extension Assistantship.** For students assisting faculty with extension activities. Does not apply to work for which students receive financial compensation.

**HD 706(7060): Supervised Teaching.** 4 credits. For advanced students who assume major responsibility for teaching a course. Supervision by a faculty member is required.

**HD 806(8060): Teaching Practicum.** 4 credits. For advanced graduate students independently to develop and teach an undergraduate topics course under the supervision of a faculty member.

**HD 899(8990) Master's Thesis and Research**

Fall or spring. Credit TBA; 1-15 (3 hours work per week per credit). Prerequisite: permission of thesis advisor. S-U grades only.

**HD 999(9990) Doctoral Thesis and Research**

Fall or spring. Credit TBA; 1-15 (3 hours work per week per credit). Prerequisite: permission of thesis advisor. S-U grades only.

**POLICY ANALYSIS AND MANAGEMENT**

R. Avery, chair (119A MVR, 255-2578); R. Geddes, director of undergraduate studies; D. Kenkel, director of graduate studies; W. White, director of Sloan Program; B. Hollis, executive director of Sloan Program; C. Calori, associate director of Sloan Program; H. Allen, J. Allen, R. Battistella, R. Burkhauser, J. Cawley, T. DeLara, R. Dunifon, N. Fabrizio, J. Gerner, K. Joyner, J. Kuder, J. Lewis, D. Lichter, C. Lucarelli, A. Mathios, J. Matsudarira, S. Nicholson, A. Parrot, E. Peters, P. Pollak, E. Rodriguez, W. Rosen, S. Sassler, W. Schlesinger, K. Simon, R. Swisher, S. Tennyson, D. Tobias, W. Trochim, S. Unur, M. Waller. Emeritus: R. Babcock, D. Barr, H. Biesdorf, W. K. Bryant, F. M. Firebaugh, J. Ford, J. Greene, A. Hahn, E. S. Maynes, C. McClintock, J. Mueller, L. Noble, J. Robinson, C. Shapiro, L. Street, B. L. Yerka, J. Ziegler

**PAM 200(2000) Intermediate Microeconomics**

Fall or spring. 4 credits. Prerequisite: ECON 101 or equivalent. Students must enroll in a sec. J. Cawley, W. Rosen, and S. Unur.

Topics include theory of demand and consumer behavior including classical and indifference curve analyses; theories of production and cost; models for the following markets—competitive, monopoly, monopolistic competition, oligopoly, and inputs; general equilibrium; welfare economics; public goods; and risk.

**PAM 204(2040) Economics of the Public Sector**

Fall or spring. 3 credits. Prerequisite: PAM 200. S-U grades optional. J. Lewis.

The public sector now spends nearly two out of every five dollars generated as income in the U.S. economy. A thorough knowledge and understanding of this important sector is an essential part of training in policy analysis and management. This course provides an overview of the public sector of the U.S. economy, the major categories of public expenditures, and the main methods used to finance these expenditures. The principles of tax analysis and cost-benefit analysis are presented with a focus on the role of public policy in improving economic efficiency, promoting the goals of equity and social justice, and improving equity by altering the distribution of wealth and income.

**PAM 210(2100) Introduction to Statistics**

Fall or spring. 4 credits. K. Joyner, J. Lewis, W. Rosen, R. Swisher, and S. Unur.

Introduces students to descriptive and inferential statistics. Topics include hypothesis testing, analysis of variance, and multiple regression. To illustrate these topics, this course examines applications of these methods in studies of child and family policy.

**PAM 215(2150) Research Methods**

Fall or spring. 3 credits. Prerequisite: PAM 210 or equivalent. S. Sassler and M. Waller. Students learn the logic and methods of social science research, as well as how to create researchable questions out of their issues of interest. Readings, written assignments, and in-class exercises focus on stating hypotheses, designing studies and samples to test hypotheses, measuring variables, and simple statistical analysis. PAM majors should take this course no later than their junior year.

**[PAM 222(2220) Controversies about Inequality (also PHIL 195(1950), SOC/D SOC 222(2220))]**

Spring. 1-3 credits. Not offered 2006-2007. Staff.

For description, see SOC 222.]

**[PAM 223(2230) Consumer Marketing]**

Fall. 4 credits. Offered alternate years; not offered 2006-2007. R. Avery.]

**PAM 230(2300) Introduction to Policy Analysis**

Fall or spring. 4 credits. R. Avery and J. Gerner.

Policy analysis is an interdisciplinary field that uses theories, concepts, and methods from disciplines such as economics, sociology, and political science to address substantive issues in the public policy arena. Students are introduced to the functions of and interactions between the major institutions (public and private) at the national, state, and local level involved in the policy making process. The course focuses on public policy analysis in the consumer, health, and family/social welfare areas and also includes an introduction to the technical skills required to undertake policy analysis.

**PAM 245(2450) Neighborhoods, Families, and the Life Course**

Spring. 3 credits. R. Swisher.

Considers the social policy implications of research on the effects of geographic inequalities (e.g., neighborhood poverty) on individual and family welfare across the life course. Emphasizes the consequences of neighborhood poverty in adolescence, explores the long-term effects of these early experiences for outcomes later in the life course, and contrasts them to those of working-class, middle-class, and more advantaged youth. Policy implication discussions include welfare reform, housing policy, racial and class segregation, the Moving to Opportunity demonstration program, school vouchers, and neighborhood programs aimed at promoting social capital and community policing.

**PAM 303(3030) Ecology and Epidemiology of Health**

Spring. 3 credits. S-U grades optional. Staff.

Covers ecological and epidemiological approaches to the problems that restrict human health within the physical, social, and mental environment. Introduces epidemiological methods and surveys the epidemiology of specific diseases such as AIDS, hepatitis, Legionnaires' disease, plague, cancer, herpes, and chlamydia. Discusses application of epidemiology to health care.

**PAM 305(3050) Introduction to Multivariate Analysis**

Fall or spring. 4 credits. Prerequisites: PAM 210, AEM/ILRST 210 or equivalent. Sec meets once a week. C. Lucarelli and W. Rosen.

Introduces basic econometric principles and the use of statistical procedures in empirical studies of economic models. Discusses assumptions, properties, and problems encountered in the use of multiple regression procedures. Students are required to specify, estimate, and report the results of an empirical model.

**[PAM 323(3230) Consumer Behavior**

Spring. 4 credits. Not offered 2006–2007.  
R. Avery.]

**PAM 334(3340) Corporations, Shareholders, and Policy**

Fall. 3 credits. Prerequisite: ECON 101. S-U grades optional. R. Geddes.

Uses economic analysis to study the interaction of the market, the corporation, and the law and how these interactions affect the well-being of shareholders and consumers. Examines the costs and benefits of the corporate form of organization. The legal institutions defining the corporation, such as limited liability and shareholder voting, are analyzed along with regulations governing these institutions. A particular focus is mechanisms that control the behavior of managers. Those mechanisms include hostile takeovers, insider trading, outside directors on the board, the role of large investors, and executive compensation plans. Additional topics include government ownership of corporations and nonprofit enterprises.

**PAM 335(3350) Low-Income Families: Qualitative and Policy Perspectives**

Spring. 3 credits. M. Waller.

Examines the experiences and challenges of low-income families in the contemporary United States as documented in qualitative and policy research. Also looks at policies designed to assist these families. Considers such topics as the characteristics and causes of poverty, changes in family structure and the emergence of "fragile families," nonresident fathers' relationships with their children, families' participation in the welfare system and low-wage labor market, and socioeconomic variations in parenting and child well-being.

**PAM 336(3360) Evolving Families: Challenges to Family Policy (also SOC 336[3360])**

Fall. 3 credits. S. Sassler.

This course examines the social institution of the family, challenges to the institution's well-being and stability, and the role of public policy in these transformations. Topics include family structure and responsibilities; marriage as a traditional building block of the family and challenges to the institution of marriage, including divorce, nonmarital childbearing, cohabitation, and same-sex unions; children, and the impact of family change on their well-being, including the effects of child poverty, maternal employment, and paternal involvement. The role of public policy in managing and shaping these developments will be discussed.

**PAM 337(3370) Racial and Ethnic Differentiation (also SOC 337[3370])**

Spring. 3 credits. S. Sassler.

This course provides an overview of perspectives used in sociological studies of race and ethnicity. We will read classic and contemporary research on racial and ethnic relations in the United States. The first part of the course covers a variety of theories on race/ethnic relations and addresses issues related to the social construction of race, racial

identities, and the impact of immigration on racial dynamics. We next examine racial and ethnic inequality in social and demographic outcomes. The course concludes with readings that explore interracial contact and multiracial populations.

**PAM 340(3400) The Economics of Consumer Policy**

Fall. 4 credits. Prerequisite: PAM 200 or permission of instructor. S. Unur.

Familiarizes students with the economic analysis of consumer policy issues. Uses the tools of microeconomic analysis to investigate the interaction between government and the marketplace, with an emphasis on how that interaction affects consumers. Examines the rationale for and effects of regulation of industry. Considers alternative theories of regulation, including the capture, economic, and public interest theories. Applies those theories to specific types of regulation, including economic regulation of specific industries (e.g., telecommunications, electricity, trucking, railroads, postal services) as well as to broader social regulation (e.g., health, safety, environmental). The effects of regulatory reform in numerous industries are also examined. An attempt is made to examine current topics relating to consumer policy.

**PAM 341(3410) Economics of Consumer Law and Protection**

Spring. 3 credits. Prerequisite: ECON 101 or equivalent. S-U grades optional. J. Gerner.

Economic analysis of the roles played both by the courts and by federal and state regulatory legislation in altering consumer markets, consumer behavior, and consumer welfare. Topics include economic analyses of contract law, product liability, accident law and antitrust law, and the activities of such agencies as the Federal Trade Commission, the Food and Drug Administration, and the Consumer Product Safety Commission.

**PAM 346(3460) Economics of Social Security (also ECON 447[4470])**

Fall. 3 credits. Prerequisite: PAM 200. S-U grades optional. R. Burkhauser.

Provides students with an economic perspective on social security policies. The readings illustrate the use of economic analysis to predict the behavioral effects and income distributional consequences of policy. Focuses primarily on the Old-Age, Survivors, and Disability Insurance Program but also discusses other programs such as the Supplemental Security Income and mandates, for example, the Americans with Disabilities Act, that affect the aged and those with disabilities.

**PAM 350(3500) Contemporary Issues in Women's Health**

Fall. 3–5 credits. A. Parrot.

Deals with the history of women in medicine and the historical and cultural treatment of women's health problems. Also addresses health care research and the exclusion of women from research trials and protocols. Reproductive issues, alternative approaches to treatment, medical problems, ethical issues, cancers, factors that contribute to post-traumatic stress disorders, health promotion behaviors, political issues, and routine medical recommendations are also discussed in depth. Students may take the course for a fifth credit, which requires attending a discussion section every other week and observing 12

facilities (e.g., birthing center, mammogram, and ultrasound center, wellness center, hospital labor and delivery unit, LaMaze class, women's self defense class) that provide a variety of women's health care. Some of these visits will be virtual visits available through the course web site, others will require in-person attendance.

**PAM 371(3710) Demography and Family Policy**

Fall. 3 credits. K. Joyner.

Examines from a demographic perspective family policies that concern children and adults. Toward this end, it considers the relationships between family policies and demographic behavior. It also addresses the effects of family policies and demographic behavior on the well-being of children. Although this course focuses on the United States, it considers U.S. trends against the backdrop of changes in other industrialized countries.

**PAM 380(3800) Human Sexuality**

Spring. 4 credits. Limited to 150 students. Prerequisite: introductory course in human development and family studies, psychology, or sociology (or equivalent social science course). Recommended: biology course. Two 75-minute lec and one sec per week. A. Parrot.

Provides students with an understanding of the interactions and interrelationships of human behavior that influence sexual development and behavior. Focuses on the evolution of sexual norms, cross-cultural customs, legislation within changing sociopolitical systems, and delivery of services related to sexual issues, needs, and/or problems. Addresses future trends in sexuality.

**PAM 383(3830) Social Welfare as a Social Institution**

Fall. 4 credits. S-U grades optional. J. Allen.

Provides a philosophical and historical orientation to social welfare policy, programs, and services. Examines the social, political, and economic contexts within which social welfare policies have evolved in the United States. Analyzes the ideological, political, and social processes through which public policy is formed and focuses on the significance of social justice, social and economic disparities, and the process by which public policies are translated into social welfare programs. The importance of a global perspective is emphasized in the context of present program design, public concerns, interrelationships, and human need.

**PAM 392(3920) New York State Government Affairs: Capital Semester in Albany**

Spring. 15 credits; for HE students, 7 credits count toward outside-the-major requirement; for PAM majors, credits satisfy capstone requirement and 7 additional PAM credits. Prerequisite: permission of instructor; sophomores, juniors, and seniors with minimum 2.3 GPA. W. Rosen. Students participate in either the New York State Assembly or New York State Senate Intern Programs. Internships include research on legislation, support for legislator initiatives and public hearings, work on constituent and interest group issues, and other tasks. Students also participate in one "in-residence" course, and Cornell students also participate in a seminar conducted by W. Rosen. Students earn \$3,500 stipend.

**PAM 400-401-402-403(4000-4010-4020-4030) Special Studies for Undergraduates**

Fall and spring. Credit TBA. S-U grades optional. Staff.

For advanced independent study by an individual student or for study on an experimental basis with a group of students not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department field office. This form must be signed by the instructor directing the study, the student's faculty advisor, and the department head and filed at course registration or within the change-of-registration period in the college registrar's office, 145 MVR. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the department chair is necessary. Students, in consultation with their faculty supervisor, should register for one of the following subdivisions of independent study.

**PAM 400(4000): Directed Readings.** For study that predominantly involves library research and independent reading.

**PAM 401(4010): Empirical Research.** For study that predominantly involves data collection and analysis.

**PAM 402(4020): Supervised Fieldwork.** For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

**PAM 403(4030): Teaching Apprenticeship**  
Prerequisite: course (or equivalent) in which student is assisting and has demonstrated high level of performance.  
For study that includes assisting faculty with instruction.

**PAM 406(4998) Politics and Policy: Theory, Research, and Practice (also GOVT 500[4998], ALS 500[4998], AM ST 501[4998])**  
Fall, spring. Taught in Washington, D.C. For description, see GOVT 500.

**PAM 423(4230) Risk Management and Policy**  
Spring. 3 credits. Prerequisite: ECON 101 and statistics course. S. Tennyson.  
Provides students with a broad understanding of risk management problems and solutions, a greater appreciation of the importance of risk and risk regulation in our society, and increased comprehension of the complexities of making decisions about risk. Topics include alternative ways to define and measure risk, the importance of risk-tradeoffs, and models of decision making under risk. With this background, alternative approaches to risk management are analyzed. The impact on risk management of the legal liability system and government programs, laws, and policies is also considered.

**PAM 435(4350) The U.S. Health Care System**  
Fall. 3 credits. R. Battistella.  
Introduction to the health care delivery systems in the United States. Covers the interrelatedness of health services, the financing of health care, and the key

stakeholders in health care delivery, including regulators, providers, health plans, employers, and consumers. Describes the history and organization of health care, behavioral models of utilization, issues of health care reform, and current trends. Provides an overview of the key elements of the field including ambulatory care services, mental health services, hospitals and clinicians, insurers, the role of public health organizations, and the politics of health care in the United States.

**PAM 437(4370) Economics of Health Policy**  
Spring. 3 credits. Prerequisite: ECON 101 or equivalent. S-U grades optional. K. Simon.

Uses the economic tools of policy analysis to understand the health care system and critically evaluate current policy debates. In the past decade, some of the most controversial policies considered by state and federal governments have involved issues that have been studied by health economists and health services researchers. Uses the United States as its main institutional framework but also pays attention to health care topics of international concern, such as the AIDS epidemic.

**PAM 440(4400) Critical Perspectives**  
Fall. 3 credits. J. Allen.  
Presents an overview of different perspectives on U.S. social policies and programs with an emphasis on health, education, social welfare, family, and consumer issues. Analyzes and contrasts historical, social, scientific, and personal perspectives. Students explore the inevitability and legitimacy of diverse perspectives on social conditions, policies, and programs. Students also gain knowledge about the social contexts, conditions, policies, and programs presented; critically analyze them; employ the conceptual frameworks presented; and evaluate policy debates by applying these insights.

**[PAM 441(4410) Evidence-Based Practice**  
Spring. 3 credits. Prerequisite: PAM seniors. Not offered 2006-2007. W. Trochim.]

**PAM 444(4440) Violence against Women: Policy Implications and Global Perspectives (also FGSS 448[4480])**  
Spring. 3 credits. A. Parrot.  
Focuses on the historical and current reasons for and impact of the alarming rate of violence against women both domestically and internationally. Considers the impact of legislative, public, social, or religious policies on the incidence of such violence. Considers rape, child sexual abuse, homicide, battering, hate crimes, gay bashing, kidnapping, ethnic cleansing, war crimes, forced prostitution, female genital mutilation, honor killings, public beating, lashing, stoning, torture, female infanticide, trafficking of women, forced abortions, acid attacks, sexual slavery, and sati (self-immolation). Each student is required to evaluate the impact of one current policy and critique the potential value of one pending policy relating to violence against women.

**[PAM 457(4570) Innovation and Entrepreneurship in the Health Care Industry**  
Spring. 3 credits. Prerequisite: PAM 435 or permission of instructor. Not offered 2006-2007. J. Kuder.]

**[PAM 461(4610) Public Policy and Marketing**  
Fall. 3 credits. Prerequisites: PAM 200 and 305. Not offered 2006-2007. A. Mathios.]

**[PAM 462(4620) The Welfare of America's Children**  
Spring. 3 credits. Not offered 2006-2007. J. Allen.]

**PAM 473(4730) Social Policy**  
Spring. 3 credits. Prerequisites: GOVT 111 or SOC/D SOC 105 or permission of instructor. S-U grades optional. J. Allen.  
Examines the policy process and the significance of national policies as they affect the distribution of resources and services. Uses several analytical frameworks to evaluate social programs and service delivery systems in selected policy areas, including education, economic and social security, juvenile justice, child welfare, health, mental health, and housing. Explores implications for change and the significance of current competing policy priorities at the state and local levels. Field experiences in the Ithaca community are encouraged.

**PAM 498(4980) Honors Seminar**  
Fall. 3 credits. Prerequisites: PAM 210 and PAM 305. Letter grades only. J. Gerner.  
Designed to help guide students through the development of their honors thesis. The objective of the course is to help students frame a research question that is appropriate for an honors thesis, identify an appropriate methodology to use in answering this question, identify data that can be used to answer this question, and identify literature appropriate to this question. Students will also work collaboratively in critiquing research questions and techniques to be used. Students will meet in a seminar style class each week and will also meet with the students individually and with their research mentor throughout the semester as they work on their thesis question and methods. Students who wish to participate in the PAM Honors Program must enroll in this course during their senior year. Students must receive a grade of B or better to continue in the Honors Program.

**PAM 499(4990) Honors Program**  
Fall or spring. Credit TBA. Prerequisite: PAM 498. Letter grades only. PAM faculty.  
Provides students with the opportunity to undertake basic or applied research that will be preparation of a thesis representing original work of publishable quality. Intended for students who desire the opportunity to extend their interests and efforts beyond the current course offerings in the department. Furthermore, the program is designed to offer the student the opportunity to work closely with a professor on a topic of interest. The number of hours of thesis credit is determined by the student's research mentor. See Professor Rick Geddes for more details.

**PAM 547(5470) Microeconomics for Management and Policy**  
Spring. 4 credits. S-U grades optional. W. White.

Introduces microeconomic theory and its application to decision making in the management and policy arenas. Places special emphasis on the economic environment of health care organizations and the problems faced by managers in this environment.



**PAM 552(5520) Health Care Services: Consumer and Ethical Perspectives**

Fall. 3–4 credits; 4-credit option may be used as Biology and Society senior seminar option. Limited to 30 students. Prerequisite: undergraduates by permission of instructor. A. Parrot.

Focuses on consumer and ethical issues faced by professionals in the health care field today. Broad topics discussed include ethical standards and guidelines, health care costs and accessibility of services, government role in health care delivery, health care as a right or privilege, private industry role in health care, services for the medically indigent and elderly, practitioner burnout and training, ethics of transplant surgery and funding, reproductive technology, AIDS research and funding, animals in medical research, right to die, and baby and granny Doe cases.

**[PAM 554(5540) Legal Aspects of Health Care]**

Spring. 3 credits. Prerequisites: PAM 557 or permission of instructor. Offered alternate years; not offered 2006–2007. H. Allen.]

**[PAM 556(5560) Managed Health Delivery Systems: Primary–Ambulatory Care]**

Fall. 3 credits. Prerequisite: PAM 557 or permission of instructor. Not offered 2006–2007. J. Kuder.]

**PAM 557(5570) Health Care Organization**

Fall. 3 credits. Limited to 30 students.

Prerequisite: Sloan students or permission of instructor. R. Battistella.

Graduate-level introduction to the organization of health providers in the United States, the interrelationships of health services and the major sources and methods of paying for care. Describes how health services are structured in the United States and how these different services interrelate along the continuum of care. Describes and analyzes organization, delivery, and financing issues from a variety of perspectives using specific performance criteria (e.g., equity, quality, efficiency). Also presents innovations by the public and private sectors in the delivery and reimbursement of health care.

**PAM 558(5580) Field Studies in Health Administration and Planning**

Fall or spring. Fall, 1 credit; spring, 3 credits; 4 total credits. Capstone course for second-year Sloan students. Staff.

Students interested in developing administrative and program-planning research skills are given an opportunity to evaluate an ongoing phase of health care agency activity in the light of sound administrative practice and principles of good medical care. In planning and carrying out the research, students work closely with a skilled practicing administrator and with members of the faculty.

**PAM 559(5590) Epidemiology, Clinical Medicine, and Management Interface Issues**

Spring. 3 credits. Staff.

Explores, from an empirical and analytical framework, the relationships between epidemiology, clinical medicine, and management. Reviews the epidemiology, policy issues, and treatment of selected diagnoses accounting for a significant percentage of utilization and cost of health care services. In addition, students have an opportunity to explore issues of resource allocation and continuous quality improvement. The format is lecture, discussion, and case analysis.

**[PAM 561(5610) Economics of Health and Medical Care]**

Fall. 3 credits. Not offered 2006–2007. J. Kuder.]

**PAM 562(5620) Health Care Financial Management I**

Spring. 3 credits. S. Nicholson.

Provides a framework for evaluating how a firm should make investment and financing decisions to create value for its shareholders or stakeholders. Most of the course focuses on profit-maximizing firms, although it also discusses whether and how the investment and financing decisions are different for nonprofit firms that are prevalent in the health care industry. Therefore, this is primarily a course on general corporate finance. Specifically, the course discusses why the net present value (NPV) of discounted cash flows is the best investment criterion; calculates NPVs; derives appropriate discount rates; estimates the value of bonds, stocks, and options; and determines the optimal amount a firm should borrow. To understand how firms make investment and financing decisions, it considers how financial markets function and how investors in those markets should make decisions.

**PAM 563(5630) Health Care Financial Management II**

Fall. 3 credits. Prerequisite: PAM 562 or other financial management course. S. Nicholson.

Focuses on the financial analyses that managers in the health care industry use to make strategic and operating decisions. Begins by examining how health insurers design and price their products and manage enrollees' medical expenditures. Next reviews two different methods of valuing a medical product/service, and two methods of estimating the value of a company. The four valuation methods covered are: net present value of free cash flows, decision tree analysis/real options, multiples, and the venture capital method. Seven cases allow students to apply these skills to examine decisions/situations such as: determining why a Medicare HMO is losing money and recommending a redesigned benefit and reimbursement structure; estimating a health system's profitability by product line; valuing a pharmaceutical company; determining whether a medical device company should go public and how it should price its products.

**PAM 564(5640) Information Resources Management in Health Organizations**

Spring. 3 credits. Prerequisite: strong basic computer skills. S-U grades optional. S. Nicholson.

Graduate course in health administration. Exposes students to the opportunities and challenges inherent in the use of health management information systems (HMISs) in clinical and nonclinical applications. Focuses on the manager's role in the application of HMISs to solve problems and address concerns in today's health care service industry. Students learn how an HMIS can enhance the ability to appraise multiclinical and nonclinical services of care.

**PAM 566(5660) Strategic Management and Organizational Design of Health Care Systems**

Fall. 3 credits. T. deLara.

Examines strategy and design issues faced by health care organizations. Topics include analysis of market conditions,

organizational culture issues, development of an organizational mission and management strategy, the management of professionals, and the importance of roles, structure, and inter- and intra-institutional relationships within organizations. Taught via a case study approach.

**PAM 567(5670) Health Policy**

Fall. 3 credits. Prerequisite: Sloan MHA students, Ph.D. students, or permission of instructor. K. Simon.

Addresses major health policy issues and the critical processes that influence them. Focuses primarily on the United States, with some coverage of health policy in other countries. Topics include Medicare, Medicaid, the uninsured, public health, the effect of welfare policy on health care, managed care development and regulation, state and federal health care reform, and many others. The course analyzes the politics of health policy in terms of legislative and executive processes; the forces involved including economic, social, ethical, and political factors; and key players in health policy, such as special interest groups, public agencies, and elected officials.

**PAM 569(5690) Regression Analysis and Managerial Forecasting**

Fall. 3 credits. Prerequisite: at least one statistics course. C. Lucarelli.

Teaches various statistical methods for managerial decision making, with a particular emphasis on regression and forecasting. Other topics include ANOVA, correlation, confounding, interaction, and statistical process control. Emphasizes applications to health care organizations.

**PAM 570(5700) Health Care Accounting**

Fall. 4 credits. Core course for Sloan MHA students. W. Schlesinger.

Introduces the basic concepts of financial and managerial accounting with emphasis on health care applications. Explains the measurement system of business operations, business valuation, financial reporting, budgeting, cost allocation, service and product costing, and special reports for managerial use. Ethical and international issues are integrated throughout the course materials with real world applications. At the conclusion of the course, students should be able to read, understand, and analyze the annual financial reports of an organization. Collaborative learning, cases, discussions, readings, researches, presentation, speakers, problem solving, videotapes, and lectures are used as teaching pedagogy.

**PAM 571(5710) Organizational Development/Human Resource Management in Health Care Organization**

Fall. 3 credits. Prerequisite: graduate standing. N. Fabrizio.

Explores (1) the theoretical foundation of organizational theory, research, and human resource management with an emphasis on implementation; (2) real-world problems while analyzing, exploring, and discussing varied interpretations of selected cases; (3) the building blocks of managerial activity; internal organizational issues; performance issues related to organization design; and strategic issues. Key organizational change and development concepts enhance students' perspectives on how the theories, strategies, and practices relate to today's organizations. The course serves as a framework to



establish the theory and both the conceptual and competency foundations necessary for applying interventions.

**[PAM 572(5720) Economic Evaluations in Health Care]**

Fall. 3 credits. Recommended: background in microeconomics and statistical tools. S-U grades optional. Not offered 2006-2007. D. Kenkel.]

**PAM 574(5740) Short Course in Fundamentals of Health Facility Planning for Managers**

Spring. 1 credit. B. Hollis.

Provides MHA and other students who may be interested in careers in health care management with a basic familiarity regarding some of the concepts and terminology related to health facility planning projects. The course will touch on areas that a manager might encounter, including working with designers, the relationship between strategic planning issues and facility planning, basic cost estimating techniques, simplified plan interpretation, and use of architectural and engineering scales. The course will have two primary components. One portion will be lectures and hands-on demonstrations on plan reading/measurements and an overview of the process of project planning. We anticipate a tour of an active or recently completed project at either Cornell or Cayuga Medical Center as time allows. The other will involve live or videoconference presentations from invited practitioners and researchers in the health facilities area.

**PAM 576(5760) Long-Term Care and Life Style Alternatives for the Older Adult**

Spring. 1 credit. M. Weidner.

Provides students exposure to, and fosters critical thinking about policy, and operational issues related to health care and living alternatives for the well, near frail and frail older adult. Preliminary readings will introduce the student to societal issues of the aging, clinical issues facing the older adult, and management operations for nursing homes, independent living communities, assisted living, and home care. Emphasis will be placed on student interaction with instructors and other seminar participants regarding society and management issues. Case studies will be used to enhance student interaction and participation.

**PAM 577(5570) Marketing for Health Care Managers**

Spring. 3 credits. Prerequisites: microeconomics and permission of instructor. D. Perosio.

Introduces students to the substantive and procedural aspects of marketing strategy and management. The course is designed to convey the key concepts of marketing and how they fit into the larger context of overall management strategy and decisions. Both the practical "how" and the fundamental "why" of marketing activities will be explored. Course examples rely heavily on actual situations and experiences in the health care industry. Students will apply their knowledge of marketing and health care management to the development of a marketing plan.

**PAM 600(6000) Special Problems for Graduate Students**

Fall and spring. Credit TBA. S-U grades optional. Staff.

Independent advanced work by graduate students recommended by their chair and

approved by the department chair and the instructor.

**PAM 601(6010) Policy Process and Theory**

Fall. 3 credits. R. Swisher.

Introduces students to the policy process model, of goal setting and problem formulation, identification of policy alternatives, cost-benefit analysis and policy selection, implementation, monitoring, and feedback. At each stage, students read and discuss theoretical contributions from across the social sciences and political philosophy that help to contextualize and "socially embed" this mainstream, microeconomics-driven model. Such contributions include notions of bounded-rationality, satisficing, incrementalism, and muddling-through from organizational behavior; heuristics and biases from social psychology; theories of justice from political philosophy; habitus and other pragmatic logics from anthropology; and concepts such as bureaucracy, power, status, symbolic interaction, and social learning from sociology and psychology.

**PAM 603(6030) Experimental, Quasi-Experimental, and Economic Evaluation Methods**

Spring. 3 credits. Highly recommended: background in statistics (e.g., BTRY 601 or equivalent) and microeconomics (e.g., PAM 200, PAM 547, or ECON 639). E. Peters.

Focuses on quantitative methods of policy analysis and program evaluation, with an emphasis on those programs and policies that are related to health, family, and consumer issues. The first part of the course covers experimental design and methods of making causal inferences from non-experimental data. The second part covers benefit-cost analysis, explicitly incorporating both equity and efficiency considerations. Throughout the course attention is paid to the role of economic modeling in program evaluation, including the role of structural theoretical models and general equilibrium analysis.

**PAM 604(6040) Qualitative, Survey, and Mixed-Method Approaches to Policy Research**

Spring. 3 credits. Prerequisite: Ph.D. students. Highly recommended: previous course in social science research methods. M. Waller.

Introduces students to theories and methods of data collection techniques such as in-depth interviews, ethnography, focus groups, and surveys as well as mixed-method approaches used in policy and evaluation research. Addresses the strengths and weaknesses of various methods and the design of qualitative and mixed-method studies. Covers epistemology, ethics, induction and deduction, measurement, validity, and triangulation. Also discusses more concrete issues such as gaining access to a field site, developing a qualitative interview guide and survey questionnaire, conducting a qualitative interview, managing data, and assessing data quality.

**[PAM 605(6050) Economics of Family Policy]**

Fall. 3 credits. Prerequisite: PAM 639 or ECON 609 or permission of instructor. S-U grades optional. Not offered 2006-2007. E. Peters.]

**PAM 606(6060) Demographic Techniques (also D SOC 608(6080))**

Fall. 3 credits. S-U grades optional.

D. Gurak and K. Joyner.

For description, see D SOC 608.

**PAM 608(6080) Economics of Consumer Demand (also AEM 670(6700))**

Fall. 3 credits. Prerequisite: PAM 200, ECON 313, or concurrent enrollment in one of those, and two semesters of calculus. S-U grades optional. C. Ranney.

For description, see AEM 670.

**PAM 611(6110) Social Demography**

Fall. 3 credits. Prerequisites: STBTRY 601, SOC 505, or equivalent. K. Joyner.

Considers demographic behavior from a sociological perspective. Topics include fertility, cohabitation, marriage, divorce, inequality, immigration, and health. Close attention is paid to the effects of social policies on demographic behavior. To a lesser extent, this course addresses the effects of social policies and demographic behavior on individual well-being. Although a background in demographic methods is not required, some of the assigned articles are based on these methods.

**[PAM 631(6310) Ethics, Public Policy in American Society]**

Fall. 3 credits. Prerequisite: senior or graduate standing. Not offered 2006-2007. J. Ziegler.]

**PAM 632(6320) The Intergovernmental System: Analysis of Current Policy Issues**

Fall. 3 credits. Prerequisite: graduate students or seniors who have had course in American government. J. Ziegler.

Offers advanced policy analysis of current political/social/economic issues in the context of the intergovernmental system. Pays particular attention to how certain policy and human service issues are played out at the federal, state, and local levels of government, and to the formulation of federal and state budget policy. Considers general public administration theory. Students work in teams on a policy/administrative research project and report to the class.

**PAM 633(6330) Seminar in Pharmaceutical Policy Issues**

Fall. 2 credits. S-U grades optional. Meets once a week. S. Tennyson.

Exposes students to, and fosters critical thinking about, consumer and health policy issues related to pharmaceuticals and the pharmaceuticals industry. A key component of the seminar is invited presentations from practitioners and researchers in pharmaceutical policy. Specific topics vary and depend in part on the interests of the invited speakers. Students are required to write critiques of invited papers and a literature review on a selected topic in pharmaceutical policy.

**[PAM 639(6390) Microeconomics for Policy Analysis]**

Fall. 4 credits. Prerequisites: intermediate economics and calculus course; Ph.D. students; undergraduates by permission of instructor. Not offered 2006-2007. J. Cawley.]

**[PAM 640(6400) Consumers, Information, and Regulatory Policy]**

Spring. 3 credits. Prerequisites: PAM 639 or calculus and intermediate microeconomics. Not offered 2006–2007. R. Geddes.]

**PAM 691(6910) Health Economics I (also ECON 691[6910])**

Spring. 3 credits. First course in Ph.D.-level health economics sequence. Prerequisites: Ph.D.-level courses in microeconomic theory and econometrics. J. Cawley.

Comprehensive course covering microeconomic theory and its application to health and health care markets. Topics include consumer decision making, the theory of the firm, welfare economics, monopolies and oligopolies, and market imperfections. Applications in health economics include the demand for health, rational addiction, the industrial organization of health care, cost-effectiveness analysis, price discrimination by health care providers, how consumers respond to information about health care, adverse selection in health insurance, and the moral hazard created by physician compensation strategies. Each student writes a research paper, testing predictions from microeconomic theory by acquiring suitable data and estimating the appropriate econometric model, and presents his or her findings in a research seminar.

**PAM 692(6920) Health Economics II**

Fall. 3 credits. Prerequisites: Ph.D.-level courses in microeconomic theory and econometrics. D. Kenkel.

Covers microeconomic theory and its applications to health and health care markets. Topics include consumer demand for health and health behaviors, the supply side of health promotion, the industrial organization of health care, and cost-benefit and cost-effectiveness analysis of health interventions. Second course in Ph.D.-level health economics sequence, but the courses may be taken in any order.

**PAM 760(7600) Challenges and Trends in the Health Services Industry**

Fall and spring. 1 credit. Prerequisite: graduate standing or permission of instructor. S-U grades only. W. White.

Provides students with information and exposure to current and emerging issues in the health services industry. Topics may include financial management of health care facilities, human resource management, information systems, cost-effective clinical decision making, quality measurement and outcomes, public health, and entrepreneurship in the health services industry.

**PAM 899(8990) Master's Thesis and Research**

Fall and spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional.

**PAM 999(9990) Doctoral Thesis and Research**

Fall and spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional.

**TEXTILES AND APPAREL**

A. Lemley, chair (209 MVR, 255-3151); C. C. Chu, director of graduate studies; A. Netravali, director of undergraduate studies; S. Ashdown, N. Breen, C. Coffman, M. Frey, J. Hinestroza, C. Jiousek, V. D. Lewis, S. Loker, S. K. Obendorf, A. Racine

**TXA 114(1140) Introduction to Computer-Aided Design**

Fall. 3 credits. Limited to 14 students per sec. Priority given to TXA students. S-U grades optional. Minimum cost of materials: \$80. A. Racine.

Studio course that explores the creative potential of microcomputers. Uses AutoCAD software program as a design tool for generating a wide variety of visual images. Introduces basic Photoshop software commands. Includes daily hands-on demonstrations and studio work. Students develop two- and three-dimensional designs based on historical, cultural, and museum sources for portfolios and display.

**TXA 117(1170) Fashion Graphics (Drawing the Clothed Figure)**

Spring. 3 credits. Limited to 21 students. Priority given to apparel design students. Prerequisite: basic drawing course. Letter grades only. Minimum cost of supplies: \$125; lab fee: \$30. V. D. Lewis.

Students develop both familiar and unfamiliar methods that enable them to draw the fashioned body and ancillary expressions of fashion. Drawing is explored as a communicative medium for visual research and as a creative tool for image creation.

**TXA 125(1250) Art, Design, and Visual Thinking**

Fall. 3 credits. S-U grades optional. C. Jiousek.

Introduction to the visual arts and design that explores aesthetic and cross-cultural dimensions of visual experience. Augmented by slide presentations, artifacts, video, and an Internet-based electronic textbook, lectures emphasize the varieties of visual expression seen in works of art and design. Discusses social, cultural, and historic interpretations of visual expression.

**TXA 135(1350) Fibers, Fabrics, and Finishes**

Spring. 3 credits. S-U grades optional. M. Frey.

Introduction to fibers, fibrous materials, and dyes and finishes. Gives special emphasis to the use of fibrous materials in apparel, residential and contract interiors, and industrial applications. Topics include fiber properties, fabric structure, coloration of fibrous materials, dimensional stability, flammability, product specifications, and performance standards.

**TXA 136(1360) Fiber and Yarn Analysis Laboratory**

Spring. 1 credit. Corequisite: TXA 135. Letter grades only. M. Frey.

Consists of 14 laboratory sessions, in which students learn techniques to identify and test fibers and yarns. A midterm and final exam are based on using the methods learned to identify an unknown fiber (midterm) and an unknown bi-component yarn (final).

**TXA 145(1450) Introduction to Apparel Design**

Spring. 4 credits. Limited to 30 students; 15 per lab. Priority given to TXA students and students transferring into TXA. Prerequisite: TXA 114. Letter grades only. Apparel design majors should take course during first year. Minimum cost of materials: \$200. A. Racine.

Intensive study of principles and processes of flat-pattern design with emphasis on creative expression in children's apparel. Students develop an understanding of the techniques needed to produce apparel from sketches, including patternmaking and garment assembly.

**TXA 237(2370) Structural Fabric Design**

Fall. 3 credits. Prerequisite: TXA 135. Recommended: college algebra. S-U grades optional. M. Frey.

Covers the elements of technical fabric design with an emphasis on woven and knitted fabrics. Topics include structure of woven and knitted fabrics, openness, manufacturability, equivalence, and color effects.

**TXA 264(2640) Draping**

Fall. 4 credits. Limited to 30 students; 15 per lab. Prerequisites: TXA 125 and 145. Recommended: drawing course. Letter grades only. Minimum cost of materials: \$250; lab fee: \$10. S. Ashdown.

This studio course examines the process of creating a three-dimensional garment from the two-dimensional fabric. The principles and processes of draping, advanced flat pattern making, and fitting are studied through projects. Drawing exercises focus on the communication of three-dimensional garments in two-dimensional sketches. Assigned problems require students to make judgments regarding the design process, the nature of materials, body structure, function, and fashion.

**TXA 265(2650) Apparel Patternmaking**

Spring. 3 credits. Limited to 30 students. Prerequisites: TXA 114, 117, 125, 145, and 135 (may be taken concurrently). Letter grades only. Minimum cost for fabrics, studio, and portfolio supplies: \$250. A. Racine.

The goal of this apparel studio course is to expand student competencies in flat pattern design and analysis and fitting techniques. Students generate original design concepts using fashion sources from historic to contemporary times. The Cornell Costume Collection is used for inspiration and instruction. Full-scale samples in various levels of completion, from paper patterns to muslins to finished garments, include detailed technical drawings for portfolios.

**TXA 266(2660) Apparel Design: Product Development**

Spring. 3 credits. Prerequisites: TXA 114, 145; and TXA 117 and 265 (may be taken concurrently). Letter grades only. Minimum cost of materials: \$250; lab fee: \$10. S. Ashdown.

Project-based course in which students explore the relationship between technology and design. Students learn computer-aided patternmaking, grading, manufacturing technologies, communication of technical details, flats, specifications, and costing of garments and how those factors affect design. Designs are developed to various stages from conceptual work to final garment.

**TXA 300(3000) Special Studies for Undergraduates**

Fall or spring. Credit TBA. Staff.  
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the college registrar's office. The form, signed by both the instructor directing the study and the department chair, is filed at course registration or during the change-of-registration period.

**[TXA 325(3250) Color and Surface Design of Textiles**

Fall. 4 credits. Was TXA 225. Limited to 18 students. Priority given to TXA apparel design majors. Recommended: TXA 114 and 135. Minimum cost of materials: \$100; lab fee: \$75. Next offered 2007-2008. C. Jirousek.

Studio experience in textile surface design and color theory. Students produce a portfolio of textile design technique samples, color exercises, and a final yardage project.]

**TXA 335(3350) Fiber Science**

Fall. 3 credits. Limited to 20 students. Prerequisites: college chemistry and physics. S-U grades optional. A. Netravali.  
Covers fibers commonly used in various engineering, medical, and apparel applications. Topics include the nature of polymer molecules, the chemical structure of organic fibers, inorganic fibers, micro-macro structure of fibers, fiber dimensions, environmental effects, and mechanical, optical, thermal, and frictional properties of fibers. The following fiber uses are discussed: composites in aerospace and other structural components, circuit boards, bulletproof vests, sutures, artificial arteries, geotextiles, sporting goods, and others.

**[TXA 336(3360) Fundamentals of Color and Dyeing**

Fall. 3-4 credits. 3 credits for lec only; 4 credits for lec and lab. Fiber science students required to take lab. Prerequisite: college natural science requirements. S-U grades optional. Lab fee: \$15. Next offered 2008-2009. C. C. Chu.

Theories and scientific principles of color for design, marketing, or research. Addresses how colorants are used to dye fabrics. Includes guest lecturers from the industry.]

**TXA 346(3460) Design Process**

Fall. 4 credits. Limited to 30 students. Prerequisites: TXA 135, 145, 264, and 265. Letter grades only. Minimum cost of materials: \$250; lab fee: \$10. V. D. Lewis.  
Exposition of the methods used by the creative fashion designer. Aims to develop students' personal handwriting as designers. Unites a provocative design issue with the requirement of functionality and emphasizes pattern cutting as a way of realizing design ideas.

**TXA 369(3690) Style, Fashion, and the Apparel Industry**

Fall. 2 credits. Was TXA 269. Limited to 30 students. Not open to freshmen. Prerequisites: TXA 125, 135, and 237. Priority given to TXA majors. Letter grades only. A. Racine.

Illustrated lectures focus on changes in the U.S. apparel industry and fashion from the 19th century to the present day resulting from social forces, technological developments, and

shifting demographics. The Cornell Costume Collection is used for discussion. Students write a term paper on issues relating to the fashion industry.

**TXA 370(3700) History of Color and Design in Textiles**

Fall. 3 credits. Prerequisite: TXA 125 or permission of instructor. S-U grades optional. Offered alternate years. C. Jirousek.

Explores color theory principles, color trends, science and technology of color measurement, color and design in textile construction and embellishment, design use of pigments and dyes, and history of textile design as a designer resource. Students complete hands-on exercises, two exams, and a paper.

**TXA 400-401-402-403(4000-4010-4020-4030) Special Independent Studies for Undergraduates**

Fall, summer, or spring. Credit TBA. S-U grades optional. Staff.

For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of TXA not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department office. This form must be signed by the instructor directing the study and the department chair and filed at course registration or within the change-of-registration period after registration along with an add/drop slip in the college registrar's office (145 MVR). To ensure review before the close of the course registration or change-of-registration period, early submission of the special-studies form to the department chair is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study.

**TXA 400(4000): Directed Reading.** For study that predominantly involves library research and independent reading.

**TXA 401(4010): Empirical Research.** For study that predominantly involves data collection and analysis, or laboratory or studio projects.

**TXA 402(4020): Supervised Fieldwork.** S-U grades only. For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

**TXA 403(4030): Teaching Apprenticeships.**

Fall or spring. 2-4 credits. Prerequisites: upperclass standing, demonstrated high level of performance in subject to be taught and in overall academic program, and permission of instructor and department chair. S-U grades optional. Staff. Apprenticeship includes both a study of teaching methods in the field and assisting the faculty with instruction.

**TXA 431(4310) Apparel Production and Management**

Spring. 3 credits. Limited to 40 students. Prerequisites: ECON 101 and 102 and upper-division course in either apparel or textiles. S-U grades optional. Staff.  
Introduction to the global textile and apparel industry, particularly the technical and economic aspects of apparel production. Includes analysis of specific apparel manufacturing and management issues such as

international sourcing, Quick Response, mass customization, production and information technology, labor, and logistics.

**TXA 432(4320) Product Quality Assessment**

Spring. 3 credits. Limited to 36 students in lec, 18 per lab. Prerequisites: TXA 135 and statistics course. S-U grades optional. Lab fee: \$15. N. Breen.

Covers evaluation of fibers, yarns, fabrics, and garments, with emphases on the meaning of standards, testing philosophy, quality control, and statistical analysis. Discusses day-to-day tests done in the textile and apparel industry. Laboratory sections introduce students to various test methods, data generation for analysis, and evaluation.

**[TXA 436(4360) Fiber Chemistry**

Spring. 3 credits. Prerequisite: senior or first-year graduate standing. S-U grades optional. Offered alternate years; next offered 2007-2008. C. C. Chu.

Chemical and physical structure of several commercially important fibers and their polymerization process. Discusses color chemistry and relationship to fiber dyeing.]

**TXA 439(4390) Biomedical Materials and Devices for Human Body Repair (also BME 539[5390])**

Spring. 2-3 credits. Prerequisites: junior or senior standing; college natural science requirement (chemistry or biology). S-U grades only for 2 credits, letter grades only for 3 credits. C. C. Chu.

Surveys materials and devices for repair of injured, diseased, or aged human tissues/organs. Includes properties of synthetic and biological materials, wound healing processes, medical devices for repair of wounds, blood vessels, hearts, joints, bones, nerves, male impotence, vision/hearing/voice, and drug control/release.

**TXA 444(4440) Apparel/Textile Retailing and Distribution**

Fall. 3 credits. Prerequisites: junior or senior standing; TXA 135 and marketing course. S-U grades optional. N. Breen.

Overview of the business of design, production, distribution, marketing, and merchandising of apparel and related products from a management perspective. Includes the organization and structure of both domestic and international retailers along with pricing strategies, merchandise planning, inventory management, and sales promotion. New uses of computer systems and information technologies are emphasized throughout.

**TXA 466(4660) Textiles, Apparel, and Innovation**

Fall. 3 credits. Prerequisite: TXA 237. Recommended: TXA 432. S-U grades optional. Cost of field trip: \$100. Offered alternate years. S. Ashdown and J. Hinestroza.

Designed for students in all TXA options. Explores the relationship between materials and design with a concentration on the use of innovative textile materials in apparel. Both aesthetic and functional issues are addressed. The course consists of a combination of lecture, discussion of readings, oral reports, a research paper, and project work. There is a one-day field trip to New York City.

**TXA 470(4700) Fashion Presentation: Portfolio Development**

Fall. 3 credits. Limited to 25 students.  
Prerequisites: TXA 117, 264, 265, and 346.  
Minimum cost of materials: \$250.  
V. D. Lewis.

Students gain an understanding of presentation methods currently used by fashion designers, runway illustrative journalists, forecasting artists, and fashion editorial illustrators. Skills in fashion illustration, image manipulation, and photography are developed. To satisfy personal philosophies of fashion, students discover and adopt current presentation techniques with new and original effects. Students must bring all past project work for possible inclusion in the portfolio.

**TXA 499(4990) Honors Thesis Research**

Fall and spring. 1–6 credits; max. 6 credits for graduation. Prerequisite: TXA students admitted to college honors program. S-U grades optional. Staff.

Independent research leading to the honors thesis. Students must follow college honors program guidelines.

**TXA 600(6000) Special Problems for Graduate Students**

Fall or spring. Credit TBA. S-U grades optional. Staff.

Independent advanced work by graduate students recommended by their chair and approved by the department chair and instructor.

**TXA 620(6200) Physical Properties of Fiber-Forming Polymers and Fibers**

Spring. 3 credits. Prerequisite: permission of instructor. Offered alternate years.  
A. Netravali.

Covers formation and properties of fiber-forming polymers, rubbery, glassy, and crystalline states and their interconnection. Discusses fiber structure, relationship between chemical structure and physical properties of manufactured and natural fibers, mechanical, thermal, and viscoelastic properties of fibers and testing methods.

**TXA 626(6260) The Chemistry of Textile Finishes and Dyeing**

Spring. 3 credits. Prerequisites: TXA 336 or equivalent and organic chemistry course or permission of instructor. S-U optional.  
Offered alternate years. C. C. Chu.

Discusses chemical aspects of textiles with emphasis on finishes and dyeing. Studies industrially important textile chemicals used for dyeing and enhancing fiber and fabric properties, such as durable press, anti-soiling, water repellency. Emphasizes the correlation of the observed effect with chemical structure, end-use influences, interaction with fabric and fibers, sources, and synthetic routes. Briefly discusses the environmental effect of these textile chemicals and current federal regulation.

**TXA 637(6370) Research Seminars in Apparel Design**

Fall and spring. 1 credit; repeat of course each semester encouraged for all apparel design graduate students. Prerequisites: permission of individual instructor for advanced undergraduates. S-U grades only. Apparel Design faculty.

**[TXA 639(6390) Mechanics of Fibrous Assemblies**

Fall. 3 credits. Prerequisite: solid mechanics course or permission of instructor. S-U grades optional. Offered alternate years; next offered 2007–2008. Staff.

Studies the mechanics of fiber assemblies: deformation of yarns and fabrics in tensile, shear, and compressive stress; bending and buckling.]

**TXA 664(6640) Human Factors: Anthropometrics and Apparel**

Fall. 3 credits. Open to advanced undergraduates. Prerequisites: statistics course and permission of instructor. S-U grades optional. Offered alternate years.  
S. Ashdown.

Seminar course focusing on the human form and its relationship to clothing. Includes discussion of quantification of body sizes and human variation; historical, cultural, and aesthetic concepts of fit; apparel sizing techniques; national and international sizing systems and standards; impact of sizing systems on various populations (e.g., elderly, disabled).

**[TXA 666(6660) Fiber Formation: Theory and Practice**

Spring. 3 credits. Prerequisites: polymer chemistry, college physics, TXA 436, 620, or permission of instructor. S-U grades optional. Offered alternate years; next offered 2007–2008. M. Frey.

Covers the practical and theoretical analysis of the chemical and physical principles of the methods of converting bulk polymer to fiber.]

**[TXA 670(6700) Fashion Theory**

Spring. 3 credits. Limited to 25 students. Prerequisite: TXA 346 for undergraduates or similar course for graduates. Letter grades only. Offered alternate years; next offered 2007–2008. Minimum cost of materials: \$250. V. D. Lewis.

The course connects theoretical concepts in criticism, philosophy, and fashion scholarship with fashion design practice. Students create concepts that are demonstrated in fashioned objects.]

**[TXA 675(6750) Aesthetics and Meaning in World Dress**

Spring. 3 credits. Prerequisites: TXA 125 or course in history of art, costume history, or other history. S-U grades optional. Offered alternate years; next offered 2007–2008.  
C. Jirousek.

Examines the aesthetic and social/psychological relationship between body and clothing in a cross-cultural context. Individual research papers lead to the development of an exhibition.]

**TXA 899(8990) Master's Thesis and Research**

Fall or spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional. Staff.

**TXA 999(9990) Doctoral Thesis and Research**

Fall or spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional. Staff.

## FACULTY ROSTER

Allen, Josephine A., Ph.D., U. of Michigan.  
Assoc. Prof., Policy Analysis and Management

Ashdown, Susan, Ph.D., U. of Minnesota.  
Assoc. Prof., Textiles and Apparel

Avery, Rosemary J., Ph.D., Ohio State U. Prof.  
and Chair, Policy Analysis and Management

Battistella, Roger M., Ph.D., U. of Michigan.

Prof., Policy Analysis and Management

Becker, Franklin D., Ph.D., U. of California,

Davis. Prof. and Chair, Design and

Environmental Analysis

Brainerd, Charles, Ph.D., Michigan State U.

Prof., Human Development

Brannon, Patsy, Ph.D., Cornell U. Prof.,

Nutritional Sciences

Brumberg, Joan J., Ph.D., U. of Virginia. Prof.,

Human Development

Burkhauser, Richard, Ph.D., U. of Chicago.

Prof., Policy Analysis and Management

Casasola, Marianella, Ph.D., U. of Texas,

Austin. Asst. Prof., Human Development

Cawley, John, Ph.D., U. of Chicago. Asst.

Prof., Policy Analysis and Management

Ceci, Stephen J., Ph.D., U. of Exeter

(England). Prof., Human Development

Chu, Chih-Chang, Ph.D., Florida State U. Prof.,

Textiles and Apparel

Cochran, Moncrieff, Ph.D., U. of Michigan.

Prof., Human Development

Cornelius, Steven W., Ph.D., Pennsylvania

State U. Assoc. Prof., Human Development

Danko, Sheila, M.I.D., Rhode Island School

of Design. Assoc. Prof., Design and

Environmental Analysis

Depue, Richard, Ph.D., U. of Oklahoma. Prof.,

Human Development

Dunifon, Rachel, Ph.D., Northwestern U. Asst.

Prof., Policy Analysis and Management

Eckenrode, John J., Ph.D., Tufts U. Prof.,

Human Development

Elliott, John, M.E. Des., U. of Calgary

(Canada). Assoc. Prof., Design and

Environmental Analysis

Eshelman, Paul E., M.F.A., U. of Illinois. Prof.,

Design and Environmental Analysis

Evans, Gary, Ph.D., U. of Massachusetts,

Amherst. Prof., Design and Environmental

Analysis

Frey, Margaret, Ph.D., North Carolina State U.

Asst. Prof., Textiles and Apparel

Geddes, Raymond R., Ph.D., U. of Chicago.

Assoc. Prof., Policy Analysis and

Management

Gerner, Jennifer L., Ph.D., U. of Wisconsin.

Prof., Policy Analysis and Management

Gibson, Kathleen J., M.A., Ohio State U.

Assoc. Prof., Design and Environmental

Analysis

Hamilton, Stephen F., Ed.D., Harvard U. Prof.,

Human Development, Co-Director, Family

Life Development Center

Haugaard, Jeffrey, Ph.D., U. of Virginia. Assoc.

Prof., Human Development

Hazan, Cindy, Ph.D., U. of Denver. Assoc.

Prof., Human Development

Hedge, Alan, Ph.D., U. of Sheffield (England).

Prof., Design and Environmental Analysis

Hinestroza, Juan, Ph.D., Tulane U. Asst. Prof.,

Textiles and Apparel

Jennings, Jan, M.S., Oklahoma State U. Assoc.

Prof., Design and Environmental Analysis

Jirousek, Charlotte, Ph.D., U. of Minnesota.

Assoc. Prof., Textiles and Apparel

Joyner, Kara, Ph.D., U. of Chicago. Asst. Prof.,

Policy Analysis and Management

Kenkel, Donald, Ph.D., U. of Chicago. Prof.,

Policy Analysis and Management

Koslowski, Barbara, Ed.D., Harvard U. Assoc. Prof., Human Development

Kuder, John, Ph.D., U. of Michigan. Assoc. Prof., Policy Analysis and Management

Laquatra, Joseph Jr., Ph.D., Cornell U. Prof., Design and Environmental Analysis

Lemley, Ann T., Ph.D., Cornell U. Prof. and Chair, Textiles and Apparel

Lewis, Van Dyk, Ph.D., U. of Central England, Birmingham. Asst. Prof., Textiles and Apparel

Lichter, Daniel, Ph.D., U. of Wisconsin, Madison. Prof., Policy Analysis and Management

Loker, Suzanne, Ph.D., Kansas State U. Prof., Textiles and Apparel

Lucarelli, Claudio, Ph.D., U. of Pennsylvania. Asst. Prof., Policy Analysis and Management

Lust, Barbara C., Ph.D., City U. of New York. Prof., Human Development

Mathios, Alan, Ph.D., U. of Pennsylvania. Prof., Policy Analysis and Management; Assoc. Dean

Matsudaira, Jordan, Ph.D., U. of Michigan. Asst. Prof., Policy Analysis and Management

Maxwell, Lorraine E., Ph.D., City U. of New York. Assoc. Prof., Design and Environmental Analysis

Netravali, Anil, Ph.D., North Carolina State U. Prof., Textiles and Apparel

Obendorf, Sharon K., Ph.D., Cornell U. Prof., Textiles and Apparel, Assoc. Dean

Parrot, Andrea, Ph.D., Cornell U. Prof., Policy Analysis and Management

Peters, H. Elizabeth, Ph.D., U. of Chicago. Prof., Policy Analysis and Management

Pillemer, Karl A., Ph.D., Brandeis U. Prof., Human Development

Pollak, Patricia B., Ph.D., Syracuse U. Assoc. Prof., Policy Analysis and Management

Reyna, Valerie, Ph.D., Rockefeller U. Prof., Human Development

Robertson, Steven S., Ph.D., Cornell U. Prof., Human Development

Rodriguez, Eunice, Ph.D., U. of California, Berkeley. Asst. Prof., Policy Analysis and Management

Sassler, Sharon, Ph.D., Brown U. Assoc. Prof., Policy Analysis and Management

Savin-Williams, Ritch C., Ph.D., U. of Chicago. Prof. and Chair, Human Development

Simon, Kosali, Ph.D., U. of Maryland. Asst. Prof., Policy Analysis and Management

Sims, William R., Ph.D., Massachusetts Inst. of Technology. Prof., Design and Environmental Analysis

Swisher, Raymond, Ph.D., U. of North Carolina, Chapel Hill. Asst. Prof., Policy Analysis and Management

Temple, Elise, Ph.D., Stanford U. Asst. Prof., Human Development

Tennyson, Sharon, Ph.D., Northwestern U. Assoc. Prof., Policy Analysis and Management

Tobias, Donald J., Ph.D., Michigan State U. Assoc. Prof., Policy Analysis and Management

Trochim, William M. K., Ph.D., Northwestern U. Prof., Policy Analysis and Management

Waller, Maureen R., Ph.D., Princeton U. Asst. Prof., Policy Analysis and Management

Wang, Q. I., Ph.D., Harvard U. Asst. Prof., Human Development

Wells, Nancy, Ph.D., U. of Michigan. Asst. Prof., Design and Environmental Analysis

Wethington, Elaine, Ph.D., U. of Michigan. Assoc. Prof., Human Development

White, William, Ph.D., Harvard U. Prof., Policy Analysis and Management

Williams, Wendy M., Ph.D., Yale U. Assoc. Prof., Human Development

### Lecturers

Basinger, Annette, B.A., Michigan State U. Lec., Design and Environmental Analysis

Beck, Sam N., Ph.D., U. of Massachusetts. Sr. Lec., Urban Semester

Breen, Nancy, Ph.D., Syracuse U. Lec., Textiles and Apparel

Curtis, Steven H., B.A., Syracuse U. Lec., Design and Environmental Analysis

Delara, Thomas, M.B.A., Barry U. Lec., Policy Analysis and Management

Fabrizio, Nick, Ph.D., Walden U. Lec., Policy Analysis and Management

Gilmore, Rhonda, M.A., Cornell U. Lec., Design and Environmental Analysis

Lewis, Jeffrey, Ph.D., U. of Maryland, College Park. Lec., Policy Analysis and management

Racine, Anita, Ph.D., Cornell U. Sr. Lec., Textiles and Apparel

Rosen, William, Ph.D., U. of California. Sr. Lec., Policy Analysis and Management

Ross-Bernstein, Judith, M.Ed., Northwestern U. Sr. Lec., Human Development

Schlesinger, Warren, M.B.A., Cornell U. Lec., Policy Analysis and Management

Segal, Harry, Ph.D., U. of Michigan. Sr. Lec., Human Development

Unur, Ali Sinan, Ph.D., Cornell U. Lec., Policy Analysis and Management



## SCHOOL OF INDUSTRIAL AND LABOR RELATIONS

### ADMINISTRATION

Harry C. Katz, dean

Robert Smith, associate dean, academic affairs

Gordon Law, librarian

Allan Lentini, director, administrative services

Martin Wells, director, research

Christopher Crooker, director, external relations

Laura Lewis, director, office of student services

William J. Sonnenstuhl, graduate faculty representative

Tove Hammer, editor, *Industrial and Labor Relations Review*

### DEGREE PROGRAMS

	Degree
Industrial and Labor Relations	B.S.
	M.I.L.R.
	M.P.S.
	M.S.
	Ph.D.

### THE SCHOOL

The School of Industrial and Labor Relations at Cornell (ILR) is a small school within a large university. It tries to maintain the small-college atmosphere expected of an institution that has about 800 undergraduates and approximately 200 graduate students, even as ILR students participate fully in the activities of the larger Cornell community.

ILR students study in modern, technologically advanced lecture halls, seminar rooms, and libraries.

Almost half of the school's typical freshman class comes from the greater New York City area. Another 20 percent live in other parts of New York State. Students from other states and a few from foreign countries make up the rest of the class. Women constitute about 50 percent of entering classes, and minority students comprise about 25 percent of freshmen and transfer students.

Students enrolled in the School of Industrial and Labor Relations at Cornell may take a substantial number of courses in the other six undergraduate colleges and schools of the university, including the College of Arts and Sciences. Cornell students have access to all of the libraries and other services of the university.

The school operates in four areas: (1) resident instruction, (2) extension and public service, (3) research, and (4) publications. It provides instruction to undergraduates and graduate students who are preparing for careers in industrial and labor relations, as well as to

men and women already engaged in industrial relations activities and the general public through its Extension and Public Service Division.

The school's Conference Center, part of the extension division, initiates and hosts conferences covering the full scope of industrial and labor relations. The center provides continuing education and information to practitioners and scholars.

The Research Division develops materials for resident and extension teaching and originates studies in industrial and labor relations. The Publications Division publishes and distributes the research results.

### GRADUATE DEGREES

More than 200 students on the Cornell campus are enrolled in graduate study in industrial and labor relations, one of the largest graduate fields in the university. Students may work toward the degrees of master of industrial and labor relations, master of professional studies, master of science, and doctor of philosophy. For further information on graduate programs, contact the Graduate Office, School of Industrial and Labor Relations, Cornell University, 214 Ives Hall, Ithaca, NY 14853-3901.

### DEPARTMENTS OF INSTRUCTION

Courses in the school are organized into six departments:

#### Collective Bargaining, Labor Law, and Labor History

In the study of workers, employers, and the government policies affecting them, members of this faculty concentrate on subjects of industrial and labor relations best understood by reliance on the fields of administration, economics, history, and law. Courses explore subjects within the framework of American society, stress fundamental forces of change, and analyze texts and empirical data with methods drawn from the social sciences, the humanities, and the legal professions.

#### Human Resource Studies

The Department of Human Resource Studies consists of world-class faculty members engaged in research, teaching and practice. These faculty members play integral roles in the administration of the Center for Advanced Human Resource Studies (CAHRS), an ILR-based research center funded by over 50 corporations, and the ILR Executive Education Program, which offers advanced training to HR practitioners. The goal in teaching is to balance a rigorous academic research approach with a real-world practice orientation. In this way students are provided with state-of-the-art knowledge relevant to managing human resources in organizations.

#### International and Comparative Labor

The Department of International and Comparative Labor is concerned with industrial and labor relations systems and labor markets in other parts of the world. The world-renowned faculty members are authorities on the labor markets of Western Europe, Asia, Latin America, South America and Africa and bring this knowledge to bear on the courses they teach as they prepare their students to understand the global marketplace.

#### Labor Economics

The Department of Labor Economics deals with labor markets, that is, the institutional arrangements, terms, and conditions under which workers supply their labor and under which firms demand their labor. Faculty members are especially concerned with understanding the workings of labor markets and the effects of various public policies. The topics dealt with in courses and research include analysis of the labor force, employment and unemployment, wages and related terms of employment, income distribution, income security programs, health and safety in industry, retirement, pensions and social security, economic aspects of collective bargaining, and economic demography.

#### Organizational Behavior

The psychologists and sociologists in the Department of Organizational Behavior use discipline-based theoretical perspectives to examine an array of empirical workplace phenomena. Their teaching and research focus on the impact of environmental, technological, and interpersonal relationships on work group and organizational dynamics.

#### Social Statistics

Faculty members in the Department of Social Statistics conduct research in the field of economic and social statistics. In applying their research results to their teaching, they provide their students with cutting-edge training on the principles of statistical reasoning, statistical methods, and the application of statistical tools of analysis.

A full list of required and elective courses is available from the Office of Student Services, 146 Ives Hall.

### RESIDENT INSTRUCTION

This division conducts the on-campus programs leading to the degrees of bachelor of science, master of industrial and labor relations, master of professional studies, master of science, and doctor of philosophy from Cornell.

#### Office of Student Services

Staff members from the Office of Student Services, 101 Ives Hall, work closely with faculty members and faculty committees to

administer degree programs for the school and many of the school's support services. The office's responsibilities include admitting and orienting new students, maintaining students' personal and academic records, and counseling students on personal and academic concerns. The office also works closely with seniors who are planning graduate study.

### Counseling and Advising

New students are advised on orientation, academic procedures, and course registration by counselors in the Office of Student Services.

Each of the school's academic departments names faculty members to serve as advisors for students who wish to consult with them regarding career possibilities in the field, research opportunities, postgraduate programs, or similar matters. Questions or issues related to graduation requirements, course registration, and related academic procedures should be directed to counselors in the Office of Student Services.

### Minority Programs

The School of Industrial and Labor Relations values diversity and is responsive to the unique social, academic and cultural contributions and needs of minority students. The School is committed to providing students with support that will enhance academic achievement, career development, and personal growth. The associate director of minority educational affairs in the Office of Student Services works in conjunction with many university programs to provide services that ensure academic success and an enjoyable quality of life for ILR minority students. For more information, see the Minority Affairs web site: [www.ilr.cornell.edu/studentservices/ac/minority.html](http://www.ilr.cornell.edu/studentservices/ac/minority.html).

### STUDY OPTIONS

Several study options are open to ILR undergraduates, making it possible to tailor a program to fit special circumstances.

One such option is the five-year ILR master's degree. With early planning, some students may earn the M.S. degree in the fifth year.

Some students elect to spend a semester in New York City, Albany, or Washington, D.C., with a chance to observe actual labor problem solving as interns in congressional offices, labor organizations, personnel offices, and state and federal agencies. For more information, see "Special Academic Programs" below.

Study abroad options are also available at a number of foreign universities. Qualified students may spend a semester or a full year studying abroad.

A number of ILR courses deal directly with today's workplace issues and involve fieldwork in the Ithaca area and elsewhere in the country.

The ILR program allows juniors and seniors who want to conduct their own research to receive course credit for individually directed studies if the program is supervised by a faculty member.

### Study in Absentia

Registration in absentia enables a student to seek admission in another American institution for a semester or a year and transfer credit toward completion of the Cornell degree. This study option requires the development of a plan of study, a statement of appropriate reasons for study away from the university (e.g., availability of courses not offered at Cornell), good academic standing, approval of the plan by the director of student services, and payment of a special in absentia registration fee.

### Leave of Absence or Withdrawal

Students who desire to withdraw or take a personal leave of absence from the university should schedule an interview with a counselor in the Office of Student Services. Counselors will assist students in contacting the appropriate offices or departments of the university, if necessary. All medical leaves are handled by Gannett Health Center.

### REQUIREMENTS FOR GRADUATION

To earn the Cornell bachelor of science degree in industrial and labor relations, a student must successfully complete 120 credits. This requires eight semesters for an average of 30 credits a year although some students accelerate their studies.

#### New Curriculum Effective Fall 2006

##### First Year

##### FALL

First-year writing seminar*	3
ILR colloquium (introduction to ILR School, ILRID 150)**	1
Introduction to Organizational Behavior (ILROB 122)**	3
History of American Labor (ILRCB 100)**	3
Introductory Microeconomics (ECON 101)*	3
Elective	(3)
PE (university requirement)	

##### SPRING

First-year writing seminar*	3
Introductory Macroeconomics (ECON 102)*	3
Electives	(9)
PE (university requirement)	

##### Sophomore Year

##### FALL

Statistical Reasoning (ILRST 212)**	4
Labor and Employment Law (ILRCB 201)**	3
Human Resource Management (ILRHR 260)**	3
Advanced Writing†	3
Electives	(3)

##### SPRING

Collective Bargaining (ILRCB 205)**	3
Economics of Wages and Employment (ILRLE 240)**	3
Western Intellectual Tradition†	3
Cultural Perspectives†	3
Elective	(3)

### Junior and Senior Years

Science and Technology†	3
ILR Elective courses—40 credits	40

- Must include at least one course from an approved list in each of the following three areas: International and Comparative elective, Labor History elective and Economic Policy elective
- Minimum of 24 credits of ILR course work, including 495 Honors, 499 Independent Study—with a maximum of 16 credits for non-ILR courses at Cornell as approved in ILR departments.
- Maximum of 12 credits from foreign language or advanced math
- May include up to 9 credits for one semester abroad or 15 credits for a full year abroad
- Maximum of 12 credits in a credit internship program

Additional general elective credits (in addition to distribution requirements) 12

Minimum total credits required for graduation 120

\*Required courses usually taken in the College of Arts and Sciences

\*\*Required courses taken in the ILR School

†Distribution credits (courses you choose that satisfy requirements in certain categories)

Physical Education credit does not count toward the 120 credits

Students who take more than 50 credits in the endowed colleges (the College of Architecture, Art, and Planning; the College of Arts and Sciences; the Johnson Graduate School of Management; the College of Engineering; the School of Hotel Administration; and the Law School) must pay for each credit taken in excess of 50, whether or not the courses are passed. For the precise fee per credit, students should call the Office of the Bursar.

The number of credits that may be taken in the endowed colleges at no additional cost to the student may be changed at any time by official action of the school.

### ILR Math Requirement

A student who took AP calculus in high school and scored a 3 or better on the AB exam or subscore of BC exam has fulfilled the ILR math requirement. If AP calculus wasn't completed, or if the scores noted above were not achieved, the student is expected to take and pass the ILR Math Assessment before registering for required courses in Statistics and Labor Economics. The Math Assessment is based on materials covered in New York State Regents Exams for Courses 2 and 3. (Calculus is not covered in those courses.)

The ILR Math Assessment is scheduled in August, January, and May. Those who do not pass in the first attempt are expected to register in an appropriate math course and pass the assessment *before the beginning of their third semester* in the school. Any student who cannot meet the requirement by the beginning of the third semester is enrolled for a terminal semester and is expected to leave the school thereafter.

Transfer students are expected to meet the same standards in math: either present the score required by Cornell University for AP calculus (AB or BC) credit or pass the ILR Math Assessment before being permitted to register in ILRST 212 or ILRLE 240 with a terminal semester possible after failing the assessment given at the beginning of a third semester as an ILR student.

## SCHEDULING AND ATTENDANCE

### Schedule Changes

Occasionally it may be necessary for a student to request changes in his or her course schedule either before a semester begins or during the semester. Such requests must be directed to the Office of Student Services to avoid possible loss of academic credit.

### Class Attendance

It is each student's responsibility to attend all scheduled classes unless excuses have been approved by the faculty members. In some courses an instructor may permit a maximum number of class absences without a grade penalty or dismissal from the course. An explanation for absence from class may occasionally be secured from the Office of Student Services in advance of the expected absence. An approved absence may be warranted by:

1. participation in authorized university activities such as athletic events, dramatic productions, or debates;
2. medical problems supported by a record of clinic or infirmary treatment;
3. serious illness or death in the immediate family;
4. other circumstances beyond the student's control.

A request for explanation of an absence should, when possible, be made to the Office of Student Services before the date of expected absence. A reported and explained absence does not relieve a student from fulfillment of academic requirements during the period of absence. The course instructor has the authority to determine what work must be completed. The office can only confirm the explanation for absence. Students should inform the Office of Student Services of any problems they have meeting course requirements.

## STANDING AND GRADES

### Academic Integrity

In 1987 the faculty of the School of Industrial and Labor Relations approved a revised code of academic integrity. This code, while based on the Cornell University code, varies somewhat.

Absolute integrity is expected of all Cornell students in all academic undertakings. They must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or be a party to another student's failure to maintain academic integrity. The code specifically prohibits:

1. knowingly representing the work of others as one's own;
2. using or obtaining unauthorized assistance in any academic work;
3. fabricating data in laboratory or field work;
4. giving fraudulent assistance to others;
5. fabricating data in support of laboratory or field work.

Full details on the applications of those prohibitions to course work, term papers, examinations, and other situations are listed in the code. Copies are available from the Office of Student Services, 101 Ives Hall.

### Dean's List

A Dean's List is compiled for each of the four undergraduate classes each semester on the seventh day following receipt of final grades from the registrar. Eligibility for the Dean's List is determined by applying all of the following criteria:

1. achievement of a semester average for freshmen of 3.3 or better; for sophomores of 3.4 or better; and for juniors and seniors of 3.6 or better;
2. a minimum course load for the semester of 12 letter-graded credits;
3. completion of all courses registered for at the beginning of the semester;
4. satisfaction of all good-standing requirements.

### Academic Standing

Good standing requires that all of the following criteria be met at the end of each semester:

1. an average of C- (1.7) for the semester's work, including a minimum of 8 completed and letter-graded credits;
2. no failing grades in any course, including physical education;
3. a cumulative average of C- (1.7) for all completed semesters.

If at the end of any semester a student fails to maintain good standing, or if overall academic performance is so marginal as to endanger the possibility of meeting school and university degree requirements, his or her record is reviewed by the Committee on Academic Standards and Scholarships. The committee may issue a written warning to the student at that time. If a student who does not improve after the written warning, he or she may be denied permission to register for the next semester.

### Involuntary Separation from the School for Academic Reasons

A student may be denied permission to reregister at the end of any semester when he or she has failed:

1. to establish good standing after a semester on warning;
2. to maintain an average of 1.7 in any semester after a previous record of warning;
3. to achieve good standing after being on warning any two previous semesters;

4. two or more classes in one semester or has a semester average of 1.0 or below.

The Academic Standards and Scholarship Committee may decide to permit a student to remain on warning more than one semester if there has been significant improvement even though the cumulative average is still below 1.7.

### S-U Grading Policy

An undergraduate may register to receive a final grade of S (Satisfactory) or U (Unsatisfactory) in courses that offer this option—either in the school or in other divisions of the university—subject to the following conditions:

1. the S-U option may be used in ILR and in out-of-college course electives only, not in directed studies;
2. students are limited to registering in *two* S-U courses a semester;
3. S-U registration is limited to 4 credits for each course;
4. students registering for S-U grades must be in good standing;
5. students must fulfill the graduation requirement of 105 letter-graded credits.

ILR faculty members assign a grade of U for any grade below C- and a grade of S for any grade of C- or better. A grade of U is considered equal to an F in determining a student's academic standing, although it is not included in the cumulative average.

No change of grading (from letter to S-U or from S-U to letter) may be made after the first three weeks of class. There are no exceptions to this restriction, and appeals will not be accepted.

### Grades of Incomplete

A grade of incomplete (INC) is assigned when a course has not been completed for reasons that are acceptable to the instructor. It is understood that the work will be completed later and credit given. Instructors may grant a grade of incomplete for a limited number of clearly valid reasons, but only to students with substantial equity in a course. A firm and definite agreement on the conditions under which the work may be made up must be made with the instructor. The school's policy allows a maximum of two full semesters of residence for removal of a grade of incomplete. If it is not made up within this time, the grade automatically becomes an F.

## SPECIAL ACADEMIC PROGRAMS

To meet the special academic objectives of some students, the school's faculty has established several special academic programs. For additional information, students should contact a counselor in the Office of Student Services. Counselors will explore the program with students to help them decide if it suits their interests.

### Five-Year Master of Science Degree Program

With early planning it is possible to earn the M.S. degree in a fifth year of study. This program is designed specifically for those who wish concentrated study in an area of specialization

in the school for a master of science degree. Students considering this program should consult a counselor in the Office of Student Services after their freshman year.

### Internships

Many ILR students decide to participate in the ILR Credit Internship Program, working in cities all over the country, typically during the junior year. Most sponsors expect that interns will have completed the introductory required courses before coming to work with them, so the junior year is the earliest opportunity to test out what's been learned in the classroom. The majority of ILR interns are located in either New York City, Washington, D.C., or the ILO in Geneva, Switzerland. Contact ILR's Off-Campus Programs office and visit Professor Clete Daniel's ILR Credit Internship web site at [www.ilr.cornell.edu/creditinternships/](http://www.ilr.cornell.edu/creditinternships/).

### Summer Internships

What is a summer internship? During the summer, a student who works in a job that is related to industrial and labor relations may find that the employer refers to that job as an internship. Their terminology differs from that used by ILR and Cornell to refer to credit-bearing internships. Academic credits earned: ILR considers an internship to be a learning experience engaged in during the academic year, for which students earn academic credit, are supervised by a faculty member, are evaluated, have a grade recorded, and pay tuition. With very few exceptions (the Clem Miller Scholarship, Saul Wallen internship, Chaim and Ida Miller Scholarship, all of which are summer support provided to selected ILR students) summer employment has little in common with the semester credit internship program. Approval is required in advance. Some companies tell students that they cannot be employed unless they receive academic credit for a summer internship. Cornell does not grant credit unless a student is registered, pays tuition, has a faculty supervisor, and is in a position approved for internship credit.

### Programs in Washington

Two Washington programs are available to ILR students: the ILR Credit Internship Program and the Cornell in Washington program, sponsored through the College of Arts and Sciences.

**ILR Credit Internship Program:** Interns work approximately 30 hours per week for the 15 weeks of the semester, in ILR-related organizations approved by the ILR faculty. They also work on a research project related to their internship, which is graded by their ILR faculty supervisor. The credit hours that they earn are ILR elective credits. Internships are available in New York City and Washington, D.C., as well as other locations. Cornell in Washington interns find placement in practically any and every operation in Washington, work there about 30 hours per week, and attend Cornell classes taught in Washington by Cornell faculty members. Interns are expected to complete a major thesis project that is related to their course work and internship and for which they receive a grade.

**Selecting a program:** Most ILR students who wish to be interns in Washington, D.C., apply to the ILR Credit Internship Program. Occasionally, an ILR student identifies

an interest that cannot be met by the ILR program. The student may then apply to the Cornell in Washington program but will be expected to secure ILR faculty approval of his or her plans and academic eligibility before applying to the Cornell in Washington program.

**Application procedure:** Interested students are expected to discuss the program with Professor Daniel, ILR's academic coordinator for internships, before proceeding with applications.

### Honors Program

Undergraduates who are ranked in the top 20 percent of their class at the end of the junior year may propose a two-semester research project, an honors thesis, for review by the Committee on Academic Standards and Scholarships. When approved, the candidate for graduation with honors works for two semesters (for 4 credits each semester) to research, write, and then defend the thesis.

### Study Abroad

Students in ILR who plan to study in another country usually do so in the junior year, occasionally in the senior year. They may study in one of the programs that is sponsored by Cornell, in one sponsored by another institution and endorsed by Cornell, or in an approved externally sponsored program. Information about study abroad is available in OSS (146 Ives Hall) or the Cornell Abroad office (300 Caldwell Hall).

Students are expected to register for a full course load, the equivalent of 15 credit hours in a semester or 30 hours in a year, when they study abroad. Some courses will be the equivalent of general elective credit or distribution credit, but others may be accepted as ILR elective credit if evaluated and approved by the relevant ILR department chairs. A student may satisfy up to 9 hours of the ILR elective requirement in a single semester abroad and up to 15 hours in a year of foreign study.

Application for foreign study requires that the student meet the schedules of the program of interest and Cornell's schedule. Applications include tentative class schedules, recommendations from faculty members, approval of the application by an ILR faculty committee, essays, and transcripts. After being approved in ILR, the application is sent to the Cornell Abroad office and then to the program for which the student is applying. For more information, contact Kevin Harris, ILR study abroad coordinator, 101 Ives Hall, 255-2223, [kfh4@cornell.edu](mailto:kfh4@cornell.edu), or the Cornell Abroad office, 300 Caldwell Hall, 255-6224, [CornellAbroad@cornell.edu](mailto:CornellAbroad@cornell.edu), [www.cuabroad.cornell.edu/](http://www.cuabroad.cornell.edu/).

## COLLECTIVE BARGAINING, LABOR LAW, AND LABOR HISTORY

R. Lieberwitz, chair (387A Ives Hall, 255-3289); M. Cook, J. Cowie, C. Daniel, I. DeVault, R. Givan, M. Gold, L. Gray, J. Gross, H. Katz, S. Kuruvilla, D. Lipsky, N. Salvatore, L. Turner

### ILRCB 100(1100) Introduction to U.S. Labor History

Fall and spring, 3 credits. J. Cowie, C. Daniel, I. DeVault, and N. Salvatore.

Introductory survey covering the major changes in the nature of work, the workforce, and the institutions involved in industrial relations from the late 19th century to the present.

### ILRCB 201(2010) Labor and Employment Law

Fall and one sec in spring, 3 credits. M. Gold, J. Gross, R. Lieberwitz, and K. Stone.

Survey and analysis of the law governing labor relations and employee rights in the workplace. The first half of the course examines the legal framework in which collective bargaining takes place, including union organizational campaigns, negotiations for and enforcement of collective bargaining agreements, and the use of economic pressure. The second half surveys the laws against discrimination based on race, religion, sex, national origin, age, and disability. Also serves as an introduction to judicial and administrative systems.

### ILRCB 205(2050) Collective Bargaining

Fall and spring, 3 credits. R. Givan, H. Katz, D. Lipsky, S. Kuruvilla, R. Seeber, and L. Turner.

Comprehensive introduction to industrial relations and collective bargaining in the United States; the negotiation, scope, and day-to-day administration of contracts; the major substantive issues in bargaining, including their implication for public policy; industrial conflict; the major challenges facing unions and employers today; U.S. industrial relations in international and comparative perspective.

### ILRCB 207(2070) The Legal Construction of Asian American Workers

Fall, 3 credits. Limited to 20 students. Prerequisite: ILRCB 201. Fulfills ILR advanced writing requirement. Not open to students who have taken ILRCB 103 (FWS). J. Ying.

Discussion-based and writing-intensive course. How does the legal construction of race/ethnicity influence how we see ourselves and how others perceive us in the workplace, and consequently, impact our career paths and career mobility? At once the model minority, the perpetual foreigner, the quiet American, and the math and science whiz, Asian Americans assume a unique but stereotypical position in our racial terrain. As such, studying the legal construction of this racial category will throw new light on our understanding of citizenship, identity, and work. This course will draw heavily from critical race theory and case law to help us understand how the legal construction of race impacts the Asian American worker.

**ILRCB 208(2080) Race and Rights at Work**

Spring. 3 credits. Limited to 20 students.

Prerequisite: ILRCB 201. Fulfills ILR

sophomore writing requirement. J. Ying. Discussion-based and writing-intensive course. What does it mean to be non-White in the workplace? Does a workplace racial hierarchy exist, and if so, how does this hierarchy affect our career success? We discuss how the socio-legal construction of racial categories impacts the American worker and American society. We use works in critical race theory, critical White studies, and intersectionality theory as tools to analyze the employment vicissitudes of women and men in business, the law, and science and engineering.

**ILRCB 209(2090) Work and Labor in the Global Economy**

Fall. 3 credits. Limited to 20 students.

Fulfills sophomore writing requirement.

K. Bronfenbrenner.

Examines the evolution of American workplace in the past 20 years in the context of the global economy. Through a combination of nonfiction, fiction, workplace site visits, worker interviews, guest speakers, and weekly short writing assignments, students explore the changing nature of corporate structure, the workplace, the work process, and workers' lives in a range of occupations in five different sectors of the economy: IT, manufacturing, public sector, health care, and casual labor. Guest speakers include workers, union leaders, and employers from companies in the target sectors and site visits are made to both union and nonunion facilities. Particular emphasis is placed on exploring how work, workers, and communities have been impacted by globalization.

**ILRCB 301(3010) Labor Union Administration**

Fall. 4 credits. R. Hurd.

Study and analysis of the structure and operations of American unions, including the complicated internal life of the organizations; the varied environments in which unions develop and grow or decline; the relationship of national unions, local unions, and members in the context of internal union government; the ways in which unions are set up to handle organizing, collective bargaining, contract administration, and political activity; and the widespread movement toward merger and consolidation of unions. Examines the role of union leaders and the strategic choices they make. Attention is given to current developments in the labor movement and to the eternal problems of attaining union democracy.

**ILRCB 302(3020) Strangers and Citizens: Immigration and Labor in U.S. History**

Fall or spring. 4 credits. I. DeVault.

Explores immigrant workers' experiences in the 19th and 20th centuries from different perspectives. Students examine what it meant to the immigrants themselves to arrive as strangers in the United States while also examining the ways in which preexisting American groups defined these immigrants as "strangers." Similarly, students look at U.S. citizens in their roles as greeters of immigrants, detractors of immigrants, and as models for the aspirations of immigrants. The main examples are taken from the industrial and union realms.

**ILRCB 303(3030) Working-Class America in Mass Media and Popular Culture**

Spring. 4 credits. J. Cowie.

Examines a variety of representations of working people found in commercial popular culture throughout the 20th century as a means to explore the ways in which history, memory, and politics are shaped through popular discourse. Uses sources as diverse as popular music, Hollywood movies, the mainstream press, and television sitcoms to understand the ideological and political influences on our pre-conceptions of workers, and how those forces influence our notions of authenticity, the historical experience, and the politics of social class.

**ILRCB 304(3040) Seminar in American Labor and Social History**

Fall or spring. 4 credits. Prerequisite:

permission of instructor. J. Cowie,

C. Daniel, I. DeVault, and N. Salvatore.

Undergraduate seminar whose topic changes depending on semester and instructor.

**ILRCB 305(3050) Introduction to Labor Arbitration and Alternative Dispute Resolution**

Fall. 4 credits. J. Gross.

Introductory survey that focuses on the U.S. labor arbitration process in the private and public sectors (legal issues, discipline and discharge, contract language interpretation, remedies, and procedures) and on alternative dispute resolution systems in the United States and other countries. Student participation in class discussion is expected, and assignments include an original research paper.

**ILRCB 306(3060) Recent History of American Workers: From the 60s through the 90s**

Fall. 4 credits. J. Cowie.

Focuses on the social history of American workers and the role of organized labor in American life since the 1960s. Course themes often center on the complexities of social class in the United States. Topics include the transformations of liberalism, the civil rights and black power movements, the Vietnam War, the rise and fall of the New Left, industrial restructuring, the rise of neoconservatism, changes in civic identity, and sources of cultural conflict. Course ends with an examination of globalization, changes in the major political parties, the future of work, and prospects for social change.

**ILRCB 307(3070) U.S. Business History Since the Civil War**

Spring. 4 credits. R. Applegate.

Surveys the history of U.S. business enterprise since the establishment of a nationally unified political economy. Focuses on the corporation's emergence as the dominant form of business organization in the context of changing government-business relations. Students examine distinctive features of American business development—such as the preeminence of "big business," corporate governance by managerial hierarchies, and the multinational scope of corporate operations—by exploring the circumstances of their creation, the private-sector limits of their reach, and their consequences for economic development and industrial relations.

**ILRCB 383(3830) Workers' Rights as Human Rights**

Fall or spring. 4 credits. J. Gross.

Examines U.S. domestic labor law and policy using internationally accepted human

rights principles as standards for judgment.

Considers the idea of human rights, its philosophical and moral origins, and introduces the legal and social obligations of both governments and nonstate actors to respect the human rights of workers. Topics include the Universal Declaration on Human Rights, ILO International Labor Standards, the Declaration on Fundamental Principles and Rights at Work, workers' freedom of association and the right to organize and collectively bargain, occupational health and safety, discrimination, forced labor, child labor, migrant labor, labor rights defined in international trade agreements, the value judgments underlying labor policy choices, and the struggle for enforcement of human rights standards nationally and internationally. The course examines these topics in an internationally comparative context and includes presentations and discussions from international experts on various human rights issues.

**[ILRCB 384(3840) Women and Unions (also FGSS 384(3840))]**

Fall or spring. 4 credits. Not offered 2006–2007. I. DeVault.

Explores women's participation in the United States labor movement in the 19th and 20th centuries. Issues covered include women workers' relations with male-dominated union movements, the role of cross-class alliances of women in organizing women workers, interactions with radical parties and organizations, problems faced by women union leaders and activities, and others.]

**ILRCB 385(3850) African American Social History, 1865 to 1910: The Rural and Urban Experience**

Fall. 4 credits. N. Salvatore.

Examines the experience of black Americans from Emancipation through the experience of the first generation born after slavery. Topics include the changing nature of work; political organization and the rise of Jim Crow; protest, accommodation, and separatism; and the continued evolution of black social and cultural expression after slavery.

**ILRCB 386(3860) African American Social History, 1910 to the Present: Race, Work, and the City**

Spring. 4 credits. N. Salvatore.

Examines the experience of black Americans from the start of the Great Migration just before World War I. Topics include the effects of migration on work experiences and unionization patterns, the impact of depression and two world wars on black social structure and economic status, the growth of the Civil Rights movement, and the impact of migration and urbanization on a variety of social and cultural institutions.

**ILRCB 400(4000) Union Organizing**

Spring. 4 credits. Prerequisites: ILRCB 201/501, 205/500. K. Bronfenbrenner.

Explores various aspects of unions' attempts to organize workers: including why some workers join unions and others do not; strategy and tactics implemented by unions and management during organizing campaigns; present status of labor law as it affects organizing; creative approaches to union organizing; and the organizing model of unionism.



**ILRCB 404(4040) Contract Administration**

Fall. 4 credits. Prerequisites: ILRCB 201/501, 205/500. K. Bronfenbrenner.

Focuses on the practice, nature, and challenges of union representation under collective bargaining agreements. Working with union contracts, constitutions, and by-laws from a diversity of national and local public and private sector agreements, the course examines how U.S. unions represent their members in different industries and different collective bargaining environments. Issues addressed include union representative/steward rights and responsibilities, contract enforcement structures and practice, access to information, new work systems, hours of work and scheduling, contingent staffing arrangements, workplace discrimination, health and safety, promotional opportunities, downsizing, leadership development, membership involvement and commitment, internal organizing, community coalition building, and decertification campaigns. Students practice hands-on work in interpreting contract language and preparing and presenting grievances and unfair labor practices.

**ILRCB 407(4070) Contemporary Trade Union Movement**

Spring. 4 credits. Prerequisites: undergraduates, ILRCB 100; graduate students, ILRCB 502. R. Hurd.

Examination of contemporary trade union issues, including union power, political action, collective bargaining approaches, and organizing efforts. Covers structural, functional, and strategic aspects of contemporary unions. Speakers from the union movement address the class.

**ILRCB 482(4820) Ethics at Work**

Fall or spring. 4 credits. Prerequisite: junior or senior standing or permission of instructor. M. Gold.

Examines major theories of ethics, then applies them to issues in the employment relationship such as genetic screening of job applicants, random drug testing of employees, affirmative action, discipline for off-duty conduct, whistle-blowing, worker safety and cost/benefit analysis, comparable worth, strikes by employees providing crucial services, and crossing a picket line.

**ILRCB 488(4880) Liberty and Justice for All**

Fall or spring. 4 credits. Prerequisite: junior or senior standing or permission of instructor. M. Gold.

Examines major theories of ethics, then applies them to contemporary issues such as affirmative action and reverse discrimination, the right to life (from abortion to capital punishment), comparable worth, and constitutional rights such as freedom of speech.

**ILRCB 495(4950) Honors Program**

Fall and spring (yearlong). 4 credits each semester. Students are eligible for ILR senior honors program if they (1) are in upper 20 percent of their class at end of junior year; (2) propose an honors project, entailing research leading to completion of a thesis, to an ILR faculty member who agrees to act as thesis supervisor; and (3) submit project, endorsed by proposed faculty sponsor, to Committee on Academic Standards and Scholarships.

Accepted students embark on a two-semester sequence. The first semester consists of determining a research design, familiarization

with germane scholarly literature, and preliminary data collection. The second semester involves completion of the data collection and preparation of the honors thesis. At the end of the second semester, the candidate is examined orally on the completed thesis by a committee consisting of the thesis supervisor, a second faculty member designated by the appropriate department chair, and a representative of the Academic Standards and Scholarship Committee.

**ILRCB 497-498(4970-4980) Internship**

Fall and spring. 497, 4 credits; 498, 8 credits. Staff.

All requests for permission to register for an internship must be approved by the faculty member who will supervise the project and the chairman of the faculty member's academic department before submission for approval by the director of off-campus credit programs. Upon approval of the internship, the Office of Student Services will register each student for 497, for 4 credits graded A+ to F for individual research, and for 498, for 8 credits graded S-U, for completion of a professionally appropriate learning experience, which is graded by the faculty sponsor.

**ILRCB 499(4990) Directed Studies**

Fall and spring. 4 credits.

For individual or group research projects conducted under the direction of a member of the ILR faculty, in a special area of labor relations not covered by regular course offerings. Sophomores, juniors, and seniors with a preceding semester of 3.0 semester average are eligible to submit projects for approval by the Academic Standards Committee. Students should consult with a counselor in the Office of Student Services at the time of CourseEnroll to arrange for formal submission of their directed study.

**ILRCB 500(5000) Collective Bargaining**

Fall. 3 credits. Prerequisite: graduate standing. Recommended: previous or concurrent enrollment in ILRCB 501.

H. Katz, S. Kuruvilla, and L. Turner.

Comprehensive introduction to the industrial relations system of the United States. Covers the negotiation, scope, and day-to-day administration of contracts; union and employer bargaining structures; implications of industrial relations issues for U.S. competitiveness and public policy; industrial conflict; and U.S. industrial relations in international and comparative perspective.

**ILRCB 501(5010) Labor and Employment Law**

Fall. 3 credits. Prerequisite: graduate standing. L. Compa, M. Gold, and R. Lieberwitz.

Survey and analysis of the law governing labor relations and employee rights in the workplace. The first half of the course examines the legal framework in which collective bargaining takes place, including union organizational campaigns, negotiations for and enforcement of collective bargaining agreements, and the use of economic pressure. The second half surveys additional issues of rights in employment, including such topics as employment discrimination, the developing law of "unjust dismissal," and union democracy. Also serves as an introduction to judicial and administrative systems.

**ILRCB 502(5020) History of Industrial Relations in the United States since 1865**

Fall or spring. 3 credits. Prerequisite: graduate standing. C. Daniel, I. DeVault, and N. Salvatore.

Introductory survey course emphasizing historical developments in the 20th century. Special studies include labor union struggles over organizational alternatives and such other topics as industrial conflicts, working-class lifestyles, radicalism, welfare capitalism, union democracy, and the expanding authority of the federal government.

**ILRCB 504(5040) The U.S. Industrial Relations System**

4 credits. Offered only in New York City for M.P.S. program. Staff.

Examines the development, operation, and outcomes of the U.S. industrial relations system in a comparative context. Specifically, the course contrasts the American experience with industrial relations institutions and outcomes with the experience of several other countries in Europe and Asia. Students look at the process of union formation, the practice of collective bargaining at different levels, the methods of dispute resolution, and the legal regime germane to industrial relations. The course also focuses on both processes and outcomes of different country systems, focusing on the degree of collaboration or conflict, wage levels and wage inequality, and practices in different industries and firms. Finally the role played by industrial relations and human resource policy in economic and social development in these nations is addressed.

**ILRCB 602(6020) Arbitration**

Fall and spring. 4 credits. Limited to 21 students. Prerequisites: ILRCB 201, 205; 500 and 501. J. Gross and R. Lieberwitz.

Study of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of a mock arbitration hearing, and the preparation of arbitration opinions and post-hearing briefs.

**ILRCB 603(6030) The Economics of Collective Bargaining in Sports**

Fall or spring. 4 credits. L. Kahn.

Surveys economic and industrial issues in the sports industry. Topics include salary determination, including free agency, salary caps, salary arbitration; competitive balance and financial health of sports leagues; antitrust issues in sports; labor disputes, union history, and contract administration issues in sports leagues; discrimination in sports; and performance incentives.

**ILRCB 605(6050) Readings in the History of Industrial Relations in the United States**

Fall. 4 credits. Prerequisite: senior or graduate standing. C. Daniel and N. Salvatore.

Intensive seminar covering original printed sources and scholarly accounts for different periods in American history.

**ILRCB 606(6060) Theories of Industrial Relations Systems**

Fall or spring. 4 credits. Prerequisite: senior or graduate standing; ILRCB 100, 205, 500. H. Katz.

Traces the evolution of theory and research on industrial relations. Topics include theories

of the labor movement; institutional models and evidence regarding what unions do; the origins of internal labor markets and their relationship with unionization; models of strikes; empirical assessments of arbitration; research on union decline; and empirical evidence of the impacts of new technology.

**ILRCB 607(6070) Values in Law, Economics, and Industrial Relations**

Fall and spring. 4 credits. Limited to 21 students. Prerequisites: ILRCB 201, 205, 500, 501. J. Gross.

Examination of the often hidden values and assumptions that underlie the contemporary U.S. systems of employment law, work and business, and industrial relations. Classroom discussions and student research projects use novels and short stories (as well as the literature of industrial and labor relations) to focus on issues such as discrimination; law, economics, and the state; work and business; power, conflict, and protest; and rights and justice.

**ILRCB 608(6080) Sex Discrimination and the Law**

Fall or spring. 4 credits. Prerequisites: ILRCB 201, 501, or permission of instructor. R. Lieberwitz.

Lec 01—Examines various legal issues relevant to discrimination on the basis of sex. Problems analyzed include sexual harassment, pornography, reproductive rights, prostitution, work-family conflict, inequality in employment opportunities, gay and lesbian rights, welfare rights, and affirmative action.

**ILRCB 608(6080) Collective Bargaining Simulation**

Fall. 4 credits. Limited to 18 students. Prerequisite: junior, senior, or graduate standing. Recommended: previous or concurrent enrollment in collective bargaining theory and labor law course. Attendance at first class mandatory. Up to two required evening extended bargaining sessions. H. Kramer.

Lec 04—Students prepare for and participate in a simulated negotiation between a hypothetical corporation and a hypothetical union in a typical big company with mid-size single site bargaining unit context. Students are assigned, usually in line with preferences, to either a management or union bargaining team. The course stresses the negotiation process over settlement or substantive outcomes. Negotiation problems are as real life as possible, constrained by student time needs and with attention given to dynamic legal, political, economic, and communications concerns as well as power, information, and time factors. Participants plan for negotiations, reach agreements in principle and negotiate language, bargain wages, pensions, health care and noneconomic items in the context of a company and union with an established contract, policies, and culture. This is a hands-on program with active participation essential.

**ILRCB 608(6080) Labor and Employment Law and Immigrant Workers in the United States**

Fall. 4 credits. Prerequisites: ILRCB 201, 502. L. Compa.

Lec 05—Immigrant workers have surged into the U.S. labor force in recent years, creating new problems and new agendas for the labor law system. This course examines labor and employment law developments affecting documented and undocumented immigrant workers. Because labor economics

and immigration policy obviously set the framework for legal developments, some early classes and assignments address these issues. Most of the course is then devoted to federal and state legislation and case law on immigrant workers, focusing on labor and employment matters rather than immigration law as such.

**ILRCB 608(6080) Special Topics in International Labor and Employment Law**

Fall. 2 credits. Prerequisites: ILRCB 201/501. J.-P. Lavie.

Lec 07—This seven-week course explores, from an international and comparative perspective, various topics related to the regulation of work and workplace relations in a global economic environment.

**ILRCB 610(6011) Negotiation: Theory and Practice**

Fall or spring. 4 credits. Prerequisites: background in economics and social sciences, or permission of instructor. D. Lipsky and R. Seeber.

Deals with negotiation and bargaining, focusing on process, practice, and procedures. Concentrates on the use of negotiation and bargaining to resolve conflicts and disputes between organizations and groups. Discusses various theories of negotiation, including conventional, "positional" bargaining, interest-based bargaining, the use of power in negotiation, and game theoretic approaches to bargaining. Examples, cases, and exercises are used to illustrate general principles. This is a generic negotiation course and thus does not deal with labor relations nor does it focus on any particular type of negotiation. Rather, it examines negotiation and bargaining generally, using examples drawn from several contexts, including employment relations, environmental disputes, real estate transactions, and other settings.

**ILRCB 611(6012) Managing and Resolving Conflict**

Fall or spring. 4 credits. Prerequisite: background in economics and social sciences or permission of instructor. D. Lipsky and R. Seeber.

Deals with managing and resolving workplace conflicts and examines dispute resolution and conflict management in both union and nonunion settings. The course covers two related topics: (1) third-party dispute resolution, including alternative dispute resolution (ADR). It focuses primarily on the use of mediation and arbitration but also deals with other dispute resolution techniques, such as fact-finding, facilitation, mini-trials, early neutral evaluation, peer review, and the ombuds function; (2) conflict management in organizations, including the recent development of conflict management systems. The course reviews the factors that have caused the growth of ADR and conflict management systems, and it provides instruction on the design, implementation, and evaluation of such systems.

**ILRCB 618 (6018) Current Issues in Collective Bargaining: Theory and Practice**

Spring. 4 credits. K. Bronfenbrenner.

Designed to provide an in-depth examination of the contemporary collective bargaining process from a strategic and theoretical perspective. This is achieved both through a review of recent literature on bargaining theory and practice and through the analysis

and evaluation of a series of contract negotiations from a variety of industries, unions, strategic models, and outcomes. Subjects include: changing bargaining climate, bargaining theory, changes and variations in bargaining structures and practices, union and company power analysis, role of membership in bargaining, interest-based bargaining, strategic coordinated campaigns, strikes and lockouts, bargaining in a global economy, community labor coalitions, concessions and job security, and settlement and defining victory.

**ILRCB 650(6013) Service Work and Workers in Historical Perspective**

Fall or spring. 4 credits. I. DeVault.

Takes a historical perspective on the development of a service economy in the United States. Readings include general and theoretical works, but the main focus is recent historical scholarship on specific occupations and situations in the "nonproductive" workforce. Students explore primary sources for research on the subject and write research papers.

**ILRCB 651(6014) Industrial Relations in Transition**

Spring. 4 credits. Prerequisite: senior or graduate standing. H. Katz.

Considers whether recent developments such as concession bargaining, worker participation programs, and the growth of nonunion firms represent a fundamental transformation in industrial relations practice. Reviews recent research and new theories arguing that such a transformation is occurring, including the work of Piore and Sabel, Bluestone and Harrison, and Kochan, McKersie, and Katz. Also reviews the counterarguments and evidence put forth by those who believe no such transformation is under way. Course material focuses on industrial relations practice in the private sector in the United States, although some attention is paid to developments in Western Europe, the United Kingdom, and Japan.

**ILRCB 655(6014) Employment Law I**

Fall. 4 credits. Prerequisites: ILRCB 201, 501, or permission of instructor.

Attendance and participation mandatory. May be taken either before or after ILRCB 656. L. Adler.

Takes a similar approach to ILRCB 656, but the subject matter differs. Topics include employment at will and its exceptions; the role of the Constitution in the U.S. workplace; the law of electronic and traditional privacy at work; and the slowly evolving rights of contingent workers in the old and new economies. One study reviews primarily federal and state court decisions and focuses upon the way that employees' rights are advanced or constricted by law. There are considerable reading responsibilities.

**ILRCB 656(6016) Employment Law II**

Spring. 3 credits. Prerequisites: ILRCB 201, 501, or permission of instructor.

Attendance and class participation mandatory. May be taken either before or after ILRCB 655. L. Adler.

Takes a similar approach to ILRCB 655, but the subject matter differs. Topics include the meaning and validity of preemployment arbitration agreements; the critical distinctions in the status and thus the rights of employees, independent contractors, and contingent workers; what rights the working poor, the homeless, and workfare individuals have

on the "job;" and the origin and application of the workers' compensation laws that apply when people are injured or contract disease from their work. One study reviews primarily federal and state court decisions and focuses on the way that employees' rights are advanced or constricted by the law. There are considerable reading responsibilities.

**ILRCB 681(6810) International Labor Law**

Fall or spring. 4 credits. Prerequisites: undergraduates, ILRCB 201; graduate students, ILRCB 501. Fulfills ILRIC distribution requirement for ILR students. L. Compa.

Examines labor rights and labor standards in a world economy regulated by bilateral and multilateral trade agreements, in a context of sharp competition among countries and firms. Readings and discussions focus on the intersections of labor, human rights, and international trade law and policy in this new global economic context. A prior course in a related topic may be helpful but is not required—the first classes are meant to establish a foundation in each area. While labor law is a unifying theme, the course is more policy-oriented than legalistic. After the introductory classes on labor rights, human rights, and trade, the focus turns to a series of topics that reflect the links between labor rights and trade.

**ILRCB 683(6830) Research Seminar in the History of Industrial Relations**

Fall or spring. 4 credits. Prerequisites: ILRCB 100, 502. J. Cowie, C. Daniel, I. DeVault, and N. Salvatore.

Areas of study are determined each semester by the instructor offering the seminar.

**ILRCB 684(6840) Employment Discrimination and the Law**

Fall or spring. 4 credits. Prerequisite: ILRCB 201/501 or equivalent. M. Gold and R. Lieberwitz.

Examines the laws against employment discrimination based on race, color, religion, sex, national origin, age, and disability.

**ILRCB 686(6860) Collective Bargaining in Public Sector**

Fall or spring. 4 credits. Prerequisites: ILRCB 201 and 205/500. L. Adler.

Examines the history of public employees' collective bargaining and other workplace rights. Emphasis is placed on the current trade-offs between municipal and state governments and their unionized employees in New York City and state, although trends in other states, the federal sector, and in certain EU countries are also examined. Topics include representation rights, public sector workers ability to leverage their power, unfair labor practices, impasse procedures, the scope of collective bargaining, and a limited treatment of the U.S. constitution in the public workplace. Examination of the development, practice, and extent of collective bargaining between federal, state, and local governments and their employees. Throughout, we are mindful of how the exercise of public employee rights impacts municipal, state, and federal public policy labor market considerations. There are several prominent guest speakers.

**ILRCB 687(6870) Introduction to Labor Research**

Spring. 4 credits. Limited to 20 students. K. Bronfenbrenner.

Designed to provide students interested in the labor field with the skills necessary to understand and use social science research as it relates to the labor movement. The course's four major goals are to (1) develop the skills to critically evaluate a wide variety of research relating to unions and the workplace; (2) introduce a number of both quantitative and qualitative research techniques used by unions and those who study the labor movement; (3) familiarize students with the broad range of library and computer resources that can be used for labor and corporate research; and (4) provide students with an opportunity to design and conduct a research project for a national or local union.

**ILRCB 689(6890) Constitutional Aspects of Labor Law**

Fall or spring. 4 credits. R. Lieberwitz.

In-depth analysis of the Supreme Court decisions that interpret the United States Constitution as it applies in the workplace. Focuses on the First Amendment, Fifth Amendment, Fourteenth Amendment, and Commerce Clause, with issues including freedom of speech and association, equal protection, due process, and other issues in the area of political and civil rights. The course entails a high level of student participation in class discussion, and assignments include a research paper.

**ILRCB 703(7030) Qualitative Research Methods in Industrial Relations and Human Resources**

Spring. 4 credits. Prerequisite: M.S. and Ph.D. students; ILRCB 500. Recommended: statistics course beyond level of ILRST 510. S. Kuruvilla.

Advanced doctoral seminar that focuses on the philosophy of inquiry, generally, as well as the various paradigms governing research on work. The course further focuses on selected qualitative research methods used in research in industrial relations, human resource management, and organizational behavior.

**ILRCB 705(7050) The Economics of Collective Bargaining**

Spring. 3 credits. Prerequisites: ILRCB 500, ILRLE 540 or equivalents and an understanding of multiple regression analysis; or permission of instructor. Staff.

Focuses on both the economic analysis of unions and collective bargaining in our economy and the economic forces that affect collective bargaining. The method is to identify and conceptualize the structural determinants of relative bargaining power. On this basis, the course examines both the economic outcomes of collective bargaining and current bargaining trends in a variety of industries. Tentative theoretical analyses of unionism (neoclassical, institutionalist) are compared. The statistical techniques and empirical results of research on the union effect on economic outcomes (wages, prices, inflation, profits, productivity, earnings inequality) are also evaluated. The effect of technology, corporate structures, and public policy on union bargaining power is outlined, and a number of case studies of collective bargaining in the private sector are reviewed. A term paper is required.

**ILRCB 706(7060) Labor in Global Cities (also GOVT 706(7060))**

Fall. 3 credits. L. Turner.

Examines urban and labor literature, targeting selected cities to assess union influence and strategies in local politics, organizing, and coalition building. Each student chooses a city of particular interest and becomes an expert on that city's key unions, political actors, and corporations. The idea is to develop overall pictures of new union vitality (if and where it exists) based not only on particular unions, industries, and nations but also on regions, coalitions, and local politics.

**ILRCB 708(7080) Negotiations in Practice**

Fall. 3 credits. S. Kuruvilla.

Provides opportunities for students to develop their negotiating abilities for use in organizational and other settings. The course is premised on the assumption that negotiating concepts are best learned through practice that is grounded in rigorous analysis and reflection. While theoretical principles and concepts from various reference disciplines (e.g., social psychology, sociology, and economics) are presented through lectures and readings, this course focuses primarily on improving practical skills. Participants learn not only to enhance their individual abilities in dyadic and group situations but also to analyze contexts for the most effective application of these skills.

**ILRCB 783(7081) Seminar in American Labor History (also HIST 683(6830))**

3 credits. Prerequisite: graduate standing and permission of instructor. N. Salvatore.

Explores the relationship of scholarly biographical writing to the field of American social history. More and more historical biographies look to incorporate social analyses at the center of their biographical structures. Students read, discuss, and analyze the varied strengths and weaknesses of a number of these efforts. The author's understanding of the play between biographical subject and the larger social context, and its meaning for the structure of the book, are a point of inquiry that encourages numerous approaches and interpretations. A research paper is required.

**ILRCB 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits. Staff.

Supervised research only for those enrolled in the ILR M.P.S. program.

**ILRCB 798(7980) Internship**

Fall and spring. 1-3 credits.

Designed to grant credit for individual research under direction of a faculty member by graduate students who have been selected for an internship. All requests for permission to register for ILRCB 798 must be approved by the faculty member who will supervise the project.

**ILRCB 799(7990) Directed Studies**

Fall and spring. Credit TBA.

For individual research conducted under the direction of a member of the faculty.

**ILRCB 980(9800) Workshop in Collective Bargaining, Labor Law, and Labor History**

Fall and spring. 2 credits. Prerequisite: M.S. and Ph.D. candidates in department. S-U grades only. Staff.

Provides a forum for the presentation of current research being undertaken by faculty members and graduate students in the

Department of Collective Bargaining, Labor Law, and Labor History, and by invited guests. All M.S. and Ph.D. candidates in the department who are at work on their theses are strongly urged to enroll. Each student is expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of his or her thesis research.

## HUMAN RESOURCE STUDIES

L. Dyer, chair (393 Ives Hall, 255-8805);  
R. Batt, B. Bell, J. Bishop, V. Briggs,  
C. Collins, K. Hallock, J. Hausknecht, L. Nishii,  
Q. Roberson, S. Snell, W. Wasmuth, P. Wright

### **ILRHR 260(2600) Human Resource Management**

Fall. 3 credits. Prerequisite: ILR students or permission of instructor. Staff.  
Intended to introduce students to the field of human resource management (HRM). Students learn theories and applications involved in effectively managing people in organizations. In addition, this course covers current topics in HRM that have resulted from environmental and organizational challenges, e.g., technology, globalization, legislation, restructuring, work/life balance, changing labor markets, and so on. Emphasis is placed on developing relevant problem solving and critical thinking skills, as the basic concepts of HRM and the skills developed in this course are applicable to all types of organizations and jobs in which students will eventually work.

### **ILRHR 266(2660) Essential Desktop Applications**

Fall, spring, and summer. 2 credits. Limited enrollment. C. Homrighouse.  
Provides skills in the use of personal computers that run the Windows operating system. Covers the basics and time-saving techniques for Windows, Lexis Nexis, and Microsoft Excel, Access, and PowerPoint. Emphasizes hands-on experience and development of PC-based solutions by using examples that address human resource and other practical real-world issues. The skills developed in this course are useful prerequisites for several elective courses in human resource management and essential in the 21st-century workplace.

### **ILRHR 360(3600) Human Resource Economics and Public Policy**

Fall and spring. 4 credits. Prerequisite: sophomore, junior, or senior standing. J. Bishop.  
Review of labor-market trends, data collection systems, and theories pertaining to public efforts to develop the employment potential of the nation's human resources and to combat unemployment. Examines the major segments of the nation's educational training enterprise (e.g., public education, higher education, employer-provided training, apprenticeship, and special training programs for the economically disadvantaged). Also covers policies issues pertaining to welfare reform, direct job creation, worker relocation, economic development, and targeted tax credits.

### **ILRHR 362(3620) Career Development: Theory and Practice**

Fall, spring, seven weeks. 2 credits.  
Limited to 30 students. S-U grades only.  
L. Gasser.

Covers the components of career management, individual factors, and organizational realities in the development of both careers and organized programs for career management. Two complementary learning tasks are required: information-gathering for career decision making based on self-assessment activities, and comprehension of organizational circumstances and practices encountered as careers develop. Grades are based on short writing assignments and a research paper.

### **ILRHR 365(3650) Organizational Consulting: Process and Results**

Fall. 4 credits. Prerequisite: ILRHR 260 or equivalent. R. B. Hewerston.  
Provides students with the insights and tools they need to work successfully as human resource generalists who consult with operating managers to improve organizational effectiveness. The consulting process is examined from both an interpersonal and systems perspective. This includes the knowledge and skills required to build trust and influence, contract with clients, and maintain good working relationships with clients. It also includes developing a clear comprehension of the consulting process from diagnosis, through action planning, to implementation and completion. While attention is given to theory and practice, the focus is on gaining hands-on experience dealing with real-world issues. As a final project, students design and present consulting plans based on actual case situations (e.g., implementing a new HR program, effectuating a new organizational culture, and enhancing project team operations).

### **ILRHR 367(3670) Employee Training and Development**

Fall. 4 credits. Prerequisite: ILRHR 260; undergraduate standing. B. Bell.  
Faced with increasing competition, globalization, technological complexities, and dynamic labor markets, firms increasingly are struggling to determine the best approaches to training and developing their workforces. This course introduces the issues, concepts, and processes with which firms are wrestling, as well as specifics on planning, designing, implementing, and evaluating training and development programs. After completing this course, participants should be able to conduct a needs assessment, evaluate employee readiness, evaluate the strengths and weaknesses of various training and development techniques, solve transfer of learning problems, and design evaluation procedures.

### **ILRHR 456(4600) International Human Resource Management**

Fall. 4 credits. Prerequisite: ILRHR 260 or equivalent. L. Nishii.  
Illustrates how cultural context affects the structure and implementation of HR practices. The first part focuses on comparative human resource management or the study of how HRM differs across cultures, with a primary emphasis on comparing American HRM practices with those in East Asia and a secondary focus on Western European HRM practices. Class readings and discussions are grounded in theories of cultural variation.

The second part focuses on IHRM, or the HRM issues facing multinational corporations. Topics include expatriation and repatriation, global leadership, compensation, and training.

### **ILRHR 461(4610) Working in the New Economy: The Sociology of Work**

Spring. 4 credits. Prerequisite: undergraduate standing. R. Batt.  
Seminar that draws on qualitative studies of the workplace to examine how workers and managers are affected by changes in technologies, business strategies, labor markets, and other external factors. What dilemmas and conflicts emerge, how are they managed, and what are their outcomes? Readings cover firsthand accounts of people's experiences in a wide range of occupations and industries, including professional, service, and factory workers.

### **ILRHR 462(4620) Staffing Organizations**

Spring. 4 credits. Prerequisite: undergraduate standing. C. Collins and J. Hausknecht.  
Seminar designed to provide an overview of the processes by which organizations staff positions with both internal and external applicants. Through a combination of lectures, cases, and projects, the course covers theory, research, and legal foundations that inform organizational staffing actions. Topics include staffing strategy and context, measurement of staffing effectiveness, job/competency analysis, human resource planning, recruitment and job choice, retention, and internal and external selection practices.

### **ILRHR 463(4630) Diversity and Employee Relations**

Fall. 4 credits. Prerequisite: undergraduate standing. Q. Roberson.  
Designed to provide an opportunity for students to understand the importance of, and develop competencies for, promoting organizational justice and building inclusive work environments. The first half of the course focuses on identifying differences and similarities in the experiences, needs, and beliefs of people from diverse backgrounds as well as assisting students in developing sensitivity to such differences. The second half focuses on stimulating critical thinking regarding the management of diversity and employee relations in organizations as well as increasing students' knowledge of HR policies and practices designed to manage these issues effectively. To achieve these goals, the course uses an experiential design that includes readings, exercises, cases, and class discussion.

### **ILRHR 464(4640) Business Strategy**

Fall. 4 credits. Prerequisite: undergraduate standing. C. Collins.  
Integrative course focusing on strategic management. The main purpose is to provide an opportunity for students to study and analyze issues associated with strategic thinking in complex business situations, top management decision making, and the functions of corporations as a whole. Allows students to bring together all of the functional skills they have learned in other business or related classes (e.g., marketing, accounting, finance, human resources) and to apply this knowledge to business problems faced by top management in existing organizations. Class format includes lectures and case studies.



**ILRHR 465(4650) Globalization at Work**

Spring. 4 credits. Prerequisite: undergraduate standing. R. Batt. Seminar that examines how firms are responding to globalization and compares the strategies and outcomes of restructuring in manufacturing and service enterprises. While globalization has been a continuing phenomenon in manufacturing, recent changes in multilateral agreements, advances in information technology, and market deregulation have led to a process of globalization in service activities as well. Outcomes for firms, employees, consumers, and unions are examined.

**ILRHR 466(4660) Entrepreneurship and Small Business**

Fall. 4 credits. Prerequisite: undergraduate standing. M. Allen. Broadly addresses strategic issues in the management of entrepreneurial firms and small businesses. Topics include strategy, performance, financial planning, growth, and innovation. With each topic, implications for human resource management within these organizations are addressed. The course consists of a mix of lectures, case studies, guest speakers, and a final group project.

**ILRHR 468(4680) Human Resources Management Simulation**

Fall, seven weeks. 2 credits. Limited to 30 students. Prerequisite: junior or senior standing; ILRHR 260 or equivalent. Regular attendance mandatory. W. Wasmuth. Uses a simulation model and an open-systems approach as means to enhance students' skills in strategic planning and managerial decision making. Attention is given to the implications and efforts of strategic human resource managerial and supervisory decisions as measured by 10 organizational performance indicators, including quality of work life, employee productivity, customer satisfaction, employee retention, internal control, and the bottom line. Each student is assigned to a group (team) of five members and must be committed to the work of that group. An individual research paper is also required.

**ILRHR 469(4690) Immigration Policy and the American Labor Force**

Spring. 4 credits. Prerequisite: undergraduate standing. V. Briggs. Assesses the role that immigration policy plays as an instrument of human resource development in the United States. Places immigration policy in an evolutionary context but gives primary attention to the post-1965 revival of mass immigration. In addition to legal immigration, policies pertaining to illegal immigration, border commuters, "maquiladoras," refugees, asylees, and nonimmigrant workers are examined. Comparisons are also made with immigration systems of other nations.

**ILRHR 495(4950) Honors Program**

Fall and spring (yearlong). 4 credits each semester. For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 497-498(4970-4980) Internship**

Fall and spring. 4 and 8 credits. For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 499(4990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 560(5600) Human Resource Management**

Fall and spring. 3 credits. Prerequisite: graduate standing. Staff. Survey course designed to provide an introduction to concepts and topics in human resource management. Consideration is given to theories and applications involved in effectively managing people in organizations. Topics include recruitment, staffing, training, performance management, retention, compensation, international human resource management, and the legal environment. Emphasis is placed on exploring these issues from both strategic and tactical levels to increase organizational effectiveness.

**ILRHR 564(5640) Human Resources Management in Effective Organizations**

Fall or spring. 4 credits. Offered only in New York City for M.P.S. program. Staff. Offers students the opportunity to become better prepared to make effective decisions about human resources. Successful organizations depend on people, their human resources. The first module examines strategic human resource management and the effects of HR decisions on organization success and fair treatment of people. The second module focuses on alternative systems used to staff and develop people. The third module focuses on compensating and rewarding people. The final module includes employee relations and alternative work systems. Case and field studies are used throughout the course.

**ILRHR 653(6601) Research on Education Reform and Human Resource Policy**

Spring. 4 credits. J. Bishop. State and local efforts to improve K-12 education are employing a variety of (sometimes contradictory) reform strategies. This research seminar critically examines the case that is made for (and against) each of the major reform proposals and review studies that provide objective evidence on their effectiveness. The education reform strategies examined include vouchers, charter schools, small schools, career academies, direct instruction versus discovery learning, extending the school day and year, better preparation and selection of new teachers, better professional development, ending tenure, merit pay, state standards and school accountability, ending social promotion, and externally set end-of-course examinations.

**ILRHR 654(6602) Introduction to HR Information Systems**

Fall, seven weeks. 1 credit. Prerequisite: ILRHR 266 or equivalent; use of Access or similar database package for at least data entry and report generation. C. Homrighouse. Focuses on understanding how and why human resource information systems are developed, maintained, and managed. A database is designed from the ground up, beginning with basic instruction on the need for and how to create a relational database. Once the initial design is in place, the data are manipulated to create reports, forms, and queries to assist in human resource decisions. The course examines ways to make databases efficient and consistent. Production database systems such as PeopleSoft also are reviewed and used. All instruction is hands-on and supplemented with assigned readings and guest lecturers.

**ILRHR 658(6604) Field Study in Strategic Human Resources**

Spring. 4 credits. Limited to 25 students. P. Wright. Provides students with in-depth classroom instruction on HRM in a specific region of the world, and a one- to three-week visit to the region to explore human resource strategies and practices firsthand. This year's focus is the European Union. Attention is paid to the development of selected European business entities, the history, role, and current efforts of the European Union in the workplace, and local cultural nuances as they affect the world of work. Students are asked to compare and contrast significant aspects of the dominant U.S. strategic HR model with strategic HR models found in the EU. The field visit is to Brussels, with potential for further travel to The Hague and Amsterdam. Travel dates TBA. Fees for participation in the course are expected to be approximately \$2,500, payable in advance. Students incorporate their learning in the classroom and on the field visit in a final paper and/or class presentation. Papers and projects are due the final week of classes. Those enrolled must have valid passport and will be required to prove adequacy of medical coverage and complete a release of liability for international travel.

**ILRHR 659(6590) HR Challenge: Balancing, Ethics, Economics, and Social Responsibility**

Spring, seven-week course. 1.5 credits. Limited to 15 students. Prerequisite: ILRHR 260/560; MLR graduates; seniors by permission of instructor. Letter grades only. P. Wright.

Examines the challenges of synthesizing personal/professional ethics with professional responsibilities and synthesizing organizational economic demands with social responsibility, particularly focusing on how these issues impact HR professionals. These concerns are examined from both ends of the political spectrum. The course is taught in a seminar format in which students are expected to participate in and lead class discussions.

**ILRHR 660(6600) HR Leadership: Views from the Top**

Fall. 4 credits. Limited to 30 students. Prerequisites: ILRHR 260/560 or equivalent, senior or graduate standing, and permission of instructor. L. Dyer.

Hands-on course offering students a unique opportunity to learn about strategic business and human resource issues from the perspectives of senior HR executives. Five chief human resource officers (CHROs) from major corporations meet with the class for lively give-and-take sessions on subjects of strategic and topical interest to their organizations. Before their visits, teams prepare background papers on the speakers, their companies, and their topics. Students discuss these papers before the visits to assure readiness to address the issues at hand when the CHROs arrive. During the visits the teams host the CHROs and usually have an opportunity to interact informally with them. After the visits, the teams revise their background papers into white papers that reflect insights gleaned from their research and discussions. Subsequently, all five white papers are assembled in a book that is shared with the CHROs and others.



**ILRHR 661(6610) Applied Personal and Organization Development**

Fall. 4 credits. Prerequisite: senior or graduate standing. C. Warzinski.

Experiential course that deals with OD and its role in the organizational change process. Combines the opportunity for hands-on practice in a workshop setting. Students are responsible for researching and writing a paper that examines a specific method, technique, or critical issue; preparing an in-class demonstration/presentation illustrating applications of a chosen subject; and completing a final project requiring a comprehensive proposal that describes an appropriate and logically supported intervention strategy.

**ILRHR 662(6620) The Agile Enterprise: Exploring the Dynamics of Marketplace and Organizational Agility**

Fall. 4 credits. Prerequisites: ILRHR 260/560 and additional course work in business and human resource strategy. L. Dyer.

Increasingly, dynamic external environments are encouraging active experimentation with new (i.e., nonbureaucratic) organizational paradigms. One such paradigm is the agile enterprise. This course explores the dynamics of the agile enterprise with particular emphasis on underlying justification and rationale, approaches to pursuing marketplace agility, and infrastructure designs and human resource strategies, as well as new approaches to leadership. But learning about the agile enterprise is one thing, learning to operate and live in one is another. Thus this course is mostly experiential and is conducted as much like an agile enterprise as is possible in an academic setting. In pursuit of a vision and armed with a few basic principles, students learn to self-organize and function autonomously, albeit with accountability, and to use their experiences to enhance their, and others', learning about the pluses and minuses of life in an agile enterprise.

**ILRHR 663(6630) Managerial Financial Analysis**

Fall. 4 credits. Prerequisite: ILRHR 560 and one statistics course or permission of instructor. Q. Roberson.

Intended for students with limited knowledge of accounting and finance who want a better understanding of financial statements and measures that are affected directly or indirectly by the HR function. Provides a comprehensive introduction to financial statement and cash flow analysis with the goal of teaching students to compare firms' historical, current, and prospective financial condition and performance. Examines the basic concepts of accounting, major groups of accounts, financial statements that make up a company's annual report, and commonly used financial ratios.

**ILRHR 664(6640) HR Online Research and Reporting Methods for Executive Decision-Making**

Spring. 4 credits. Limited to 20 students. Prerequisite: ILRHR 560/260 or equivalent. S. Basefsky.

Designed to develop key HR competencies and skills for researching and presenting information necessary for executive decision-making. Includes a comprehensive overview of primarily web-based resources available to HR executives. Emphasizes hands-on training in the best techniques and methods for extracting conceptual frameworks, checklists,

best practices, competitive intelligence, legal information, statistical data, and academic research on topics of current interest to industry. Interviewing skills, report writing and presentation methods are imparted. Following five weeks of intense information instruction and hands-on experience, students act as consultants in a combined classroom and workplace setting as they work on special projects and topics posed by HR executives of primarily Fortune 500 companies. These team-based assignments give students exposure to different companies, their cultures, and executives while providing real work experience.

**ILRHR 665(6650) Business Strategy and Human Resources**

Fall. 4 credits. Limited enrollment.

Prerequisite: ILRHR 260/560; three other courses in human resource studies; permission of instructor. P. Wright.

In this capstone course in HR studies, students integrate the theories and practices learned in other courses, to explore the linkages between business strategy and HRM. Extensive fieldwork is involved. The field projects are designed to make students explore and understand business strategy and draw upon and integrate their course work in HR staffing, training and development, compensation and rewards, and new work systems.

**ILRHR 666(6660) Strategic HR Metrics**

Spring. 4 credits. Prerequisites: ILRHR 260/560 or equivalent, one statistics course, one elective in HR studies. P. Wright.

The search for the ideal strategic HR metrics misses the larger issue of taking a more analytical approach toward HR decision making. Analytics requires understanding the process through which knowledge is gained, and then applying the tools and techniques to gather and analyze the right kind of data relevant to the question at hand. This course covers topics such as philosophy of science, theory development, research methodology, data analysis and interpretation as well as data and practices commonly used to assess the effectiveness of HR activities. Consequently, the class simultaneously addresses the types of information needed for HR decision making, as well as the processes and techniques necessary to gather, integrate, and analyze the data.

**ILRHR 667(6670) Diversity and Inclusion in Organizations**

Spring. 4 credits. Prerequisite: ILRHR 260/560 or permission of instructor. Q. Roberson.

Explores diversity management in organizations. The primary goals are to increase students' knowledge of strategic and tactical uses of HR practices and policies to effectively manage organizational diversity issues and to create inclusive work climates. In addition, the course aims to develop students' skills in the practical management of diversity, particularly linking diversity strategy to business strategy and developing diversity initiatives to help improve organizational competitiveness and enhance bottom-line outcomes.

**ILRHR 668(6680) Staffing Organizations**

Spring. 4 credits. Prerequisites: ILRHR 260/560, one statistics course, or permission of instructor. C. Collins and J. Hausknecht.

Seminar providing an overview of the processes by which organizations staff positions with both internal and external applicants. Because staffing is one of the primary human resource activities, it is critical for human resource professionals to understand how theory, research, and legal foundations can inform staffing decisions. Therefore, this course focuses on theories, research, policies, and practices concerning job recruitment and selection. Topics include staffing strategy and context, measurement of staffing effectiveness, job/competency analysis, human resource planning, recruitment and job choice, and internal and external selection practices.

**ILRHR 669(6690) Managing Compensation**

Spring. 4 credits. Limited to 30 students.

Prerequisites: ILRHR 260/560 and statistics course. Staff.

Helps students gain an understanding of how to make decisions about compensation. The strong focus is on applications and includes some discussion of recent theory and research. By the end of the course, you should be able to design your own compensation system from scratch. Issues we consider include how compensation fits with an overall HR strategy, the internal focus on the firm (including alignment, job analysis, and job evaluation), making pay competitive with the outside market (including designing pay levels, types of pay and pay structures), considering individual contributions (by examining performance appraisals, pay-for-performance, and stock options), benefits (such as pensions, child care, and health care), management (including government regulation and managing budgets), and dealing with international issues in setting pay plans. A substantial section focuses on executive compensation and also examines how a consultant might estimate the damages to an employee in the case of wrongful termination.

**ILRHR 690(6900) International Comparative Human Resource Management**

Fall. 4 credits. Prerequisite: ILRHR 260/560 or permission of instructor. L. Nishii.

Provides students with an understanding of the complexities associated with international human resource management. The central theme of the course is to identify whether and in what ways HRM practices need to be adapted across cultures to be effective. Course material reflects a focus on comparing American HRM practices with those in East Asia and Western Europe. In addition, the major topic areas of concern to IHRM managers are covered, including the selection, training, compensation, and performance management of international managers (expatriates), coordination across subsidiaries of a company, the development and tracking of global leaders, and cross-cultural communication and negotiation.

**ILRHR 691(6910) Finance for Human Resources**

Fall. 4 credits. K. Hallock.

Helps students understand some basic ideas in finance from the perspective of human resource management. Broadly considers certain topics that include: overview of financial markets, how firms issue securities, history and pitfalls in investing, the time value of money, investment criteria such

as net present value, risk versus return and the opportunity cost of capital, capital asset pricing, capital budgeting and risk, market efficiency and predictability, measuring firm financial performance and reading financial statements, event studies in finance and economics, mergers, ESOPs and stock options, executive compensation, the relationship between job loss and firm outcomes, and other forms of organizational form such as nonprofits. Covers theoretical ideas and has many empirical, policy, and practitioner-relevant applications.

**ILRHR 693(6930) Training and Development in Organizations**

Spring. 4 credits. Prerequisite: ILRHR 560 or permission of instructor. B. Bell. Acquaints students with aspects of learning in organizations. Begins by discussing organizational learning and then focuses more narrowly on specific ways in which learning is achieved through the training and development functions. Topics include how learning is linked to organizational strategy, how to determine that training is needed, issues regarding the design of training programs, current training techniques, evaluation strategies, and management development practices.

**ILRHR 694(6940) Competing in Services: Management, Marketing, and HR Strategies**

Spring. 4 credits. Prerequisites: HR 560 or equivalent; permission of instructor. R. Batt. Examines alternative service management strategies and outcomes, with particular focus on customer relationship management. Priority is given to analyzing the relationship between business strategy, marketing, operations management, organizational structures, and human resource practices. Student projects focus on critical analysis of service management in particular companies and industries, using live cases where possible.

**ILRHR 695(6950) Education, Technology, and Productivity**

Fall. 4 credits. J. Bishop. This seminar investigates the nexus between the education and training in schools and at the workplace and the technological progressiveness, productivity, and competitiveness of firms, individuals, and nations. Students investigate how technological progress is changing the nature of work and what this implies for reform of education and training; how education and training contribute to growth and competitiveness; why educational achievement has declined; and how the responsibility for education and training should be apportioned among individuals, firms, private nonprofit organizations, and government.

**ILRHR 696(6960) Strategic Management**

Fall. 4 credits. Prerequisite: senior or graduate standing. S. Snell. Offers students the opportunity to analyze companies from a strategic perspective; how firms position themselves in the context of competitive environments, and how they develop capabilities that drive sustainable advantage and performance. Throughout the course, emphasis is placed on the role executives play in creating value for customers, shareholders, and employees. Students engage in a series of analyses that integrate external factors, including key industry forces, as well as internal factors such

as competencies, structures, and systems. In this regard, the course goes beyond issues of strategy formation to also include elements of implementation, alignment, change and organizational learning.

**ILRHR 697(6970) Special Topics in Resource Studies**

Fall or spring. 4 credits. Staff. Areas of study are determined each semester by the instructor offering the seminar.

**ILRHR 698(6980) International Human Resource Policies and Institutions**

Spring. 4 credits. J. Bishop. Comparative study of human resource policies and institutions in Western Europe, North America, Japan, and East Asia (with special emphasis on math and science education) and of the effects of these institutions on productivity, growth, and equality of opportunity. The institutions studied include primary and secondary education, apprenticeship, employer training, and higher education. Data on the consequences of policies are presented and an effort made to understand how human resource policies and institutions have contributed to the rapid growth and low levels of inequality in Europe and East Asia. An important focus of the course is understanding the causes of the low levels of achievement of American high school students relative to their counterparts abroad.

**ILRHR 699(6990) Advanced Desktop Applications**

Spring. 1 credit. Prerequisite: ILRHR 266 or significant experience (two to four years) using office applications. Letter grades only. C. Homrighouse. Explores advanced topics for common desktop applications including Windows, Word, Excel, Access, and PowerPoint. The course is designed based on student input and instructor recommendations, covering those subjects that students feel would be most useful and relevant in the job market. Examples of areas include working with tables, columns, or sections in Word, pivot tables in Excel; taking a PowerPoint presentation "on the road"; and using join tables to create relationships in Access.

**ILRHR 760(7600) Seminar in Human Resource Studies**

Fall or spring. 3 credits. Prerequisites: ILRHR 560, ILRST 510/511, and ILRHR 669 and permission of instructor. Staff. "Floating" seminar designed to give faculty and students an opportunity to pursue specific topics in detail, with an emphasis on theory and research. Topics vary from semester to semester. Interested students should consult current course announcements for details.

**ILRHR 763(7630) Interdisciplinary Perspectives on the Organization of Work**

Fall or spring. 4 credits. R. Batt. Ph.D. seminar examining the theoretical and empirical literature on the organization of work. Topics include studies of group effectiveness, teams, social capital, and recent critical and international research. Draws on alternative perspectives from psychology, sociology, engineering, organization studies, economics, and industrial relations.

**ILRHR 764(7640) Comparative International Perspectives on Work and Human Resource Systems**

Fall or spring. 3 credits. R. Batt. Research seminar focusing on comparative international research on work and human resource systems. It draws on institutional theories and empirical research across several disciplines to examine the intersection between institutions and organizations. What is the relative importance of markets, technology, management strategies, and the institutional environment in shaping work and employment systems? It considers how and why firms adopt alternative approaches to work and how variation in these choices shapes outcomes of interest to firms, employees, and other key stakeholder groups. The seminar is designed to help students formulate theoretically driven research questions of critical importance to the field and to develop appropriate qualitative and quantitative research methodologies.

**ILRHR 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits. Supervised research only for those enrolled in the ILR M.P.S. program.

**ILRHR 798(7980) Internship**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 799(7990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 960(9600) Workshop in Human Resource Studies**

Fall and spring. 2 credits. Prerequisite: M.S. and Ph.D. candidates. S-U grades only. Staff. Provides a forum for the presentation and critical discussion of current research being undertaken by graduate students, faculty members, and invited guests in the field of human resource studies. All M.S. and Ph.D. candidates in the Department of Human Resource Studies are urged to enroll; candidates in other departments are cordially invited. Each participant has an opportunity to benefit from the collective wisdom of the others in the formulation, design, and execution of his or her research, as well as to become current on the latest developments in the field.

**ILRHR 961(9610) Doctoral Research Seminar in Human Resource Management**

Fall or spring. 3 credits. Prerequisite: Ph.D. candidates. Staff. Aimed at reading, understanding, and conducting research in HRM. Students should obtain thorough understanding of the current research in traditional areas of HRM such as validation, job analysis, EEO, selection, performance appraisal, compensation, and training and should develop the skills necessary to evaluate, criticize, and contribute to the literature on HRM.

**ILRHR 962(9620) Doctoral Research Seminar in Strategic Human Resource Management**

Fall or spring. 3 credits. Prerequisite: Ph.D. candidates. Staff. Aimed at reading, understanding, and conducting research in SHRM. The course should enable students to obtain a thorough understanding of the current research in SHRM and to develop the skills necessary to evaluate, criticize, and contribute to the literature on SHRM.

**ILRHR 963(9630) Research Methods in HRM/Strategic Human Resource Management**

Fall and spring. 3 credits. Prerequisite: Ph.D. candidates. Staff.

Designed to build social science research skills, particularly in the area of human resource studies (HRS). Topics include measurement reliability, construct validity, design of studies, external validity, meta-analysis, critiquing/reviewing HRS research, publishing HRS research, and applications of statistical models of HRS issues.

**INTERNATIONAL AND COMPARATIVE LABOR**

L. Turner, chair (296 Ives Hall, 255-2279); J. Abowd, R. Batt, J. Bishop, F. Blau, G. Boyer, V. Briggs, M. Cook, I. DeVault, G. Fields, L. Kahn, H. Katz, S. Kuruvilla, L. Nishii

**ILRIC 333(4330) Politics of the Global North (also GOVT 330(3303))**

Fall. 4 credits. L. Turner.

Covers current global debates, comparative political economy of Europe, the United States, and Japan, with a focus on labor and environmental coalitions for domestic reform and global justice.

**[ILRIC 339(3390) The Political Economy of Mexico]**

Spring. 4 credits. Not offered 2006–2007. M. Cook.

Explores the range of challenges affecting contemporary Mexican politics, society, and economic development—from democratization to immigration to NAFTA. Provides both an introduction to Mexican political economy for those with no prior background and an opportunity for students with more knowledge of Mexico to explore a research topic in greater depth.]

**ILRIC 499(4990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRIC 533(6330) Politics of the Global North (also GOVT 330(3303))**

Fall. 4 credits. Prerequisite: graduate standing. L. Turner.

For description, see ILRIC 333. Graduate students also submit an analytical term paper at the end of the semester.

**ILRIC 630(6331) Special Topics**

Fall. 4 credits. M. Cook.

Devoted to new topics in the field. The specific content and emphasis vary depending upon the interests of the faculty member teaching the course.

**ILRIC 630(6331) Political Economy of United Kingdom**

Spring. 4 credits. Prerequisite: ILR 300/205 or 500 or permission of instructor. R. Givan.

Lec 03—Examines key issues in British politics, the economy, and society in recent years. Themes include Thatcherism, the rise of New Labour, trade unions, changing labor markets and changing work, race and immigration, social policy and welfare reform. No prior knowledge of the UK is expected, but students have the option of writing an in-depth research paper.

**ILRIC 631(4310) Comparative Labor Movements in Latin America**

Fall. 4 credits. M. Cook.

Examines the historical development of labor movements in Latin America, their role in national political and economic development, and the impact of economic liberalization, authoritarianism, and redemocratization on contemporary labor organizations in the region. Countries examined include, but are not limited to, Mexico, Brazil, Argentina, Chile, Peru, and Guatemala.

**ILRIC 632(6320) Revitalizing the Labor Movement: A Comparative Perspective**

Spring. 4 credits. Prerequisite: graduate students; seniors by permission of instructor. L. Turner.

Graduate seminar examining contemporary efforts in the United States and Europe to revitalize unions and reform industrial relations. The first half of the course examines contemporary reform efforts in the United States. The second half covers Britain, Germany, Italy, Spain, the "Europeanization" of labor, and/or related topics depending on student interest.

**[ILRIC 633(6331) Labor, Industry, and Politics in Germany]**

Fall. 4 credits. Prerequisite: graduate standing; seniors by permission of instructor. Not offered 2006–2007. L. Turner.

Is the successful postwar "social partnership" model of organized capitalism in the Federal Republic of Germany viable in the 21st century? To answer this question, this course looks at the works councils and codetermination, the rise of a strong postwar labor movement, the contemporary German version of social partnership, with an emphasis on current events and the new challenges for German industry and labor posed by German unification and European integration.]

**[ILRIC 635(4350) Labor Markets and Income Distribution in Developing Countries]**

Spring. 4 credits. Prerequisite: ILRLE 240/540 or ECON 313 or permission of instructor. Not offered 2006–2007. G. Fields.

Analyzes who benefits and how much from economic growth in developing countries and how income distribution would be affected by various public policies. Topics include poverty, inequality, economic mobility, and social welfare; poverty profiles, earnings functions, and decompositions; employment, unemployment, wages, and labor markets; and an introduction to public economics and development policy.]

**ILRIC 636(6360) Comparative History of Women and Work (also FGSS 636(6360))**

Spring. 4 credits. Prerequisite: permission of instructor. I. DeVault.

Explores the similarities and differences between different cultures' assumptions about the work of women as well as women's experiences in varying work circumstances throughout history. Beginning with theoretical pieces and overviews of the history of women and work, most of the course consists of in-depth examinations of specific work situations or occupations across time and geography. Comparative examples are taken from the United States, Europe, and the Third World.

**ILRIC 637(6370) Labor Relations in Asia**

Fall. 4 credits. Prerequisite: permission of instructor. S. Kuruvilla.

Comparative survey of the industrial relations systems of selected Asian nations such as Japan, South Korea, Thailand, Malaysia, Singapore, Hong Kong, China, and several others. Emphasizes economic development strategies and industrial relations policies in these countries. Industrial relations practices, the extent of union organization, and labor force demographics of these countries are examined. The primary objective is to provide students with an introduction to industrial relations systems in Asia. The countries chosen are representative but not exhaustive.

**[ILRIC 638(6380) Labor, Free Trade, and Economic Integration in the Americas]**

Fall. 4 credits. Limited enrollment.

Prerequisite: senior or graduate standing; juniors by permission of instructor. Not offered 2006–2007. M. Cook.

Analyzes the contemporary movements toward free trade and regional economic integration in the Western Hemisphere. Special attention is paid to labor's role and to transnational movements in the region. Examines the origins and implications of the North American Free Trade Agreement (NAFTA) and looks at integration schemes in South America (Mercosur), Central America, and the Caribbean and at hemisphere-wide initiatives. A research paper is required.]

**ILRIC 639(6390) Building a "Social Europe": Regional Integration in the Global Economy**

Spring. 4 credits. Limited enrollment.

Prerequisite: graduate standing; seniors by permission of instructor. L. Turner.

Seminar addresses questions such as, what have the European Union and its member nations done to develop and reform the social dimension since the 1990s? How are the major actors—labor, government, and business—positioned to influence social policy and industrial relations reform, and what strategies are they pursuing? What are the prospects for "social Europe" in an increasingly deregulated global economy?

**ILRIC 730(7300) Research Seminar on Labor Markets in Comparative Perspective**

Fall and spring. 3 credits. Prerequisite: M.S. and Ph.D. students. G. Fields.

Research seminar for students writing theses or dissertations on economic aspects of labor markets in comparative perspective. Addresses research questions, methodologies, and contributions in the areas of employment and unemployment, income and earnings, educational and human resource development, welfare economics, and economic growth. Presentations and written papers are required.

**[ILRIC 731(7310) Industrial Relations in Latin America]**

Spring. 4 credits. Not offered 2006–2007. M. Cook.

Faced with the competitive pressures brought on by globalization, employers and governments throughout the region are transforming practices, laws, policies, and institutions that shape the industrial relations arena. This course analyzes and compares the extent and character of these changes, the responses and strategies of trade unions and other political and social actors, and the

implications of industrial relations changes in the region for economic development, political stability, and democracy. The aim is to introduce students to the key issues in contemporary Latin American industrial relations and, through individual research papers, to enable students to become familiar with a specific country or sector/theme in two or more countries of the region.]

**[ILRIC 737(7370) Special Topics: Labor, Democracy, and Globalization in the South]**

Spring. 4 credits. Not offered 2006-2007. M. Cook.

Labor movements in developing countries face distinct challenges from those in advanced industrial countries. This course examines two of the most important recent changes to affect countries in the developing "South" in recent years: democratization and the adoption of market-oriented economic reforms. It focuses on how these "dual transitions" affect workers and labor organizations in developing countries and on labor's responses to political and economic change. Among the issues examined are labor's role in political democratization, factors driving market reform and labor responses, the effects of economic liberalization on labor, national versus industry analyses of change, labor law and policy reform, national protections for labor rights and international labor standards, global trade and Southern country alliances, and issues in North-South labor relations.]

**ILRIC 739(7390) The Political Economy of Mexico**

Spring. 4 credits. M. Cook.

For description, see ILRIC 339. Graduate students attend ILRIC 339 lectures, meet with the professor, and write a research paper.

**ILRIC 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits.

Supervised research only for those enrolled in the ILR M.P.S. program.

**ILRIC 799(7990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**Other courses approved to fulfill the ILRIC distribution requirement**

**ILRCB 304(3040) Latin American Labor History**

Fall. J. Cowie.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRCB 383(3830) Workers' Rights as Human Rights**

Fall. J. Gross.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRCB 681(6810) International Labor Law**

Spring. L. Compa.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRHR 456(4600) International Human Resource Management**

Spring. Staff.

For description, see "Human Resource Studies."

**ILRHR 461(4610) Working in the New Economy: The Sociology of Work**

Spring. R. Batt.

For description, see "Human Resource Studies."

**ILRHR 465(4650) The Globalization at Work**

Spring. R. Batt.

For description, see "Human Resource Studies."

**ILRHR 469(4690) Immigration and the American Labor Force**

Spring. V. Briggs.

For description, see "Human Resource Studies."

**ILRHR 690(6900) Comparative Human Resource Management**

Fall. L. Nishii.

For description, see "Human Resource Studies."

**ILRHR 698(6980) International Human Resource Policies and Institutions**

Spring. J. Bishop.

For description, see "Human Resource Studies."

**ILRLE 444(4440) The Evolution of Social Policy in Britain and America (also ECON 444[4440])**

Fall, spring. G. Boyer.

For description, see "Labor Economics."

**ILRLE 446(4460) Economy History of British Labor (also ECON 459[4590])**

Spring. G. Boyer.

For description, see "Labor Economics."

**ILRLE 448(4480) Topics in 20th-Century Economic History: The Economics of Depression and the Rise of the Managed Economy (also ECON 458[4580])**

Fall. G. Boyer.

For description, see "Labor Economics."

**ILRLE 642(6420) Economic Analysis of the Welfare State (also ECON 460[4600])**

Fall. 4 credits. R. Hutchens.

For description, see "Labor Economics."

## INTERDEPARTMENTAL COURSES

**ILRID 150(1500) Freshman Colloquium**

Fall. 1 credit. Prerequisite: ILR freshmen.

S-U grades only. Staff.

Acquaints first-year students with issues and disciplines in the field of industrial and labor relations and to establish acquaintanceship among members of the ILR faculty and small, randomly assigned groups of students. Includes a plant visit and several meetings early in the semester designed to introduce issues encountered in studying the employment relationship.

**[ILRID 250(2500) Diversity in the Workplace]**

Spring. 1 credit. Limited to 30 students.

Prerequisite: ILR sophomores. Attendance at all sessions mandatory, as is participation in group discussions and completion of written work. S-U grades only. E. Lawler. Not offered 2005-2006.

Exposes students to issues of diversity and discrimination in corporate, union, and legal environments. The purpose is to understand, analyze, and discuss the experience of being part of a culturally and ethnically diverse workplace. The goals of the course are to sensitize students to the subtle ways that prejudice and discrimination can arise in the workplace; to bring students into direct contact with practitioners in corporations, labor unions, and law firms to familiarize

students with current practices for addressing the opportunities and challenges of racial, ethnic, gender, and other forms of diversity in the workplace; and to analyze and discuss with practitioners ways to reduce prejudice and discrimination in workplaces.]

**ILRID 450(4500) Workplace Diversity: Stepping into the 21st Century**

Spring. 1 credit. Limited to 30 students;

priority given to seniors. Prerequisite:

ILRHR 260; ILR students. S-U grades only.

P. Henderson and S. Woods.

Provides an orientation to diversity in the workplace and to the expectations and challenges presented for future workplace leadership. With an emphasis on hands-on experiential learning, the course begins by familiarizing class participants with current practitioner approaches to diversity awareness training and competency building. Course focus then shifts to examine diversity as an issue of organizational change. Students consider the range of policies, practices and procedures being used to create workplaces that are both diverse and inclusive. Dialogues and case study presentations with invited workplace diversity leaders offer participants an opportunity to learn from an insider's perspective about the experiences, successes, and challenges of making diversity work. Students are required to complete a "case study" of an organization.

**ILRID 566(5660) Public Policy**

Spring. 4 credits. Offered only in New

York City for M.P.S. program. Staff.

The government's influence on the workplace and the role of public policy in the use and preparation of the nation's human resources for employment is assessed. Areas of study include the government's historical role in the labor market and the effect of efficiency, price stability and economic growth, equity, and immigration policy and its market implications.

**ILRID 599(5990) Cross-Cultural Work Experience**

Fall. 1 credit. S-U only. W. Sonnestuhl.

Open to MILR students who will be working in the summer of 2006 in a country other than that of their citizenship or past work experience. This option is only available for students who have been enrolled for one academic year by the time the Internship begins. Enrollment occurs in regular pre-enrollment period, with a grade posted in the fall after the requirements are satisfied. Prior to registering for the course, students must obtain a summer internship offer and international students MUST report to the ISSO (B50 Caldwell Hall) for their work authorization forms.

**ILRID 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits.

Supervised research only for those enrolled in the ILR M.P.S. program.

## LABOR ECONOMICS

G. Boyer, chair (266 Ives Hall, 255-2752);

J. Abowd, F. Blau, J. DeVaro, R. Ehrenberg,

G. Fields, R. Hutchens, G. Jakubson, L. Kahn,

R. Smith

**ILRLE 240(2400) Economics of Wages and Employment**

Fall and spring. 3 credits. Prerequisites:

ECON 101-102 or permission of instructor.



Applies the theory and elementary tools of economics to the characteristics and problems of the labor market. Considers both the demand (employer) and supply (employee) sides of the market to gain a deeper understanding of the effects of various government programs and private decisions targeted at the labor market. Topics include employment demand, basic compensation determination, education and training, benefits and the structure of compensation, labor-force participation and its relation to household production, occupational choice, migration, labor-market discrimination, and the effects of unions.

**ILRLE 344(3440) Development of Economic Thought and Institutions**

Fall. 4 credits. Prerequisite: ECON 101-102. Students who have taken ILRLE 140 may not receive credit for 344. G. Boyer.

Examines the historical roots of the economic institutions currently dominant in Western Europe and the United States, and the evolution of economics as a discipline, from pre-industrial mercantilist thought through the economics of John Maynard Keynes. Readings focus on the relationship between economic development and the evolution of economic thought, and in particular on policies relating to labor and the relief of poverty.

**ILRLE 440(4400) Labor Market Analysis (also ECON 341[3410])**

Spring. 4 credits. Note: ILR students can substitute ILRLE 440 for 240 by permission of instructor. J. DeVaro.

For description, see ILRLE 240. Designed for ECON majors with calculus.

**ILRLE 441(4410) Income Distribution (also ECON 455[4550])**

Spring. 4 credits. Prerequisite: ILRLE 240 or ECON 341. Students who have taken PAM 370 may not receive credit for 441.

R. Hutchens.

Explores income distribution in the United States and the world. Topics include functional and size distributions of income, wage structure, income-generating functions and theories, discrimination, poverty, public policy and income distribution, and changing income distribution and growth.

**[ILRLE 442(4420) The Economics of Employee Benefits (also ECON 456[4560])**

Fall. 4 credits. Prerequisite: ILR 240 or equivalent. Not offered 2006-2007. Staff.

In-depth treatment of the economics and financial management and administration of all employee benefits: health care, insurance, retirement income, family-care benefits, executive incentive plans, and other compensation provided as a service or contingent financial package to employees. Includes detailed international comparisons of health care and retirement systems are included.]

**ILRLE 443(4430) Compensation, Incentives, and Productivity (also ECON 443[4430])**

Fall. 4 credits. Prerequisite: ILRLE 240 or equivalent. J. DeVaro.

Examines topics in labor economics of particular relevance to individual managers and firms. Representative topics include recruitment, screening, and hiring strategies; compensation (including retirement pensions and other benefits); training, turnover, and the theory of human capital; incentive

schemes and promotions; layoffs, downsizing, and buyouts; teamwork; and internal labor markets. Focuses on labor-related business problems using the analytic tools of economic theory and should appeal to students contemplating careers in general business, consulting, and human resource management as well as in economics.

**ILRLE 444(4440) The Evolution of Social Policy in Britain and America (also ECON 444[4440])**

Fall or spring. 4 credits. Prerequisite: ILRLE 240 or equivalent. G. Boyer.

Surveys the history of social policy in Great Britain and the United States from 1800 to the adoption of the British welfare state after World War II. Topics include the role of poor relief in the early 19th century; the changing relationship between public relief and private charity; the adoption of social insurance programs and protective labor legislation for children and women; government intervention in the Great Depression; and the beginnings of the welfare state.

**ILRLE 445(4450) Women in the Economy (also ECON 457[4570], FGSS 446[4460])**

Fall. 4 credits. Prerequisite: ILRLE 240 or equivalent. Staff.

Examines the changing economic roles of women and men in the labor market and in the family. Topics include a historical overview of changing gender roles; the determinants of the gender division of labor in the family; trends in female and male labor force participation; gender differences in occupations and earnings; the consequences of women's employment for the family; and a consideration of women's status in other countries.

**[ILRLE 446(4460) Economic History of British Labor 1750 to 1940 (also ECON 459[4590])**

Fall or spring. 4 credits. Prerequisite: ILRLE 240 or equivalent. Not offered 2006-2007. G. Boyer.

Examines various aspects of British labor history from the beginning of the Industrial Revolution until World War II. Specific topics include monetary and nonmonetary changes in workers' living standards; internal migration and emigration; the London labor market; the extent of poverty and the evolution of the welfare state; Luddism and Chartism; and the development of trade unions.]

**ILRLE 447(4470) Social and Economic Data (also ILRLE 740[7400], INFO 447[4470])**

Spring. 4 credits. Prerequisites: one semester of calculus, IS statistics requirement, at least one upper-level social science course, or permission of instructor. J. Abowd.

Teaches the basics required to acquire and transform raw information into social and economic data. Legal, statistical, computing, and social science aspects of the data "manufacturing" process are treated. The formal U.S., Eurostat, OECD, and UN statistical infrastructure is covered. Major private data sources are also covered. Topics include basic statistical principles of populations and sampling frames; acquiring data via samples, censuses, administrative records, and transaction logging; the law, economics, and statistics of data privacy and confidentiality protection; data linking and integration techniques (probabilistic record linking;

multivariate statistical matching); analytic methods in the social sciences. Grading is based on a group term project.

**ILRLE 448(4480) Topics in 20th-Century Economic History: The Economics of Depression and the Rise of the Managed Economy (also ECON 458[4580])**

Spring. 4 credits. Prerequisite: ILRLE 240 or ECON 314. G. Boyer.

Examines the anatomy of the Great Depression through the experiences of the two most important economies of the time: the United States and Great Britain. Also examines the development of macroeconomic policy in the United States and Britain in the 1920s and 1930s and its evolution in the postwar world, culminating with the decline of Keynesian-style demand management policy under Reagan and Thatcher.

**ILRLE 495(4950) Honors Program**

Fall and spring (yearlong). 4 credits each semester.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRLE 497-498(4970-4980) Internship**

Fall and spring. 4 and 8 credits.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRLE 499(4990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRLE 540(5400) Labor Economics**

Fall. 3 credits. Requirement for M.I.L.R. candidates. Prerequisites: ECON 101-102 or equivalent. Not open to students who have taken NBA 544. G. Fields.

Course in labor market economics for prospective managers in the corporate, union, and governmental sectors. Begins with demand and supply in labor markets, presenting the tools of decision analysis for workers and firms. It then goes on to consider various topics for managers including deciding on the optimal mix of capital and labor to employ; attracting and retaining talent; pay and productivity; hiring and training investments; and pensions and retirement. The final section of the course covers other important labor market issues including unemployment, discrimination, poverty and inequality, and analysis of public policies.

**[ILRLE 544(5440) Labor Market and Personnel Economics**

4 credits. Offered only in New York City for M.P.S. program. Not offered 2006-2007. Staff.

Four-module course in which the first module covers the basic elements of supply and demand in the labor market, the second and third modules cover the "new personnel economics" (emphasizing economic issues in a firm that relate to selecting, training, assigning, motivating, and compensating workers), and the final module covers key institutions and economic security issues (including unemployment, pensions, disability, discrimination, and unions). The goals of this course are for students to learn to analyze both business and public policy problems, taking into account both basic principles of economic theory and the relevant institutional environments.]



**ILRLE 642(6420) Economic Analysis of the Welfare State (also ECON 460[4600])**

Fall. 4 credits. R. Hutchens.

Uses the tools of public economics to analyze modern welfare states. Although examples are drawn from several countries, the course focuses on the United States, Canada, and Sweden. What are the rationales for the level of government intervention in these states, and how do these rationales square with notions of market failure? What are the economic costs and benefits of taxes, transfers, and regulations in these states? Can voting models explain the growth and operation of welfare states? The possible answers to these questions are discussed.

**ILRLE 647(6470) Economics of Education (also ECON 347[3470])**

Spring. 4 credits. Prerequisite: ILRLE 240 or intermediate microeconomics and statistics through multivariate linear models.

R. Ehrenberg.

A survey of the econometric literature on a wide variety of educational issues, primarily dealing with elementary and secondary education. Topics include school finance policies, the class-size debate, teacher labor markets, charter schools, vouchers, and special education programs. The course begins with an introduction to experimental and quasi-experimental design and the implementation of these designs in multivariate regression models. Much of the course involves reading and discussing recent research, and students conduct their own empirical research projects.

**ILRLE 648(6480) Economic Analysis of the University (also ECON 342[3420])**

Fall. 4 credits. Staff.

Seeks to illustrate the complexity of decision making in a nonprofit organization and to show how microeconomic analysis in general, and labor market analysis in particular, can usefully be applied to analyze resource allocation decisions at universities. Topics include financial aid, tuition, admissions policies, endowment policies, faculty salary determination, the tenure system, mandatory retirement policies, merit pay, affirmative action, comparable worth, collective bargaining, resource allocation across and within departments, undergraduate versus graduate education, research costs, libraries, athletics, and "socially responsible" policies. Lectures and discussions of the extensive readings are supplemented by presentations by Cornell administrators and outside speakers who have been engaged in university resource allocation decisions or have done research on the subject.

**ILRLE 740(7400) Social and Economic Data (GR RDC) (also INFO 447[4470])**

Spring. 4 credits. J. Abowd.

Teaches the basics required to acquire and transform raw information into social and economic data. Graduate materials emphasize methods for creating and certifying laboratories in which data privacy and confidentiality concerns can be controlled and audited. Legal, statistical, computing, and social science aspects of the data "manufacturing" process are treated. The formal U.S., Eurostat, OECD, and UN statistical infrastructure are covered as are major private data sources. Topics include basic statistical principles of populations and sampling frames; acquiring data via samples, censuses, administrative records, and transaction

logging; the law, economics, and statistics of data privacy and confidentiality protection; data linking and integration techniques (probabilistic record linking; multivariate statistical matching); analytic methods in the social sciences. Graduate students are assumed to be interested in applying these techniques to original research in an area of specialization, and are required to do individual projects.

**ILRLE 741(7410) Applied Econometrics I (also ECON 748[7480])**

Fall. 4 credits. Prerequisite: graduate core sequence in econometrics or permission of instructor. S-U or letter grades.

G. Jakubson.

Considers methods for the analysis of longitudinal data, that is, data in which a set of individual units are followed over time. Focuses on both estimation and specification testing of these models. Students consider how these statistical models are linked to underlying theories in the social sciences. Course coverage includes panel data methods (e.g., fixed, random, mixed effects models) factor analysis, measurement error models, and general moment structure methods.

**ILRLE 742(7420) Applied Econometrics II (also ECON 749[7492])**

Spring. 4 credits. Prerequisite: ILRLE 741 or permission of instructor. Letter or S-U grades. G. Jakubson.

Continues from ILRLE 741 and covers statistical methods for models in which the dependent variable is not continuous. Covers models for dichotomous response (including probit and logit); polychotomous response (including ordered response and multinomial logit); various types of censoring and truncation (e.g., the response variable is only observed when it is greater than a threshold); and sample selection issues. Includes an introduction to duration analysis. Covers not only the statistical issues but also the links between behavioral theories in the social sciences and the specification of the statistical model.

**[ILRLE 743(7430) Applied Econometrics III]**

Spring. 4 credits. Prerequisites: ILRLE 741-742 or permission of instructor. ILRLE 741, 742, and 743 constitute Ph.D.-level sequence in applied microeconomics. Letter grades only. Not offered 2006-2007. G. Jakubson.

Covers topics not covered in ILRLE 741-742, including further development of duration analysis, panel data methods for nonlinear models, quantile regression and related techniques, and an introduction to nonparametric and semiparametric methods. Additional topics as suggested by their use in applied areas of social science. Covers not only the statistical issues but also the links between behavioral theories in the social sciences and the specification of the statistical model. Also develops a general framework for the techniques covered in the ILRLE 741-742-743 sequence.]

**ILRLE 745(7450) Seminar in Labor Economics I (also ECON 742[7420])**

Fall. 4 credits. Note: ILRLE 744, 745, and 746 constitute Ph.D.-level sequence in labor economics.

Includes reading and discussion of selected topics in labor economics. Stresses applications of economic theory and

econometrics to the labor market and human resource areas.

**ILRLE 746(7460) Seminar in Labor Economics II (also ECON 743[7430])**

Spring. 4 credits. Note: ILRLE 744, 745, and 746 constitute Ph.D.-level sequence in labor economics.

Includes reading and discussion of selected topics in labor economics. Stresses applications of economic theory and econometrics to the labor market and human resource areas.

**[ILRLE 747(7470) Economics of Education (also ECON 647[7470])]**

Spring. 4 credits. Prerequisite: economics and labor economics Ph.D. students or permission of instructor. Not offered 2006-2007. R. Ehrenberg.

Survey of the econometric research on a wide variety of higher education issues. Topics at the higher education level include public and private funding, financial aid and tuition policies, faculty labor markets, and Ph.D. production. Topics at the elementary and secondary level include school finance policies, the class-size debate and teacher labor markets.]

**[ILRLE 748(7480) Economics of Employee Benefits]**

Fall. 4 credits. Not offered 2006-2007. Staff. Students attend the lectures in ILRLE 442 (see description for 442) but have additional course requirements. If enrollment warrants, they also meet separately at a time TBA for discussion of topics in 442 and additional topics.]

**[ILRLE 749(7490) Economics of Development (also ECON 772[7720])]**

Spring. 4 credits. Prerequisites: first-year graduate economic theory and econometrics. Not offered 2006-2007. G. Fields.

Takes analytical approaches to the economic problems of developing nations. Topics include old and new directions in development economics thinking; the welfare economics of poverty and inequality; empirical evidence on who benefits from economic development; labor market models; project analysis with application to the economics of education; and development policy.]

**ILRLE 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits.

Supervised research only for those enrolled in the ILR M.P.S. program.

**ILRLE 798(7980) Internship**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRLE 799(7990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILRLE 940(9400) Workshop in Labor Economics**

Fall and spring. 3 credits. Intended for Ph.D. students who have started to write their dissertations.

Presentations of completed papers and work in progress by faculty members, advanced graduate students, and speakers from other universities. Focuses on the formulation, design, and execution of dissertations.

## ORGANIZATIONAL BEHAVIOR

P. Tolbert, chair (379a Ives Hall, 255-9527);  
S. Bacharach, J. Goncalo, M. Haas,  
T. Hammer, E. Lawler, M. Williams,  
W. Sonnenstuhl

### **ILROB 122(1220) Introduction to Organizational Behavior**

Fall and spring, 3 credits. Staff.  
Introductory survey course of theory and research on individual and group processes (including personality, motivation, communication, leadership), as well as structural and economic forces (including organizational design, power relations, inter-organizational ties, social norms and laws) that shape the contemporary workplace.

### **ILROB 175(1750) Behavior, Values, and Performance**

Fall and spring, 3 credits. Not open to ILR students. Staff.  
Examines the modern technology-based organization as a workplace. With global competitive dynamics as a backdrop, the course explores how organizational structures, processes, and practices have evolved to meet environmental challenges and will define the behavioral implications of those changes for practicing engineers and designers and managers who work with them. Interpreting such changes and building a capacity for professional effectiveness in this environment requires students to develop a working familiarity with an array of social and behavioral science literature, dealing with such matters as personal identity, motivation, and job design; creativity and the organizational enablers to innovation; group dynamics and project effectiveness; perception, communication, and cross-cultural understanding; and ethical decision making in a high-stress environment. The teaching cases/situations used reflect the orientation of the course toward technology-based organizations.

### **ILROB 222(2220) Controversies about Inequality (also SOC 222[2220], PAM/D SOC/GOVT 222[2220], PHIL 195[1950])**

Spring, 3 credits. S. Morgan.  
For description, see SOC 220.

### **ILROB 320(3200) The Psychology of Industrial Engineering**

Fall, 4 credits. T. Hammer.  
Study of the human factors in the industrial engineering of work, workplaces, tools, and machinery. Examines the aspects of individual and social psychology that operate in the work setting and that should be taken into account in the design of jobs. These include limitations of the human sensory system; individual difference in skills, abilities, motives, and needs; group dynamics; intrinsic motivation; job satisfaction; and conflict.

### **ILROB 321(3210) Group Solidarity (also SOC 311[3110])**

Fall, 4 credits. M. Macy.  
For description, see SOC 311.

### **ILROB 329(3290) Organizational Cultures**

Fall or spring, 4 credits. Prerequisite: one or more courses in OB and/or sociology. W. Sonnenstuhl.  
Reviews the concept of culture as it has evolved in sociology and anthropology, applying it to formal organizations in workplaces such as corporations and unions. The course first examines the nature of ideologies as sense-making definitions of

behavior, concentrating on the cultural forms that carry these cultural messages, rituals, symbols, myths, sagas, legends, and organizational stories. Considerable attention is given to rites and ceremonials as a cultural form in organizational life that consolidates many of these expressive forms into one. The course examines types of ceremonial behavior such as rites of passage, rites of enhancement, and rites of degradation, including the role of language gestures, physical settings, and artifacts in ceremonial behavior. The presence of subcultures and countercultures in organizational behavior also receive attention, especially the part played by occupational subcultures in formal organizations.

### **ILROB 370(3700) The Study of Work Motivation**

Fall, 4 credits. Prerequisite: junior or senior standing. T. Hammer.  
Designed to acquaint students with the basic concepts and theories of human motivation with implications for job design and organizational effectiveness. Focuses on theories of worker motivation and on research approaches and results as they apply to the performance of individuals and groups in formal organizations. Readings are predominantly from the field of organizational psychology, supplemented by relevant contributions from experimental and social psychology. Each student designs, executes, and analyzes a research study of his or her own.

### **ILROB 420(4200) Contemporary Organizational Behavior Applications**

Fall or spring, 4 credits. Prerequisites: ILROB 122. L. Gasser.  
Explores current practical applications of OB theory in organizations. Using a range of contemporary resources, students sift through practitioner articles and research; manage discussions; meet with managers, consultants, and employees; and explore organizational issues and problems from micro and macro perspectives in a political and legal context. Students also develop a toolbox of knowledge and skills to effectively carry out several organizational interventions or development initiatives. Choice of topics may differ to focus on contemporary issues such as emotional intelligence, influencing organizational climate and morale, engaging strategic planning processes, managing large-scale participative techniques, using job or workplace design concepts, applying SWOT analysis, developing effective teamwork, managing diversity, and applying quality management tools.

### **ILROB 422(4220) Organizations and Deviance**

Fall or spring, 4 credits. Limited to 60 students. W. Sonnenstuhl.  
Focuses on the deviant actions of organizations, including such behaviors as price fixing, environmental pollution, illegal campaign contributions, and discrimination in hiring and promotion. Examines the origins of such behaviors in organizations, the processes by which they became institutionalized, and the processes by which they become defined as deviant organizational actions. Within this context, the course examines such contemporary cases as Exxon's Valdez oil spill, Iran-Contragate, drug testing, and the federal savings and loan scandal. These events raise troubling questions about what it means to live and work in an organizational society,

and they cannot be dismissed as instances of a few individuals gone bad.

### **ILROB 423(4230) Leadership in Organizations**

Fall or spring, 4 credits. T. Hammer.  
Covers basic leadership theories with an emphasis on how they are used, analyzes leadership cases, and examines current leadership surveys and training materials. We also study leadership philosophies and management practices in countries outside of the United States. In addition, you learn to evaluate and use leadership "best-sellers," that is, the kind of books that sell in airports.

### **ILROB 424(4240) Social Influence and Persuasion**

Fall, 4 credits. Prerequisites: junior or senior standing. J. Goncalo.  
Many of the most admired organizations are adept at using social influence to achieve their strategic objectives. This course reviews basic theories of social influence such as conformity, group polarization, and social facilitation to understand how social influence tactics can be used to make organizations more efficient and productive. The course also considers how these tactics can backfire when excessive agreement gives rise to groupthink and poor decisions. We conclude by exploring strategies for managing social influence processes to encourage creativity and innovation in organizations.

### **ILROB 425(4250) Seminar in Organizational Culture**

Spring, 4 credits. Limited to 20 students. Prerequisite: ILROB 329 and permission of instructor. W. Sonnenstuhl.  
Expands on the theoretical ideas developed in the earlier course through more focused reading, intensive fieldwork, and paper writing. Students are accepted into the seminar based on their research projects for ILROB 329 and work with the professor to develop a more detailed reading list and more focused data collection strategy for expanding upon their earlier projects. The seminar also is taught as an intensive writing experience.

### **ILROB 426(4260) Managing Creativity**

Fall, 4 credits. J. Goncalo.  
Although most people can agree that creativity is an important concept, there is often very little agreement about what creativity is and how we can achieve it. This course surveys basic theories of creativity with the goal of applying this knowledge to the management of creativity in organizations. It focuses primarily on (1) cognitive theories about creative thought, (2) personality theories about exceptionally creative individuals (3) social-psychological theories about creative groups, and (4) the points at which these approaches interact. The course concludes by questioning whether, given the costs involved, anyone would willingly follow the path of a creative individual or implement the practices of the most innovative firms.

### **ILROB 427(4270) The Professions: Organization and Control**

Fall, 4 credits. Prerequisite: permission of instructor. P. Tolbert.  
Focuses on the sources of power and control exercised by professional groups in contemporary society. A number of issues are examined in this context, including the role of professions in society, processes through which an occupational group becomes defined as a profession, sources of control

that professional associations have over their members, relations between professionals and nonprofessionals in organizations, and the relationship between unionization and professionalization of occupations.

**ILROB 428(4280) Blue-Collar Work in America**

Spring. 4 credits. Prerequisites: ILROB 122. S. Bacharach and W. Sonnenstuhl.

Although America is often described as a post-industrial society in which service jobs predominate, the term "blue collar" remains relevant for understanding workplace relationship and their consequences. This course examines the nature of blue-collar work in the 21st century. It takes an in-depth look at a number of blue-collar occupations to understand workers' experiences. Special attention is paid to the manner in which management exercises control over blue-collar workers, the strategies workers use to gain greater discretion over their work, and the social and psychological consequences that follow from this struggle. This course uses lectures, readings, and interviews/discussions with blue-collar workers to illuminate workers' experiences. It uses long-distance learning technology to bring New York city-based blue-collar workers into the Ithaca classroom.

**[ILROB 429(4290) Organizational Politics and Institutional Change**

Spring, seven weeks. 2 credits.

Prerequisite: junior or senior standing; permission of instructor. Students should see instructor before first class. Not offered 2006-2007. S. Bacharach.

Examines the market, cultural, political, and structural forces that change the organizational "rules of the game," how those changes affect individuals and organizations, and the distortions that occur as individuals and organizations attempt to adjust to a new unstable order. Issues examined include power, corruption, dealmaking, rationality, uncertainty, and competition. Course requirements include completing a major research paper and leading a class discussion.]

**ILROB 470(4700) Group Processes**

Fall. 4 credits. Prerequisites: ILROB 122 or equivalent; junior or senior standing. E. Lawler.

A review of theoretical approaches and selected research on group phenomena, including the formation of groups, the structure of group relations, and group performance. Specific topics include conformity and obedience, status and power relations, social identity, emotions and emotion management, group solidarity and commitment, and groups within larger organizations.

**ILROB 471(4710) Organizations and Negotiation**

Spring. 4 credits. Prerequisite: undergraduate standing. M. Williams.

This introductory course provides understanding of the theory and the processes of negotiations as practiced in a variety of organizational settings. It is designed for relevance to the broad spectrum of bargaining problems faced by team members, managers, and professionals. It allows students the opportunity to develop negotiation skills experientially and to understand negotiation by using analytical frameworks. General topics include: distributive bargaining, integrative negotiations, psychological biases, and

multiparty negotiations. Advanced topics include: sources of power, dispute resolution, emotionally intelligent negotiations, team on team negotiations (e.g., union management). Simulations, exercises, role-playing, and cases are emphasized.

**[ILROB 472(4720) Applied Organizational Behavior**

Fall. 4 credits. Prerequisites: ILROB 170 and 171. Not offered 2006-2007.

S. Bacharach.

Introduces students to intermediate theory of organizational behavior. Concentrates specifically on teaching students to use organizational theories for analytical and applied purposes. Topics include organizational structure, work processes, organizational politics, organizational design, job design, incentive systems, and quality-of-work-life programs.]

**ILROB 475(4750) Organizational Uncertainty and Tactical Leadership**

Spring, seven weeks. 2 credits.

S. Bacharach.

Focuses on how leaders implement and sustain ideas in organizations during periods where it is clear that coming up with the perfect answer is impossible because of conditions of uncertainty. Specifically, the premise is that a good idea is not enough. What you need are the tactical skills to mobilize, implement, and sustain the idea throughout the organization. These tactical skills are the focus of the seminar. Through a series of examples and structured cases, students learn the skills of mobilization, coalition formation, and execution. There is a specific concern about how leaders need to anticipate reaction of others, analyze the political terrain in their organizations, and establish credibility. Leadership is examined not from the perspective of personality but from the perspective of practical skills that can be learned. These skills are applied to numerous types of organizations. There is case material, a required film, and tutorials. The class is broken up into six groups and grades assigned on the basis of group exercises and one final group project. An effort is made to balance the class equally between graduate and undergraduate students. Please note that the final project is a comprehensive case development in which each group must extensively illustrate many of the arguments presented in the course. The final illustrates many of the arguments presented in the course.

**ILROB 495(4950) Honors Program**

Fall and spring (yearlong). 3 credits each semester.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILROB 497-498(4970-4980) Internship**

Fall and spring. 4 and 8 credits.

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILROB 499(4990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILROB 520(5200) Organizational Behavior and Analysis**

Fall or spring. 3 credits. Staff.

Survey of concepts, theories, and research from the fields of organizational and social psychology as these relate to the behavior of individuals and groups in organizations. Job

attitudes, motivation, performance, leadership and power, group formation, perception, and organizational climate. A preliminary course for advanced work in organizational behavior.

**ILROB 525(5250) Organizational Behavior**

Fall, spring. 4 credits. Offered only in New York City for M.P.S. program. Staff.

Applies theories and methods from the behavioral sciences to the analysis of behavior in organizations. Areas of study include classical and modern theories of organization and their underlying assumptions of human nature, the relationship between organizations and their environment, the role of power, politics, and decision-making in organizations, industrial history, and leadership culture.

**ILROB 579(5790) Negotiation and Conflict Resolution**

Fall. 4 credits. Prerequisite: MILRs. M. Williams.

Provides understanding of the theory and the processes of negotiation as practiced in a variety of organizational settings. The course is designed for relevance to the broad spectrum of bargaining problems faced by the manager and the professional. It allows students the opportunity to develop negotiation skills experientially and to understand negotiation by using analytical frameworks. General topics include: distributive bargaining, integrative negotiations, psychological biases, sources of power, and multi-party negotiations. Advanced topics include: dispute resolution, emotionally intelligent negotiations, team on team negotiations (e.g., union-management, mergers). Simulations, exercises, role-playing, and cases are emphasized.

**ILROB 625(6250) Conflict, Power, and Negotiation**

Fall. 4 credits. Limited enrollment.

Prerequisite: senior or graduate standing; permission of instructor. E. Lawler.

Theoretical seminar that adopts a power perspective on bargaining and conflict resolution. Examines how power relations and power processes affect tactics in bargaining and also when power relations inhibit or promote conflict resolution. "Power" is viewed in the course as a capability, embedded in a social structure, and tactics are the action based on or using such power. The seminar gives an overview of several theoretical approaches to conflict and bargaining (e.g., rational choice, cognitive, social exchange) and places the power perspective in this context.

**ILROB 626(6260) Organizations and Social Inequality**

Spring. 4 credits. P. Tolbert.

Examines the central role that organizations in industrial societies play in allocating income, status, and other resources to individuals. A variety of theoretical explanations of social inequality are examined, and the social policy implications of each are considered.

**ILROB 627(6270) Leadership in Organizations**

Spring. 4 credits. Prerequisite: graduate standing; seniors by permission of instructor. T. Hammer.

Examination of theories and research findings from the behavioral sciences that are relevant to leadership and the influence process in groups and organizations. Discusses personality, situational factors, intergroup processes, interpersonal perception as well

as the motivation to both lead and follow. Explores the implications for leadership training, organization development, and action research.

**ILROB 679(6790) Methods of Observation and Analysis of Behavior**

Fall or spring. 4 credits. Limited to 25 students. Prerequisite: permission of instructor. W. Sonnenstuhl.

Focuses on qualitative methods and emphasizes learning by doing. Examines different approaches to the collection and analysis of data. Students learn a variety of data collection techniques for understanding individual and collective behavior, including participant observation, in-depth interviews, and working with archival materials. The course also emphasizes the constant comparative method as a basic technique for data analysis. This technique is the basis of such qualitative computer programs as Ethnograph and Nudist. Students conduct their own research projects. Students who wish to use qualitative methods either for a senior honors thesis, master's thesis, or doctoral dissertation are encouraged to take this course.

**ILROB 721(7210) Advanced Micro Organizational Behavior**

Spring. 3 credits. Staff.

Examines the historical development of psychological theories of organizational behavior and contemporary issues in micro organizational research. Emphasizes reading and analysis of primary source material.

**ILROB 722(7220) Advanced Macro Organizational Behavior**

Fall. 3 credits. Prerequisite: ILROB 520. Staff.

Examines the historical development of sociological theories of organizations and contemporary issues in macro organizational research. Emphasizes reading and analysis of primary source material.

**ILROB 724(7240) Managing Social Influence**

Fall. 3 credits. J. Goncalo.

Survey of basic theories of social influence and how they are applied (and sometimes misapplied) to managing people in organizations. Theories covered include social facilitation, social norms, group polarization, conformity and minority influence. Emphasizes the evaluation of certain popular management techniques in light of social influence processes.

**ILROB 725(7250) Analysis of Published Research in Organizational Behavior**

Fall. 3 credits. Prerequisites: ILROB 520 and one year of statistics. Staff.

Advanced research methods course that critically examines published research papers in the field of organizational behavior in terms of research design and method as well as theory.

**ILROB 726(7260) Selected Topics in Organizational Behavior**

Fall. 3 credits. Prerequisites: ILROB 520 and permission of instructor. Staff.

Advanced proseminar that seeks to develop an interdisciplinary perspective on selected topics in organizational behavior. The topics themselves change from year to year depending on participants' interests. Course is designed to allow students and the instructor to jointly pursue significant scholarly inquiry into one or more arenas of organizational

theory. Emphasis is placed on exploring the relevance of tradition in related disciplines (e.g., anthropology, linguistics, philosophy, sociology) that may enrich our understanding of organizational life.

**ILROB 727(7270) Leadership in Organizations**

Fall or spring. 3 credits. Open to MILR graduates. T. Hammer.

Covers basic leadership theories with an emphasis on how they are used, analyzes leadership cases, and examines current leadership surveys and training material. To allow you to gain additional information of practical use, you also have at the end of the semester a collection of essays on two practical topics: how to read and use leadership "best-sellers" (the kind of book that sells in airports), and leadership philosophies and management practices in foreign countries.

**ILROB 728(7280) Theories of Motivation and Leadership**

Spring. 4 credits. Prerequisite: ILROB 520. T. Hammer.

Introduction to basic concepts of human motivation in general, with particular emphasis on the theories that explain and predict work motivation. Students examine the empirical research that tests the validity of the theories and shows how and under what conditions different motivation models can be used for practice in work organizations. Several current microtheories of leadership and power and related research are examined. The disciplinary perspective employed is social organizational psychology, and the level of analysis emphasized is action and experience of individuals in groups.

**ILROB 729(7290) Organizational Change and Intervention**

Fall. 3 credits. Prerequisite: graduate standing.

Seminar concerned with planned and unplanned change in organizations. It is designed to analyze theory in practice. Particular attention is paid to the role of internal and external change agents. Students are encouraged to analyze contemporary changes such as mergers and acquisitions and workforce reductions. Participants submit weekly workforce journals.

**ILROB 772(7720) The Social Construction of Economic Life**

Spring. 3 credits. M. Lounsbury.

Drawing on the literature in economic sociology, this course emphasizes how economic activities are constituted and shaped by the social, cultural, and historical contexts in which they are situated. It surveys various empirical and theoretical approaches used to study the genesis and influence of broader-scale organizational and institutional arrangements. Provides students with an opportunity to formulate and refine their own research questions and perspectives.

**ILROB 776(7760) Globalization and Its Discontents: The Organizational Implications of Global Competition**

Fall. 4 credits. Core course in master of engineering/manufacturing option degree program. Staff.

Aimed at helping students develop an understanding of organizations as complex social systems, and at helping them understand the behavioral implications of new manufacturing initiatives. Uses

case studies to study the introduction of a variety of innovations in contemporary manufacturing firms, including manufacturing cells and teams, concurrent engineering, total quality management, and just-in-time material flow. Analyses emphasize the impact of such innovations on individuals' role definitions and relationships, organizations' communication requirements and patterns, group dynamics, leadership behaviors, labor relations, and human resource management systems.

**ILROB 778(7780) Solidarity in Groups (also SOC 778(7780))**

Fall. 3 credits. E. Lawler.

Examines sociological and social psychological theories about how social solidarity or a "sense of community" comes about and is maintained in groups and organizations. Distinguishes emotional, normative, and instrumental bases for social solidarity and shows how these promote or inhibit subgroup formation in organizations, commitment of individuals to organizations, and organizational citizenship behavior.]

**ILROB 790(7900) ILR M.P.S. Program**

Fall and spring. 1-9 credits.

Supervised research only for those enrolled in the ILR M.P.S. program.

**ILROB 798(7980) Internship**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILROB 799(7990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

**ILROB 920(9200) Organizational Behavior Workshop**

Fall. 2 credits. Prerequisite: M.S. and Ph.D. candidates in department. All M.S. and Ph.D. candidates in department at work on their theses are strongly urged to enroll. S-U grades only. Staff.

This workshop is designed to provide a forum for the presentation of current research undertaken by faculty members and graduate students in the Department of Organizational Behavior and by invited guests. Each student is expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of his or her thesis research.

## SOCIAL STATISTICS

T. DiCiccio, chair (358 Ives Hall, 255-8643); J. Bunge, P. Velleman, M. Wells

**ILRST 212(2120) Statistical Reasoning**

Fall and spring. 4 credits. Prerequisite: ILR undergraduates. P. Velleman and staff.

Introduction to the basic concepts of statistics and data analysis with applications, particularly to the social sciences. Focuses on descriptive methods, normal theory models, and inference procedures for univariate, bivariate, and multivariate data. Basic statistical designs, an introduction to probability, and applications of the Binomial and Normal distributions are considered. Estimation, confidence intervals, and tests of significance are introduced and discussed in detail for means and proportions of a single population and for differences between means and proportions of two populations. Also covers inference in the contexts of two-way contingency tables, correlations, and simple



and multiple linear regression models. A statistics computer package is used throughout the course, both in class and for weekly homework assignments.

#### **ILRST 213(2130) Applied Regression Methods**

Fall. 2 credits. Prerequisite: ILR undergraduate standing; advanced placement or transfer credit for ILRST 212, but no coverage of material on multiple regression and analysis of variance that is not ordinarily part of AP statistics or introductory statistics at other institutions; permission of instructor or ILR OSS. Assumes basic knowledge of statistics at level of AP syllabus or standard introductory course, through inference for simple regression. P. Velleman.

We cover one and two-way analysis of variance, multiple regression, regression model building and diagnosis, and, as time permits, touch on related linear model topics briefly. There is a midterm exam and a paper. This course meets once each week. Roughly half the meetings are lectures; the other half are consulting meetings with smaller groups in support of course projects.

#### **ILRST 310(3100) Statistical Sampling**

Fall. 4 credits. Prerequisite: two semesters of statistics. J. Bunge.

Theory and application of statistical sampling, especially in regard to sample design, cost, estimation of population quantities, and error estimation. Assessment of nonsampling errors. Discussion of applications to social and biological sciences and to business problems. Includes an applied project.

#### **[ILRST 311(3110) Practical Matrix Algebra**

Fall or spring. 4 credits. Not offered 2006-2007. Staff.

Matrix algebra is necessary for statistics courses such as regression and multivariate analysis and for other research methods courses in various other disciplines. One goal of this course is to provide students in various fields of knowledge with a basic understanding of matrix algebra in a language they can easily understand. Topics include special types of matrices, matrix calculations, linear dependence and independence, vector geometry, matrix reduction (trace, determinant, norms), matrix inversion, linear transformation, eigenvalues; matrix decompositions, ellipsoids and distances, and some applications of matrices.]

#### **ILRST 312(3120) Applied Regression Methods**

Fall and spring. 4 credits. Prerequisite: ILRST 212 or equivalent. M. Wells and P. Velleman.

Reviews matrix algebra necessary to analyze regression models. Covers multiple linear regression, analysis of variance, nonlinear regression, and linear logistic regression models. For these models, least squares and maximum likelihood estimation, hypothesis testing, model selection, and diagnostic procedures are considered. Illustrative examples are taken from the social sciences. Computer packages are used.

#### **ILRST 410(4100) Techniques of Multivariate Analysis**

Spring. 4 credits. Prerequisite: ILRST 312 or equivalent; some knowledge of matrix notation. P. Velleman.

Discusses techniques of multivariate statistical analysis and illustrates them using examples from various fields. Emphasizes application, but theory is not ignored. Deviation from assumptions and the rationale for choices among techniques are discussed. Students are expected to learn how to thoroughly analyze real-life data sets using computer-packaged programs. Topics include multivariate normal distribution, sample geometry and multivariate distances, inference about a mean vector, comparison of several multivariate means, variances, and covariances; detection of multivariate outliers; principal component analysis; factor analysis; canonical correlation analysis; discriminant analysis; and multivariate multiple regression.

#### **ILRST 411(4110) Statistical Analysis of Qualitative Data**

Spring. 4 credits. Prerequisite: two statistics courses or permission of instructor. T. DiCiccio.

Advanced undergraduate and beginning graduate course. Includes treatment of association between qualitative variates; contingency tables; log-linear models; binary ordinal and multinomial regression models; and limit dependent variables.

#### **ILRST 499(4990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

#### **ILRST 510(5100) Statistical Methods for the Social Sciences I**

Fall. 3 credits. Staff.

First course in statistics for graduate students in the social sciences. Covers descriptive statistics, probability and sampling distributions, estimation, hypothesis testing, simple linear regression, and correlation. Students are instructed on the use of a statistics computer package at the beginning of the semester and use it for weekly assignments.

#### **ILRST 511(5110) Statistical Methods for the Social Sciences II**

Fall and spring. 3 credits. Prerequisite: ILRST 510 or equivalent introductory statistics course. T. DiCiccio.

Second course in statistics that emphasizes applications to the social sciences. Topics include simple linear regression; multiple linear regression (theory, model building, and model diagnostics); and the analysis of variance. Computer packages are used extensively.

#### **ILRST 515(5150) Statistical Research Methods**

Fall or spring. 4 credits. Offered only in New York City for M.P.S. program. Staff. Students learn basic skills for conducting qualitative and survey research. They work through an introductory review course at home on their own time. After passing an exam, they attend a two-week immersion course in Ithaca taught by the on-campus faculty in July. Topics include an introduction to surveys and discrete analysis, basic regression, and integration of qualitative and quantitative research methods.

#### **ILRST 610(6100) Statistical Methods I (also BTRY/STBTRY 601)**

Fall and summer. 4 credits. M. Wells. For description see, BTRY 601.

#### **[ILRST 715(7150) Likelihood Inference**

Fall. 3 credits. Prerequisites: graduate courses equivalent to OR&IE 670 and 671. Not offered 2006-2007. Staff.

In most statistical models, exact distribution theory for testing hypotheses or constructing confidence intervals is either unavailable or computationally cumbersome. Inferences are routinely performed by using large-sample approximations to the distributions of test statistics. This course provides a survey of some recent higher-order asymptotic approximations for likelihood-based methods of inference.]

#### **ILRST 717(7170) Analysis of Longitudinal Data**

Spring. 3 credits. Prerequisites: extensive knowledge of SAS; advanced linear models; probability and statistics (at level of text by Casella and Berger). Staff.

Comprehensive introduction to the analysis of longitudinal data. Involves three major components: a modeling component, an analysis component, and a diagnostic component. Linear and nonlinear mixed effects models are used for the modeling portion; likelihood and estimating function methodology are used for the analysis portion. Diagnostic tools for studying the validity of various assumptions are also developed. Modeling and methodology for the analysis of missing data are also incorporated in the curriculum. SAS is used extensively.

#### **ILRST 799(7990) Directed Studies**

For description, see "Collective Bargaining, Labor Law, and Labor History."

## **ILR EXTENSION**

### **Statewide**

The following courses are open to participants in the Extension Division's statewide credit programs in labor studies and management studies. Extension offices are based in Buffalo, Albany, Rochester, Ithaca, New York City, and Long Island. These courses are not open to undergraduate or graduate students matriculated in the Ithaca ILR programs. Courses and course credits earned in Extension Division certificate programs are not automatically accepted as transfer credits or as a basis of admission to the resident ILR undergraduate and graduate programs in Ithaca. Student applications for course transfer are evaluated by the ILR school on an individual basis.

#### **204(2040) Managing Conflict**

Fall or spring. 3 credits. Staff.

Provides students with opportunities to apply conflict resolution theory to specific situations, based on real-life problems that require resolution. Students examine situations, analyze the facts and perceptions driving the actors, and engage in applying communication, negotiation, and mediation techniques to reduce or eliminate the conflict.

#### **205(2050) Oral Skills for Conflict Management**

Fall or spring. 3 credits. Staff.

Emphasizes development of oral communications skills required to successfully manage conflict both as a party to a dispute and as a third party who is charged with helping to resolve a dispute. Presents



simulations to help the participants practice their skills.

### **206(2060) The Nature of Conflict**

Fall or spring. 3 credits. Staff.  
Provides students with the conceptual foundation to engage in further study of conflict management and conflict resolution. After taking the course, students are able to identify and describe types of conflict; identify the various sources of conflict; apply a conceptual model of conflict to interpersonal, organizational, and international conflict situations; describe conflict situations in terms of social psychological aspects using a "person perception" or "attribution" theoretical orientation; and identify their personal response styles to conflict.

### **209(2090) Leadership In Unions**

Fall or spring. 3 credits. Staff.  
What role does leadership play in the vitality of the labor movement? Is there a crisis of leadership in contemporary unions? Does the political context of a democratic membership organization affect the quality of leadership? Will changing workforce demographics create a demand for increased leadership opportunities by women and minorities in their unions? This course examines theories of leadership including a comparison of leadership styles and skills in the context of changing needs of the labor movement. The dynamic relationship of leaders and followers is examined in regard to emerging internal union organizing strategies that aim to increase membership and to activate current members.

### **212(2120) Labor, Technology, and the Changing Workplace**

Fall or spring. 3 credits. Staff.  
Technological changes are having a profound impact on both work and society. But what do these changes mean for workers and their unions? Is resisting technological change equivalent to obstructing progress? What can we do to influence how work is shaped and performed? These and other questions are the central concerns of this course. The course is divided into three sections: Skills, Technology, and the Labor Process; Industrial Change and Worker Responses: Four Historical Case Studies; and Technology, and the Future of Work.

### **240(2400) Union Organizing**

Fall or spring. 3 credits. Staff.  
Students learn which unions are organizing successfully today and which workers are joining unions. Through case studies, discussion, and in-class exercises, they learn about targeting, house calls, building rank and file organizing committees, how to talk union, inoculating against anti-union campaigns, legal aspects of organizing, and innovative ways to organize outside of government-run certification elections.

### **241(2410) Arbitration**

Fall or spring. 3 credits. Staff.  
Study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of an arbitration hearing, and the preparation of an arbitration opinion.

### **242(2420) Public Sector Collective Bargaining**

Fall or spring. 3 credits. Staff.  
Introduction to collective bargaining in the public sector. Examines the historical development of bargaining in public employment, the evolution of state and federal and bargaining theory and practices, as well as impasse resolution techniques frequently found in this sector. Special emphasis is given to developing an understanding of the similarities and differences between public and private sector bargaining and how they have affected tactics and strategies employed by the parties.

### **245(2450) Public Sector Labor Law**

Fall or spring. 3 credits. Staff.  
Survey and analysis of the New York State Public Employees Fair Employment Act and compares it with other state laws covering public employees. Examines the extent to which the law protects and regulates concerted actions by employees in the public sector. The intent is to study and understand the law as written but more important to understand how it has been interpreted by the courts of New York State in its application. Major emphasis is on employee and employer rights, including recognition and certification, improper practices, strikes, grievances, and disciplinary procedures of the New York State Public Employment Relations Board.

### **247(2470) Labor and the American Economy**

Fall or spring. 3 credits. Staff.  
Helps the student understand how economic theories relate to the economic problems confronting the American citizen in general and the American union member in particular. Emphasis is placed on contemporary economic theories and how their proponents attempt to solve American economic problems.

### **248(2480) Employment Practices Law**

Fall or spring. 3 credits. Staff.  
Considers laws and regulations that directly affect managers and employers. Students examine issues and laws such as Equal Employment Opportunity, Employee Retirement Income Security Act, Federal Wage and Hour Laws, Occupational Safety and Health Act, unemployment laws, and other topics. Students focus on the practical application of laws and their impact on the workplace.

### **250(2500) New York Workers' Compensation Law for Trade Unionists and Injured Workers**

Fall or spring. 3 credits. Staff.  
There is a collective perception that the workers' compensation system in New York compounds an injured personal predicament with Byzantine responses that lead to despair. Unions and injured workers' organizations believe that, if properly empowered, they can be just as effective as lawyers in looking after their injured colleagues' claims. This course is structured to meet both of these realities. Students delve into every nook and cranny of New York Workers' Compensation law. The course is entirely practical. Skills teaching, how to present a case, decorum, ethics, and persuasiveness are built into the course. Experts on how the system really works are used.

### **251(2510) Principles and Practices of Management**

Fall or spring. 3 credits. Staff.  
Presents the theory and processes of management with an emphasis on supervision. Includes management functions of planning, organizing, staffing, and evaluating. Presents concepts and theories and analyzes case studies. Emphasizes motivating people, exercising leadership, and effectively developing employees.

### **252(2520) Contract Bargaining**

Fall or spring. 3 credits. Staff.  
Examines the principles of contract bargaining, including bargaining environments and structures as well as standards used in bargaining. Students learn to prepare bargaining demands, cost economic items, draft noneconomic contract language, negotiate economic and noneconomic issues, and resolve a contract bargaining impasse. The course considers the impact of contract bargaining outcomes on workers, unions, employers, and the public.

### **253(2530) Contract Administration**

Fall or spring. 3 credits. Staff.  
Focuses on the role of the steward in administering the union contract in the workplace. Students evaluate grievance and arbitration contract clauses, the grievance procedure in practice, the role of the union steward, the role of local and international unions, negotiation of grievances, and preparation for arbitration. Students analyze the impact of grievance and arbitration procedures on workers, unions, and employers.

### **254(2540) Labor Law**

Fall or spring. 3 credits. Staff.  
Examines the principles of labor law by looking at social philosophy and the historical context of federal labor legislation from the 1930s. Students concentrate on major provisions of the National Labor Relations Act, examining how the National Labor Relations Board and the federal courts have interpreted the national labor laws. Discussion includes new directions in labor legislation and interpretation with consideration given to the impact of labor law on workers, unions, and employers.

### **255(2550) Labor History**

Fall or spring. 3 credits. Staff.  
Reviews American labor history from the perspective of workers' social dimensions of the development of the working class, reform and revolutionary movements, and the emergence of craft, industrial, and public employee unions. Includes a discussion of the development of trade union institutions and leaders, and the evolution of union political activities and collective bargaining. Special attention is paid to the involvement of women and minority workers with unions.

### **256(2560) Dispute Resolution**

Fall or spring. 3 credits. Staff.  
Examines third-party participation in dispute resolution in private and public sector collective bargaining. Develops dispute resolution methods in American labor relations; issues and practices in neutral, binding arbitration of grievances and mediation; conciliation; and fact finding procedures are discussed. Use of exclusive labor-management mechanisms to settle industry disputes is also examined.

**259(2590) Union Administration**

Fall or spring. 3 credits. Staff.

Focuses on the principles and practices of effective union administration. Students study the dynamics of democratic organizations and the development of organizational leadership. The course explores alternative methods of decision making and lines of responsibility. The legal obligations of unions and union officials are discussed and analyzed. The course also examines the structure and evolution of relationships inside the labor movement.

**264(2640) Contemporary Labor Problems**

Fall or spring. 3 credits. Staff.

Survey of the major challenges that confront the American labor movement. Students are briefed on the background of each problem and discuss and analyze a broad range of solutions proposed by the experts.

**367(3670) Safety and Health in the Workplace**

Fall or spring. 3 credits. Staff.

Provides basic education and training in workplace safety and health. Focuses on applicable federal and state laws, standards for safety and health, industrial hygiene, and such health concerns as asbestos, radon, and AIDS. Practical experience is provided through workplace walk-through safety and health inspections and in use of industrial hygiene equipment to measure noise, temperature, humidity, airflow, and airborne toxins.

**FACULTY ROSTER**

Abowd, John M., Ph.D., U. of Chicago.  
Edmund Ezra Day Prof. of Industrial and Labor Relations, Labor Economics  
Applegate, Ronald, Ph.D., SUNY Binghamton.  
Lec., Collective Bargaining, Labor Law, and Labor History  
Bacharach, Samuel, Ph.D., U. of Wisconsin.  
Jean McKelvey-Alice Grant Prof. of Labor Management Relations, Organizational Behavior  
Batt, Rosemary, Ph.D., Massachusetts Inst. of Technology. Alice Cook Professorship in Women and Work; Assoc. Prof., Human Resource Studies  
Bell, Bradford, Ph.D., Michigan State U. Asst. Prof., Human Resource Studies  
Bishop, John H., Ph.D., U. of Michigan. Assoc. Prof., Human Resource Studies  
Blau, Francine D., Ph.D., Harvard U. Francis Perkins Prof. of Industrial and Labor Relations, Labor Economics  
Boyer, George R., Ph.D., U. of Wisconsin. Prof., Labor Economics  
Briggs, Vernon M., Jr., Ph.D., Michigan State U. Prof., Human Resource Studies  
Bronfenbrenner, Kate, Ph.D., Cornell U. Sr. Lec., Extension and Collective Bargaining, Labor Law, and Labor History  
Bunge, John A., Ph.D., Ohio State U. Assoc. Prof., Social Statistics  
Collins, Christopher, Ph.D., U. of Maryland. Asst. Prof., Human Resource Studies  
Compa, Lance, J.D., Yale Law School. Sr. Lec., Collective Bargaining, Labor Law, and Labor History  
Cook, Maria L., Ph.D., U. of California, Berkeley. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History  
Cowie, Jefferson R., Ph.D., U. of North Carolina, Chapel Hill. Assoc. Prof.,

Collective Bargaining Labor Law and Labor History  
Daniel, Cletus E., Ph.D., U. of Washington. Prof., Collective Bargaining, Labor Law, and Labor History  
DeVaro, Jed, Ph.D., Stanford U. Asst. Prof., Labor Economics  
DeVault, Ileen A., Ph.D., Yale U. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History  
DiCiccio, Thomas J., Ph.D., U. of Waterloo (Canada). Assoc. Prof., Social Statistics  
Dyer, Lee D., Ph.D., U. of Wisconsin. Prof., Human Resource Studies  
Ehrenberg, Ronald, Ph.D., Northwestern U. Irving M. Ives Professor of Industrial and Labor Relations and Economics, Labor Economics  
Fields, Gary S., Ph.D., U. of Michigan. Prof., Labor Economics, and International and Comparative Labor  
Givan, Rebecca K., Ph.D., Northwestern U. Asst. Prof., Collective Bargaining, Labor Law, and Labor History  
Gold, Michael E., LL.B., Stanford U. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History  
Goncalo, Jack, Ph.D., U. of California, Berkeley. Asst. Prof., Organizational Behavior  
Gross, James A., Ph.D., U. of Wisconsin. Prof., Collective Bargaining, Labor Law, and Labor History  
Haas, Martine, Ph.D., Harvard Business School. Asst. Prof., Organizational Behavior  
Hallock, Kevin, Ph.D., Princeton U. Assoc. Prof., Human Resource Studies  
Hammer, Tove H., Ph.D., U. of Maryland. Prof., Organizational Behavior  
Hausknecht, John P., Ph.D., Penn State U. Asst. Prof., Human Resource Studies  
Homrighouse, Christina, B.S., Ithaca Coll. Lec., Human Resource Studies  
Hurd, Richard W., Ph.D., Vanderbilt U. Prof., Extension and Public Service  
Hutchens, Robert M., Ph.D., U. of Wisconsin. Prof., Labor Economics  
Jakubson, George H., Ph.D., U. of Wisconsin. Assoc. Prof., Labor Economics  
Kahn, Lawrence M., Ph.D., U. of California, Berkeley. Prof., Collective Bargaining, Labor Law, and Labor History/Labor Economics  
Katz, Harry C., Ph.D., U. of California, Berkeley. Jack Sheinkman Prof. in Collective Bargaining, Labor Law, and Labor History  
Kuruvilla, Sarosh C., Ph.D., U. of Iowa. Prof., Collective Bargaining, Labor Law, and Labor History  
Lawler, Edward J., Ph.D., U. of Wisconsin, Madison. Martin P. Catherwood Prof., Organizational Behavior  
Lieberwitz, Risa L., J.D., U. of Florida. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History  
Lipsky, David B., Ph.D., Massachusetts Inst. of Technology. Prof., Collective Bargaining, Labor Law, and Labor History  
Roberson, Quinetta, Ph.D., U. of Maryland. Asst. Prof., Human Resource Studies  
Salvatore, Nicholas, Ph.D., U. of California, Berkeley. Prof., Collective Bargaining, Labor Law, and Labor History  
Seeber, Ronald L., Ph.D., U. of Illinois. Assoc. Prof., Extension  
Smith, Robert S., Ph.D., Stanford U. Prof., Labor Economics  
Snell, Scott, Ph.D., Michigan State U. Prof., Human Resource Studies

Sonnenstuhl, William J., Ph.D., New York U. Assoc. Prof., Extension and Organizational Behavior  
Tolbert, Pamela S., Ph.D., U. of California. Prof., Organizational Behavior  
Turner, Lowell R., Ph.D., U. of California. Prof., Collective Bargaining, Labor Law and Labor History/International and Comparative Labor  
Velleman, Paul F., Ph.D., Princeton U. Assoc. Prof., Social Statistics  
Vidyashankar, Anand, Ph.D., Iowa State U. Assoc. Prof., Statistical Science and Social Statistics  
Wells, Martin T., Ph.D., U. of California, Santa Barbara. Prof., Social Statistics  
Williams, Michele, Ph.D., U. of Michigan. Asst. Prof., Organizational Behavior  
Wright, Patrick M., Ph.D., Michigan State U. Prof., Human Resource Studies

## JOHNSON GRADUATE SCHOOL OF MANAGEMENT

### ADMINISTRATION

Robert J. Swieringa, dean

L. Joseph Thomas, associate dean for academic affairs

Douglas Stayman, associate dean for curriculum

Cathy S. Dove, associate dean for M.B.A. Program and administration

Richard A. Shafer, associate dean for corporate relations

Rebecca Mitchell, associate dean for alumni affairs and development

Thomas B. Hambury, director of executive programs

Daniel Szapiro, director of Boardroom Executive M.B.A. Program

Randall Sawyer, director of admissions

Karin S. Ash, director of career services

Deniqua Crichlow, director of Office of Diversity and Inclusion

Ann W. Richards, financial aid director and associate director of admissions

Rhonda H. Velazquez, director of student activities and special events

Kerwin-Michael Smith, college registrar

The Johnson Graduate School of Management prepares men and women for managerial careers in business. The school offers course work in many disciplines to provide potential managers with an understanding of the complexities of the professional world in which they operate and of the organizations of which they will become a part.

A bachelor's degree or its equivalent is required for admission to the two-year program leading to the master of business administration (M.B.A.) degree. Nearly half of the students have a background of undergraduate studies in arts and sciences, and about one-quarter in engineering. Five percent of the students begin their graduate training immediately after receiving their bachelor's degrees and the remaining 95 percent following work experience.

Combined degree programs allow highly qualified Cornell students to co-register in the school during their senior year, thereby earning a master's degree in less than the usual time.

The doctoral program, administered through the Graduate School, provides an advanced level of education in business for those who seek careers in teaching and research at leading universities.

More detailed information about these programs is available from the Office of Admissions and Student Affairs, Johnson Graduate School of Management, 111 Sage Hall.

Students in other graduate programs and undergraduate students registered with the university are welcome in most classes. See

the Johnson School web site: [www.johnson.cornell.edu/academic/courses/](http://www.johnson.cornell.edu/academic/courses/) for information on enrollment and a complete course roster.

### UNDERGRADUATE ONLY

#### **NBA 300(3000) Entrepreneurship and Enterprise**

Fall, spring. 3 credits. Prerequisite: non-Johnson School students. Johnson School students, see NBA 564. D. BenDaniel.

Uses Cornell-developed case studies and lectures to address entrepreneurial management in start-up ventures and new-business development in existing companies. Topics include valuation of business, planning, obtaining resources, management of growth, and cashing out. Guest lecturers speak on specialized topics such as corporate and patent law, bankruptcy and workouts, leveraged buyouts, and valuations of businesses. Students team up to write and present business plans. The course attempts to integrate marketing, finance, operations, and human-resource topics in the context of high-growth business ventures.

### COURSES FOR NON-JOHNSON SCHOOL STUDENTS

#### **NBA 507(5070) Entrepreneurship for Scientists and Engineers**

Fall, spring. 3 credits. Prerequisite: M.Eng., Ph.D., and M.S. students; priority given to seniors as undergraduates. J. Nesheim and G. Schneider.

Designed for mentored independent study, this course uses streaming video, guest speakers, distance learning, and special lectures/tutorials. There is no homework and few required class meetings. Work is focused on one project: Students form a start-up team, choose a technical business idea, and develop and found a business that can attract venture investors. Tutorial sessions with instructors apply lessons to the team business plan. Students learn how high-technology ideas are converted into world-class businesses in venture-backed start-up companies and in new business development in existing companies. Slides take the student from idea to initial public offering. Grading is based on a final exam focusing on the video lectures, a written business plan, and its final presentation to a judging panel.

#### **NBA 553(5530) Accounting and Financial Analysis for Engineers**

Spring. 3 credits. Prerequisite: non-Johnson School students. J. D'Souza. Focuses on basic financial and managerial accounting and the economic and financial concepts that have a bearing on managerial decisions. The goals are to (1) give students a working knowledge of the accounting process and the value and limitations of the data that come out of the accounting information system; (2) familiarize students

with key concepts in managerial accounting and the application of cost information to pricing and operating decisions; (3) promote an understanding of the use of economic theory in the evaluation of capital investment projects. The teaching methods consist of lectures and cases. Students are evaluated on the basis of exams.

#### **NCC 550(5500) Financial Accounting**

Fall, spring. 3 credits. Prerequisite: non-Johnson School students. Similar in content to M.B.A. core course NCC 500. Staff. Introductory accounting course that examines the subject from the viewpoint of users external to the organization. Topics include transaction analysis; the accounting cycle; financial-statement preparation, use, and analysis; revenue recognition and cost measurement; present value; and problems in financial-accounting disclosure.

#### **NCC 553(5530) Marketing Management**

Fall, spring. 3 credits. Prerequisite: non-Johnson School students. Similar in content to M.B.A. core course NCC 503. Staff. Addresses controllable and uncontrollable marketing variables that managers in multiproduct firms face in today's business environment. Topics include customer behavior, product planning, distribution, advertising and promotion, pricing, and competitive strategy.

#### **NCC 554(5540) Management and Leading in Organizations**

Fall, spring. 3 credits. Prerequisite: non-Johnson School students. Similar in content to M.B.A. core course NCC 504. Staff. Takes a resource-based approach to management by arguing that organizations should link their strategy to their internal resources and capabilities. Develops this theme by addressing (1) the strategic value of internal resources and capabilities; (2) the role of human resources and organizational behavior in formulating and implementing strategy; and (3) the importance of structure and the design of organizations in formulating and implementing strategy. Topics include how firms create sustainable competitive advantage through internal resources and capabilities; best practices for managing people; effects of best practices on attitudes and behaviors; why putting the customer first is not necessarily best practice from a resource-based perspective; why organizational culture is central to organizational effectiveness; why the formal organizational chart and structure of an organization are important; how organizations innovate; how organizations change through re-architecture and re-engineering; what firms gain and lose through pursuing core competencies; and what firms gain through strategic alliances and networks. The course makes extensive use of case materials.

#### **NCC 556(5560) Managerial Finance**

Fall, spring. 3 credits. Prerequisite: non-Johnson School students. Similar in content to M.B.A. core course NCC 506. Letter grades only. Staff.

Introduces business finance through theory and case studies. Topics include stock and bond valuation, the capital budgeting decision, portfolio theory, the asset-pricing models, raising capital, capital structure, mergers and acquisitions, costs of capital, option pricing, and risk management. International applications are considered within each topic area. Grading is based on an exam, group case reports, homework, and class participation.

## IMMERSIONS

Only the Johnson School offers learning immersion courses in strategic operations, managerial finance, investment banking, brand management, and entrepreneurship. Immersions offer a semester of continuous focus, real-world problem solving, and site visits to dozens of companies.

### MFI—Managerial Finance Immersion

Prerequisite: NCC 506 with grade of B or better.

Specifically designed for students planning to pursue finance careers. Some students interested in nonfinance careers (including consulting) may wish to consider this course, but they should recognize that it is not specifically designed for this purpose. A major objective is to help students make more informed choices about how to launch their finance careers.

**NBA 502(5020) Managerial Cost Accounting**  
3 credits

**NBA 506(5060) Financial Statement Analysis**  
1.5 credits

**NBA 549(5490) Managerial Finance—Practicum**  
1.5 credits

**NBA 558(5580) Corporate Financial Policy**  
1.5 credits

**NBA 565(5650) Corporate Governance**  
1.5 credits

**NBA 656(6560) Valuation Principles**  
1.5 credits

**NCC 508(5080) Managing Operations**  
2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**  
2.5 credits

### IBI—Investment Banking Immersion

Prerequisite: NCC 506 with grade of B or better.

Specifically designed for students planning to pursue careers in investment banking. Inappropriate for students interested in following a finance career in nonfinancial industry or nonfinance careers (including consulting).

This course is designed to meld the practical and the theoretical aspects of the field. A great deal of interaction and discussion is expected between students, participating faculty, and visiting practitioners. While the

course is designed to make its students more attractive as candidates for employment in the investment banking profession, and it is expected that some of the participating firms will be using their visits to identify candidates for summer internships, obtaining relevant summer internships remains the responsibility of the students.

**NBA 500(5000) Intermediate Accounting**  
3 credits

**NBA 511(5110) Financial Modeling**  
1.5 credits

**NBA 556(5560) Investment Banking—Practicum**  
2.0 credits

**NBA 558(5580) Corporate Financial Policy Turbo**  
2.5 credits

**NBA 656(6560) Valuation Principles**  
1.5 credits

**NCC 508(5080) Managing Operations**  
2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**  
2.5 credits

### RS&T—Research, Sales, and Trading Immersion

Prerequisite: NCC 506 with grade of B or better.

Specifically designed for students planning to pursue careers in research (both buy-side and sell-side), sales, and trading, either at Wall Street firms (sell-side) or at buy-side firms such as mutual funds. Melds the practical and theoretical aspects of the field. A great deal of interaction and discussion is expected between students, participating faculty, and visiting practitioners. While the course is designed to make its students more attractive as candidates for employment in the investment management profession, and it is expected that some of the participating firms will use their visits to identify candidates for summer internships, obtaining relevant summer internships remains the responsibility of the students.

**NBA 516(5160) Introduction to Quantitative Asset Management**  
1.0 credit

**NBA 542(5420) Investment and Portfolio Management**  
3.0 credits

**NBA 583(5830) Research, Sales, and Trading Practicum**  
1.5 credits

**NBA 656(6560) Valuation Principles**  
1.5 credits

**NCC 508(5080) Managing Operations**  
2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**  
2.5 credits

### Highly recommended courses for RS&T Immersion:

**NBA 500(5000) Intermediate Accounting**  
3.0 credits

**NBA 506(5060) Financial Statement Analysis**  
1.5 credits

**NBA 673(6730) Derivatives I**  
1.5 credits

**NBA 674(6740) Derivatives II**  
1.5 credits

**NBA 511(5110) Financial Modeling**  
1.5 credits

### SBM—Immersion in Brand Management

Limited enrollment. Prerequisites: NCC 500, 501, 502, 503, and 506; permission of instructor.

Full-time program for the semester; students are not able to take other courses concurrently. The course objective is to begin developing students to think and act like brand managers, some of the best trained and most upwardly mobile professionals in industry. It provides students with a unique opportunity to begin internalizing the concepts, principles, and tools necessary to achieve success in brand management. While the course focuses on managing traditional consumer brands, high-tech products, services, and global branding are also addressed. In-class methods consist of (1) academic and industry lecturers; (2) on-site visits with marketing and manufacturing professionals; (3) case and project discussions and presentations; and (4) a brand management simulation. Course requirements consist of (1) discussion of readings; (2) individual case write-ups and presentations; (3) group projects and presentations (including a capstone simulation); and (4) in-class exams. There is considerable off-campus travel for field study.

**NBA 502(5020) Managerial Cost Accounting**  
3 credits

**NBA 620(6200) Marketing Research**  
3 credits

**NBA 624(6240) Brand Management—Practicum**  
4.5 credits

**NCC 508(5080) Managing Operations**  
2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**  
2.5 credits

### NCC 550 Semester in Strategic Operations

Limited enrollment. Prerequisites: NCC 501 and 506 for Johnson School students; permission of instructor.

Full-time program for the semester; students cannot take other courses concurrently. The course is concerned with the integration of technological, human-resource, logistical, and financial considerations to produce a manufacturing enterprise that can respond quickly and effectively to market requirements. The course is taught by a team of faculty and industrial practitioners, and much of the student work is team-oriented. There is off-campus travel for field study of various manufacturing plants.

**NBA 502(5020) Managerial Cost Accounting**  
3.0 credits

**NBA 650(6500) Semester in Strategic Operations Practicum**

7.5 credits

**NCC 508(5080) Managing Operations**

2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**

2.5 credits

**E&PE—Entrepreneurship and Private Equities Immersion**

Comprehensive course that integrates the technical, strategic, and economic aspects of entrepreneurship; is the student's full course load for the semester. David J. BenDaniel, the Don and Margi Berens Professor of Entrepreneurship at the Johnson School, leads the faculty team for this immersion.

**NBA 564(5640) Entrepreneurship and Private Equity—Practicum**

3 credits

**NBA 618(6810) Global Technology Innovation and Commercialization**

1.5 credits

**NBA 656(6560) Valuation Principles**

1.5 credits

**NBA 657(6570) Entrepreneurship Marketing**

1.5 credits

**NCC 508(5080) Managing Operations**

2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**

2.5 credits

**Suggested additional courses for E&PE immersion****NBA 559(5590) Venture Capital Industry and Private Equity Markets**

0.5 credit

**NBA 532(5320) Due Diligence in Private Equity Investments**

0.5 credit

**SGE—Sustainable Global Enterprise**

The SGE immersion provides students with a breadth and depth of knowledge and experience relating to the broad impact of social and environmental issues as well as the strategic opportunity these issues present to firms across a number of industries. Students will spend much of their time in field projects that require them to address real problems currently being faced by companies who expect to receive practical, operational solutions.

**NBA 603(6030) Sustainable Global Enterprise**

1.5 credits

**NBA 658(6580) Sustainable Global Enterprise Practicum**

3.5 credits

**NCC 508(5080) Managing Operations**

2.5 credits

**NCC 504(5040) Managing and Leading in Organizations**

2.5 credits

credits of course work from the recommended electives list of Johnson School courses or other courses from other programs at Cornell. Course availability is subject to scheduling.

**NCC COMMON CORE COURSES****NCC 500(5000) Financial Accounting**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. R. Libby. Introductory accounting course that examines the subject from the viewpoint of users external to the organization. Topics include transaction analysis; the accounting cycle; financial-statement preparation, use, and analysis; revenue recognition and cost measurement; present value; and problems in financial-accounting disclosure.

**NCC 501(5010) Statistics for Management**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. J. McClain. Introduction to decision making under conditions of uncertainty. Topics include descriptive statistics, probability theory, classical statistics, statistical decision theory, and simple and multiple regression analysis. Applications in finance, marketing, and operations management are discussed.

**NCC 502(5020) Microeconomics for Management**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. R. Hilton. Introduces microeconomic theory and applies it to problems faced by managers. Topics include supply and demand, consumer behavior, pricing when a firm has market power, and the role of contracts. The course employs a lecture format and emphasizes problem solving. Grading is based on a midterm and a final exam.

**NCC 503(5030) Marketing Management**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. D. Stayman and E. Eisenstein. Designed to convey the key concepts of marketing and how they fit into the larger context of management strategy and decisions. Presents both the practical "how" and the fundamental "why" of marketing activities in the light of contributions from behavioral science, economics, and statistics. The goals are to provide sufficient understanding for those who need only to interact with the marketing function, as well as communication concepts and developing processes that can provide the foundation for further course work and future experience in marketing. The course makes extensive use of case materials.

**NCC 504(5040) Managing and Leading in Organizations**

Spring. 2.5 credits. Johnson School core course. Limited enrollment. E. Mannix and K. O'Connor.

Stories are central to how we know and remember events, people, and facts and to how we communicate knowledge and history. Most of the jobs we aspire to involve a particular form of story-telling—the CEO's vision, the analyst's report, the planner's strategy, the salesperson's pitch, the consultant's analysis, and the manager's brand. What distinguishes these as business stories is that they are often analytical (based on a set of objective facts and statistics) and reflect a deep understanding of the complex

interactions of individuals and organizations. This course has two goals: (1) to make students appreciate the complexity of the issues that often arise in organizations, and (2) to develop and refine students' analytical story-telling abilities. To achieve these goals, the course is taught by the case-study method, an efficient way to expand the student's experience base with respect to such issues as motivation, power, leadership, ethics, structure, design, and change. Students learn how to make good inferences about what will and won't work in particular situations, and how to learn from their own experiences and those of others.

**NCC 506(5060) Managerial Finance**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. Letter grades only. R. Michaely.

Introduces students to the basic concepts of finance. In particular, the course addresses what type of investments firms and individuals should take on and how these investments should be financed. Understanding these concepts is essential to financial managers and professional investors and has important applications to many aspects of financial decisions all of us have to make on a daily basis (e.g., is getting an M.B.A. a good investment?). These issues involve capital budgeting decisions, stock and bond valuation, how to assess and account for risk through the capital asset pricing model (CAPM), option pricing, capital structure and cost of capital, and market efficiency. Grading is based on exams, quizzes, group case reports, homework, and class participation.

**NCC 508(5080) Managing Operations**

Spring. 2.5 credits. Johnson School core course. Limited enrollment. Prerequisite: NCC 501 or permission of instructor. R. Zhang and L. Robinson.

Focuses on managing processes: actions that convert inputs into outputs. Almost any business function can be modeled as a network of processes. The first part of the course examines processes, both individually and as part of a larger system; students see that good process design reflects both the volume and the variety of the product. A common course theme is the deleterious effect of variability (in demand, supply, quality, or capacity) in complex systems. Queuing theory and simulation are particularly helpful for analyzing process capabilities. The second part analyzes how goods and services are produced. After describing the strategic role of operations, it examines forecasting systems, inventory management, and just-in-time and logistic management. Constrained optimization models provide information about managing with finite resources. The final part examines process improvement through quality and productivity management and corporate learning.

**NCC 509(5090) Strategy**

Fall. 2.5 credits. Johnson School core course. Limited enrollment. V. Kadiyali and J. Johnson.

Among the critical tasks facing any senior manager are the creation, implementation, and evaluation of a business unit's strategy. This course seeks to provide the management student with the tools and frameworks essential to carrying out these tasks. Many of these tools and frameworks are based on recent advances in game theory, industrial organization, and organization theory,

\*Note: Students electing to take the immersion must choose a minimum of five (5) additional



although the course also draws from the older business policy tradition. Students who successfully complete this course are able to analyze industries, identify areas of strategy advantage and disadvantage, and devise strategies that exploit advantages and remedy disadvantages.

## NBA MANAGEMENT ELECTIVE COURSES

### Accounting

#### NBA 500(5000) Intermediate Accounting

Spring. 3 credits. Prerequisite: NCC 500 or equivalent. M. Nelson.

Based on the essential concepts and terminologies of financial accounting introduced in the accounting core course. Students learn to evaluate financial statements through the use of case studies drawn from actual corporate financial reports.

#### NBA 502(5020) Managerial Cost Accounting

Fall, spring. 3 credits. Prerequisites: NCC 500, 501, and 502, or equivalent. R. Hilton and R. Bloomfield.

Designed both for those responsible for internal accounting information and those who use such information for decision making. Topics include budgeting, accumulating costs for product costing, activity-based costing, standard costs, the analysis of cost variances, cost estimation and prediction, cost-price-volume decisions, performance measurement, nonmanufacturing cost analysis, cost allocation, and transfer pricing. Instruction is a mixture of lecture and case discussion. Student evaluation is based on a midterm exam, a final exam, a project, and class participation.

#### NBA 503(5030) Strategic Cost Management

1.5 credits. R. Hilton.

Focuses on the role of cost management and related issues in helping a firm compete successfully in the global market. Topics include activity-based costing, activity-based management, value chain analysis, the lean enterprise, confronting competition in an industry dominated by lean enterprises, re-engineering, process value analysis, identification of non-value-added activities and costs, target costing, Kaizen costing, continuous improvement, time-based competition, cost versus quality, and benchmarking. The course is based almost entirely on cases, many of them lean enterprises in Japan.

#### NBA 506(5060) Financial Statement Analysis

Spring. 1.5 credits. Prerequisite: NCC 506, NBA 500 (or concurrent enrollment), or permission of instructor. Not open to students who have completed 3-credit version of NBA 506. S. Bhorraj and P. Hribar.

Develops a set of core skills essential to financial statement analysis. Covers strategic ratio analysis, cash flow analysis, pro forma financial statements, financial modeling, credit analysis, bond rating and bankruptcy predictions, and firm valuation using discounted cash flow techniques. Emphasizes practical applications. The course format is a

combination of case studies and lectures. The lectures communicate subtler aspects of the material while the cases provide hands-on experience. There is an exam.

#### NBA 509(5090) Advanced Financial Analysis

Fall. 1.5 credits. Prerequisites: NBA 506, finance immersion course, or permission of instructor. Not open to students who have completed 3-credit version of NBA 506. S. Bhorraj.

Builds on the core financial analysis skills developed in NBA 506. Topics include equity valuation, residual income models, quality of earnings assessments, earnings manipulation detection, market efficiency issues, fairness opinions in MBOs, and large sample stock screening strategies. The overall focus is on using accounting-based information to make investment decisions. Emphasis is on practical applications, and special attention is given to cultivating analytical and communication skills. Features both lectures and cases. There is a group term project but no final exam.

#### NBA 511(5110) Financial Modeling

Fall, spring. 1.5 credits. Prerequisites: NBA 506 or permission of instructor; mastery of basic Excel skills. P. Hribar.

Financial modeling is the art and science of constructing spreadsheet models of firms' future financial statements. This course builds on the brief introduction to financial modeling in NBA 506 by modeling the effect on the income statement, balance sheet, and statement of cash flows of more complicated financial transactions such as leveraged buyouts, mergers and acquisitions, and corporate reorganizations. The class meets in the state-of-the-art Parker Center computer lab, and active student participation is emphasized.

### Economics

#### NBA 524(5240) Macroeconomics and International Trade

Fall. 3 credits. Prerequisite: NCC 502 or equivalent or permission of instructor. I. Azis.

Applies basic macroeconomic theory to such problems as inflation, unemployment, economic growth, and productivity and examines how those problems interact with international trade and finance. Students learn to be informed observers of national and international economic policies and discerning users of economic analyses and forecasts. Uses a lecture/discussion format.

#### NBA 527(5270) Applied Price Theory

Spring. 4 credits. R. Frank.

Emphasizes how economic analysis can help firms and individuals make the most of their opportunities. Of special interest to managers and consultants is the focus on examples that illustrate how faulty economic reasoning leads to inefficient outcomes. Also emphasizes strategic thinking and instructs students in the art of "economic naturalism"—the use of economic reasoning to understand and explain everyday patterns of individual and firm behavior.

### Entrepreneurship

#### NBA 519(5190) Sustainable Business—The Challenge of the 21st Century

Fall, eight sessions. 1 credit. F. Keller.

Gives students an overview of the emerging sustainable business model. By examining current writings and comparing them to

the actual experiences of the lecturer's own business, students draw conclusions about how this business model could be employed in their individual career paths. Students learn that, in addition to traditional financial analysis, business decisions can benefit from considering the impacts of social and ecological capital. This so-called "triple bottom line" of sustainable business is so new that most information on the subject has been written in the past four years. Students read about actual cases and the logic of how this model has been constructed. There is dialogue about the advantages as well as the barriers and challenges of applying sustainable principles.

#### NBA 521(5210) Investing in Distressed Corporations

Fall. 1 credit. J. Rubin, R. Symington, and J. Hass.

Focuses on the burgeoning practice of investing in distressed companies. Once a backwater, this \$680 billion (face amount) field of finance is now a "must have" in virtually all institutional portfolios. In 2001 alone, \$63 billion of additional defaults entered this universe, with continued high inflows projected for the next few years. Corporate reorganization finance techniques are now necessary tools for individuals in a variety of other disciplines, as it is now highly likely that finance professionals and managers encounter distressed situations in their careers. Using a "bottoms-up" approach, the curriculum first seeks to develop the building blocks of this field: research, valuation, legal issues, and strategies. Issues such as target capital structure location, control/passive strategies, value creation through reorganizations/liquidations and new/old money plans are explored. These principles are then applied to real-world situations using case studies.

#### [NBA 525(5250) Social Entrepreneurship

Spring. 1 credit. Not offered 2006-2007. M. Lounsbury.]

#### NBA 530(5300) Entrepreneurship Lab

Fall. 3 credits. Prerequisites: M.B.A. students; NBA 564 or concurrent enrollment or permission of instructor. G. Schneider.

Students team up with entrepreneurs in the greater Ithaca area on defined projects that are integral to the companies' operations, such as production planning, new product launches, or assessing organizational structure. Students gain first-hand exposure to the application of functional knowledge in a start-up setting, while bringing real value to the host company.

#### NBA 531(5310) Venture Start-up

Spring, eight lec over two weeks. 1 credit. R. Ryan.

Short course by Professor Rob Ryan, founder of Ascend Communications and of Entrepreneur America, a boot camp for start-ups. Uses Ryan's book *Smartups*. The lectures contain analyses of various styles of entrepreneurship, ways of determining the viability of technical businesses and hints for negotiation with venture capital sources, among other important topics.

#### [NBA 535(5350) Special Readings in Private Equity

Spring, four meetings. 0.5 credit. Not offered 2006-2007. D. BenDaniel.

Covers the transformation of a public corporation to private equity to increase value. Discusses the advantages and disadvantages of private equity but focuses on financial models. These models show the economic advantages of private equity as well as how to achieve that status.]

**NBA 557(5570) Case Studies in Venture Investment and Management**

Fall. 1.5 credits. F. Beste and Y. Hochberg. Consists of a series of cases that focus on the venture capital investment process and the subsequent management of such ventures. The primary perspective is that of the venture capitalist in assembling and evaluating information, preparing forecasts, assessing risks, developing and negotiating investment structure and terms, and deciding whether to invest. Cases also focus on management and financial problems and on policy issues and the relationship between venture capitalists and entrepreneurs. The secondary perspective is that of the entrepreneur and the techniques and skills employed in managing growing enterprises. Presentations by venture capitalists and entrepreneurs supplement student discussion and analysis of cases. Grades are based on written reports, quality of classroom participation, and a final exam.

**NBA 559(5590) The Venture Capital Industry and Private Equity Markets**

Spring. 0.5 credit. D. BenDaniel. Focuses on the industry from the practitioners' perspective. Topics include (1) an introduction to the private equity market focusing on the transactions that define the industry, its structure, participants, history, and trends; (2) institutional private equity investing—now an increasingly important and dynamic part of the asset allocation mix; and (3) issues in private equity investing such as concentration in fewer, larger funds and the critical role of a new class of gatekeeper/consultants for limited partners. Involves four lectures and a final paper.

**NBA 563(5630) The IPO Process and Deal Structure Alternatives**

Fall, spring. 3 credits. Z. Shulman. Gives students an in-depth look at initial public offerings and deal structures from a practitioner's point of view. With respect to initial public offerings, the course covers the applicable statutory framework, pre-offering corporate preparations, the due diligence process, the implementation of corporate governance policies appropriate for a public company, the offering registration process, liability under federal securities laws, the Securities and Exchange Commission review process, underwriting arrangements, and selection of a trading forum. Regarding deal structures, the course explores choosing an appropriate transaction structure, deal financing alternatives, due diligence, public company transaction issues, and crucial legal aspects of the acquisition, such as caps/collars, letters of intent, successor liability, continuity of employees, and noncompetition agreements.

**NBA 564(5640) Entrepreneurship and Private Equities**

Fall, spring. 3 credits. D. BenDaniel. Uses Cornell-developed case studies and lectures to address entrepreneurial management in start-up ventures and new-business development in existing companies. Topics include valuation of business, planning, obtaining resources, management

of growth, and cashing out. Guest lecturers speak on specialized topics such as corporate and patent law, bankruptcy and work-outs, leveraged buy-outs, and valuations of businesses. Students team up to write and present business plans. The course attempts to integrate marketing, finance, operations, and human-resource topics in the context of high-growth business ventures.

**NBA 618(6180) Global Technology Innovation and Commercialization**

Spring. 1.5 credits. W. Sine and K. McGovern.

Examines technology commercialization from an investor's point of view. Will address issues related to intellectual property, recognizing and screening opportunities, exploiting technology opportunities, and marketing high technology. Case studies and discussions with practitioners will be used to examine this topic.

**NBA 653(6530) Strategic Alliances**

Spring. 1 credit. J. Suwinski.

A wide variety of strategic alliances are being used today as companies try to leverage their resources for competitive advantage. This course gives an overview of the spectrum of alliances, examining the strategic rationale and pros and cons of each major type of alliance. The primary focus is on joint ventures as a specific form of strategic alliance, where the success rate is less than 50 percent. The course develops a set of principles that have contributed to success for Corning Incorporated. The course is taught from the perspective of the general manager of a major business unit.

**NBA 657(6570) Entrepreneurial Marketing**

Spring. 1.5 credits. J. Brinckmann.

Addresses the special market issues related to entrepreneurial businesses. The course will cover developing a marketing model, market research, new product rollout, public relations and guerilla marketing, brand building, channel management and customer relationship building, all from an entrepreneurial point-of-view.

**NBA 678(6780) Lectures on the Venture Capital Industry**

Spring. 1.5 credits. Prerequisites: NBA 564, 300, 401, or permission of instructor. J. Bartlett and D. BenDaniel. Internet course with one classroom lec by Prof. Bartlett.

Focuses on venture capital financing, including the problems and issues facing emerging growth companies as they progress from early stage, start-up status to mature public companies. Emphasizes practical skills: hands-on examination, for example, of how deals are negotiated and valuations arrived at, the principal focus being the so-called Series A, or first professional, round of financing. Views the early stage space from three perspectives: (1) the entrepreneur, or founder, (2) the professional investors, or VCs, and (3) the key executives, i.e., the major players in emerging growth finance. Reviews economics, finance, tax, securities, corporate and employment law considerations, and custom and usage in the industry.

**NBA 689(6890) Law for High-Growth Business**

Fall, spring. 3 credits. Z. Shulman. In-depth analysis of key issues that an emerging high-growth business must consider and

address, including (1) choosing type of business entity, (2) protecting confidential information and inventions, (3) sources of capital (in both bull and bear market environments), (4) understanding capitalization structures (e.g., common stock, preferred stock, warrants), (5) using stock options as employee incentives, (6) fundamental fair employment practices, (7) proper establishment and use of boards of directors and advisory boards, (8) technology licensing and commercialization, (9) negotiating relationships with distributors, resellers, and customers, (10) the Foreign Corrupt Practices Act, and (11) dealing with creditors.

**Finance**

**NBA 512(5120) Applied Portfolio Management**

Fall, spring. 3 credits each semester. Limited enrollment. Students must commit to taking course in fall and spring semesters. Priority given to second-year M.B.A.s who successfully completed either NBA 506 or finance immersion. Students must apply formally; if number of applicants exceeds 12, admission is competitive and merit-based. B. Swaminathan.

Focuses on the management of an investment fund. For full description, see Charles Lee.

**[NBA 540(5400) Advanced Corporate Finance**

Fall. 3 credits. Prerequisite: NBA 506 or equivalent. Not offered 2006–2007. H. Bierman.

Relevant for both investment banking and the treasurer's activities of an operating corporation. Most class sessions are lecture-discussion, but there will be several corporate finance cases. Topics include debt securities (duration, convexity, inverse floaters, bond refunding, term structure), convertible debt, capital structure, distribution policy, exotic new securities, financial strategies, and the buy versus lease decision. Investigates corporate financial policy decisions from a normative-quantitative point of view and develops skill in formulating financial models and evaluating models. Uses basic mathematics.]

**NBA 542(5420) Investment and Portfolio Management**

Fall, spring. 3 credits. Prerequisites: NCC 501, 502, and 506; comfort with quantitative methods. H. Li.

Deals with several important issues pertaining to investments in securities markets. Covers (1) portfolio diversification theory, asset allocation, asset pricing models (e.g., CAPM and APT), and empirical anomalies such as size effect and January effect; (2) the issue of evaluating portfolio performance and mutual fund performance; (3) investment strategies based on patterns in historical security returns (may be loosely considered technical analysis); (4) investment strategies based on publicly available information related to accounting and other market statistics and the use of earnings forecasts (may be considered as fundamental analysis); (5) frictions to trading imposed by the institutional structure of securities markets. The goal of this course is to train students in the latest tools and techniques in portfolio theory and familiarize them with the latest developments in securities market research and applications. This is a highly quantitative course involving extensive analysis of security market data using regression analysis and other statistical

tools. Grades are based on midterm and final exams, cases, a project, and a trading game.

**NBA 543(5430) Financial Markets and Institutions**

Fall, spring. 3 credits. Prerequisite: NCC 506 (finance core). M. O'Hara.

Applies principles of finance to understand modern financial markets. Central themes are the structure of financial markets, their pricing function, the interaction between financial markets and macroeconomic conditions, and the processes of innovation and regulation in these markets. Students look at the workings of a variety of markets and develop an understanding of the different problems that different types of markets address. Studies the question of market efficiency and the interaction between government policies and financial markets. Analyzes issues in innovation and regulation with basic principles of financial economics. Throughout the course, the relevance of these issues for the practical corporate, portfolio, or public sector decision maker is considered. The course includes ideas and evidence from academic research along with historical, institutional, and international perspectives. Recent events are used to illustrate concepts and develop analytic skills. Spreadsheet assignments and a term project requiring data analysis develop research skills and illustrate academic concepts. Exams consist of computational, short answer, and short essay questions.

**NBA 552(5520) Cases in Corporate Finance**

Fall. 3 credits. Prerequisites: second-year MBAs and Twelve-Month Option (TMO) students; NCC 506 or equivalent. H. Bierman.

We will develop an understanding of the theories of corporate finance and have discussions of corporate finance cases. Cases and lectures deal with mergers, acquisitions, valuation, corporate restructuring, LBOs, MBOs, distribution policies, and the financing of corporations. The material applies to careers in investment banking, managerial finance, and top level executives. Several executives working in or with corporate finance will present cases. The goal is to develop a skill in analyzing the financing decisions of corporations.

**NBA 554(5540) International Finance**

Spring. 3 credits. Prerequisite: NCC 506 (finance core) or permission of instructor. W. Bailey.

Applies principles of finance to the international setting. International finance is different in two basic respects: (1) the existence of multiple currencies adds risk to investment and financing decisions; (2) when corporations and portfolio investors cross international borders, both problems and opportunities arise. This course focuses on these issues and highlights how finance theory can be extended to address them. Students apply the basic principles of international finance to a variety of problems. The course helps students understand the ideas and research results of international finance and adapt what they learn to the practical problems in the increasingly globalized business world. The first part of the course outlines exchange rate volatility, barriers to international capital flows, and the value of international diversification. The second part presents a variety of problems, examples, and applications from the three basic

themes described in part one. Spreadsheet assignments and a term project requiring data analysis develop research skills and illustrate academic concepts. Exams consist of computational, short answer, and short essay questions.

**NBA 555(5550) Fixed-Income Securities and Interest Rate Options**

Fall. 3 credits. Prerequisites: NCC 506 (finance core), NCC 501 (statistics core). R. Jarrow.

Designed to study the pricing, hedging, and risk management of fixed-income securities and interest rate derivatives. Topics include the term structure of interest rates, interest rate swaps (caps, floors, collars), the risk structure of interest rates, credit risk spreads, and corporate bond valuation. The method of instruction is lectures and discussion, and computer illustrations are an integral part of the course content.

**NBA 558(5580) Corporate Financial Policy**

Fall, spring. 1.5 credits. Prerequisite: NCC 506 (finance core). Y. Grinstein.

Provides an understanding of the financial decisions of corporations. Discusses the factors that affect corporate financial decisions and how they determine firms' financing, investment, and hedging policies. These factors include taxes, transaction costs, contracting (between managers and shareholders and between shareholders and other claimholders such as bondholders), and asymmetric information. Much of the material is presented using examples and cases designed to demonstrate how financial decisions create, destroy, or modify value.

**NBA 565(5650) Corporate Governance**

Spring. 1.5 credits. Prerequisites: NCC 506 and NBA 656 or permission of instructor. Y. Grinstein.

Deals with the ways in which different investors assure themselves of getting a return on their investments. How do investors get managers to return some of the profits to them? How do they make sure that managers do not invest their money in bad projects? These questions are extremely relevant for almost any organization, from start-ups to Forbes 500 companies. This course explores these issues through a series of case studies and examples. Topics depend on time availability. Career focus: M.B.A. students aspiring to top corporate offices, regardless of functional area, or envisioning a career in M&A/investment banking, financial management, or consulting firms.

**NBA 655(6550) Advanced Valuations**

Fall. 1.5 credits. Prerequisite: IBI immersion or written permission of instructor. B. Swaminathan.

Builds on the valuation principles course. Applies discounted cash flow (DCF) valuation and valuation by multiples using comparables to multinational contexts. Considers mergers and acquisitions, and multinational project and firm valuations, from the viewpoint of a U.S. manager. Discusses issues such as differences in parent and project cash flows, accounting differences, exchange risks, political risks, and valuation in developing countries. Examines the contingent claims valuation approach, with emphasis on flexibility in managerial decision-making. Focuses on the valuation of strategic options, growth options, and flexibility in capital investments using traditional and nontraditional option

pricing techniques. Discusses valuation of growth options, expansion options, natural resource investments, land development, R&D, young-high-growth companies, etc., using the Black-Scholes option pricing model and its variants. Grading is based on cases, a valuation project involving a foreign company, and a final exam.

**NBA 656(6560) Valuations Principles**

Spring. 1.5 credits. D. Weinbaum.

Deals with the principles of valuation for publicly traded firms, divisions of publicly traded firms, or private firms that have publicly traded comparables, using discounted cash flow (DCF) valuation. The definitions of cash flow and discount rate depend on whether we want to value the entire firm or value only equity. Discusses (1) how to compute free cash flows based on historical income statements and balance sheets; (2) the concept of value drivers and economic value added (economic profits or residual income); (3) operating risk and financial risk, the relation between financial leverage and cost of capital, the leveraging and unlevering of equity betas, capital asset pricing model, computing cost of equity, cost of debt, cost of preferred stock, weighted average cost of capital, divisional cost of capital, etc. These concepts are applied; (4) to computing cost of capital. Introduces valuation by multiples using comparables and discusses its applications to valuing divisions of multibusiness firms.

**NBA 673(6730) Introduction to Derivatives, Part 1**

Fall, spring. 1.5 credits. Prerequisite: NCC 506 (finance core) or permission of instructor. X. Zhang.

Introduces students to the pricing and hedging of derivative securities. Briefly covers forward contracts, futures contracts, and swaps. The primary emphasis is on option contracts. Underlying assets include stocks, currencies, and commodities.

**NBA 674(6740) Introduction to Derivatives, Part 2**

Fall, spring. 1.5 credits. Prerequisite: NCC 506 (finance core) or permission of instructor. X. Zhang.

For description, see NBA 673.

**General Management**

**[NBA 537(5370) Information in Markets**

Spring. 1.5 credits. Not offered 2006-2007. R. Bloomfield.]

**NBA 544(5440) Workplace Management: An Economic Approach**

Spring. 1.5 credits. G. Fields.

Covers labor market economics in the corporate and nonprofit sectors. Begins with demand and supply in labor markets, presenting the tools of decision analysis for workers and firms. Considers various topics for managers, including hiring the right quantity and types of workers; identifying, attracting, and retaining top talent; individual labor supply decisions; and strategic budget constraints.

**NBA 550(5500) Risk Management**

Fall. 1.5 credits. R. Jarrow.

Studies advanced topics in derivatives and risk management. The first part of the course covers topics in derivatives and develops the tools necessary for analysis, and the second part covers their application to risk management.

**NBA 560(5600) Business Law I (also AEM 320[3200])**

Fall, 3 credits. Requirement for students intending to be professional accountants. Highly recommended for finance students. Prerequisite: junior, senior, or graduate standing. D. Grossman.

Introduces the basic tenets of law as they apply to businesses and their operations. Topics include personal property, contracts, agency, real property, and landlord-tenant concerns. Uses text readings and case studies.

**NBA 561(5610) Business Law II (also AEM 321[3210])**

Spring, 3 credits. Prerequisite: NBA 560 or permission of instructor. D. Grossman.

The first portion of this course examines legal issues in the formation and operation of business enterprises, particularly partnerships, corporations, and limited-liability companies. The second portion covers selected topics in business law, such as employment discrimination, secured transactions, product liability, unfair competition, and international business law.

**NBA 562(5620) Estate Planning (also AEM 422[4220])**

Fall, 14 sessions. 1 credit. Prerequisite: junior, senior, or graduate standing. D. Grossman.

Covers law and use of trusts, the law of wills, federal and New York State estate and gift taxes, and probate procedures.

**NBA 567(5670) Management Writing**

Fall, spring, 1.5 credits. Priority given to M.B.A. students; open to other graduate students and employee degree candidates if room. B. Mink, A. Pike, and C. Rosen.

Students learn to write clearly and effectively by focusing on the writing process as well as the finished product. Topics include audience perspective, style, organization, strategy, and persuasion. There is a writing assignment every week. Students receive instructor and peer feedback.

**NBA 568(5680) Oral Communication**

Fall, spring, seven weeks. 1.5 credits. Priority given to M.B.A. students; open to other graduate students and employee degree candidates if room. B. Mink, A. Pike, and C. Rosen.

Focuses on improving the presentation skills of management students. Covers speaking formats (impromptu, extemporaneous, manuscript), delivery, organization, visual aids, and question/answer. Student speeches constitute the bulk of class time, with each student presenting seven or eight speeches. The small class size allows for significant individual attention. Students receive feedback from classmates and the instructor, and have the opportunity to review in tutorials the videotapes of most of their presentations.

**NBA 569(5690) Management Consulting**

Fall, spring, 3 credits. A. McAdams.

Case study-oriented course focusing on strategic consulting. Objectives are to (1) provide students with the opportunity to understand the role of the consultant and for them to gain indirect experience in that role through dealing with a broad range of practical and real-world issues; (2) help students improve their analytic skills through practice with case studies; (3) provide students with information that they are unlikely to gain in other courses, as well as experience in making group presentations

and evaluating them. Students are required to write a comprehensive analytic term paper.

**NBA 570(5700) Leadership in Management**

Spring, five full-day training sessions.

1 credit; attendance required at each day of course to receive credit. Prerequisite: M.B.A. students. E. Mannix, RPW Executive Development, and other Johnson School faculty.

Partnership with RPW Executive Development to provide M.B.A. students with the self-awareness and interpersonal skills required to be effective leaders (the general principles of leadership course is NBA 668). The first two days focus on self-awareness and employ several experiential exercises and self-assessment instruments, including the Campbell Leadership Index (CLI), Myers-Briggs Type Indicator (MBTI), the Fundamental Interpersonal Relations Orientation-Behavior (FIRO-B), the Kirton Adaptation/Innovation inventory (KAI), and the Ambiguity Preference Scale (APS). Students are also trained in giving and receiving feedback from team members and faculty. Midweek activities consist of various leadership and team challenges, including a business simulation. Note: Most of the self-assessment instruments listed above need to be completed before the first day of class to allow for scoring and analysis.

**NBA 571(5710) Cornell Management Simulation**

Fall, 1.5 credits. Prerequisite: second-year M.B.A. students. Not open to students who have completed NBA 549. Letter grades only. S. Smidt.

This computer-based simulation is played by self-selected teams of four students who make marketing, production, and finance decisions for one of five companies operating competitively in the same industry. After the first week, during which the rules of the simulation are explained and the software used by each team is demonstrated, the teams make periodic decisions (meeting at their own convenience). At the beginning of the simulation, each team writes a strategic intent paper and, before the results of the last decision have been determined, presents an in-depth analysis of its performance and its strategy for the future in a "board of directors" (BOD) meeting. Grades are based on the value created for the company's shareholders (relative to other firms in the same industry), the team's strategic intent paper, and the instructor's evaluation of team's performance at the BOD meeting. Meetings are periodic throughout the semester.

**NBA 572(5720) Environmental Management Policy**

Fall, 1.5 credits. D. Chapman.

The seminar assists participants in remaining current with the rapidly evolving state of the art in the analysis and management of environmental policy and practice in enterprises. Although it focuses on the private sector, it also gives attention to understanding the economic basis for government's role in environmental protection. Another focus is the analysis of the operational significance of the concepts of sustainability, ecoefficiency, and market-based environmental policies. Seminar speakers from finance, marketing, electricity, forest products, construction, and other businesses with environmental responsibilities meet with the class. Readings and Harvard Business School (HBS) case studies are

distributed throughout the semester. Each student makes a case study of an individual enterprise or organization.

**NBA 573(5730) Seminar in Sustainable Development**

Spring, 1-3 credits, variable. A. McAdams. Involves readings and discussion of issues in environmental management and features four significant outside speakers on the subject of environmental management. (Students interested in doing consulting projects in environmental management are accommodated in NBA 575 Management Projects.)

**NBA 575(5750) Management Projects**

Fall, spring (yearlong). 3 credits.

A. McAdams, J. Thomas, and R. Allen.

Designed to apply consulting processes to real business projects. Students form consulting teams focused on specific strategic, process improvement, or operational problems in companies. A faculty member and the consultant in residence (CIR) advisors, are closely engaged in the teams' work. The teams meet with the faculty advisors weekly. Sessions focus on cross-team learning about the application of the consulting process to a variety of consulting engagements. The faculty advisor and/or CIR also meet as needed with each team to work through real-time issues presented by each consulting project. Projects include local small-business clients, not-for-profits, Big Red Incubator, and large national and multinational companies. At the end of the project, each student and team receive 360-degree feedback from the faculty advisor, CIR, the client, and other team members.

**NBA 578(5780) Consulting Process**

Fall, spring, half semester. 1.5 credits.

R. Allen.

Focuses on understanding and applying the basic consulting process by covering the elements of a consulting engagement, including selling the engagement; scoping the project; contracting with the client; forming the consulting team; creating consultant/client work teams; defining deliverables; developing a work plan; conducting analysis; creating a communication and change plan; managing the project; overcoming resistance and barriers; developing recommendations; presenting the deliverables/implementation plan; and developing potential follow-on work. The course is organized around a real client engagement, examining the consulting process from the perspective of the case. Several guest speakers from the consulting engagement add both client and consulting perspectives. The course is intended for students with no or limited consulting experience who have an interest in exploring consulting as a career or who want to sharpen their analytical and organizational change skills.

**NBA 579(5790) Cases in Business Strategy**

Fall, 1.5 credits. Prerequisite: second-year M.B.A. students. J. Suwinski.

Focuses on the process of effective strategy formulation from the perspective of the general manager of a business unit. Discusses corporate strategy and its interaction with business unit strategies; tools for industry and company analysis; and situational analysis. Complements the core strategy course, with emphasis on understanding and practicing frameworks that are useful in case-based interviews. Draws heavily on the instructor's experience developing strategy for



numerous businesses at Corning Incorporated. Guest speakers from industry and strategy consulting firms and from industry present their approaches to strategy and discuss the analytical tools they find most effective in working on business strategy. Students gain experience, via assigned cases, in analyzing business problems/opportunities, using the strategic process to formulate effective business strategies, and in presenting their recommendations in written and oral form. A major case write-up and presentation in a mock board environment at the end of the course gives each student an opportunity to play the role of a strategy consultant working on a real case.

#### **NBA 603(6030) Sustainable Global Enterprise**

Spring, 1.5 credits. S. Hart.

Explores the connections between "global sustainability" and business strategy—the unlimited business opportunities in solving the world's most difficult problems. Through a combination of cases, readings, lectures, videos, and simulations, class sessions will engage students in discussions aimed at developing strategy models and applying new strategy tools that incorporate principles of environmental management and social performance.

### **International Management**

#### **NBA 524(5240) Macroeconomics and International Trade**

Spring, 3 credits. I. Azis.

Applies basic macroeconomic theory to such problems as inflation, unemployment, economic growth, and productivity and examines how those problems interact with international trade and finance. Students learn to be informed observers of national and international economic policies and discerning users of economic analyses and forecasts.

#### **NBA 548(5480) International Political Risk Management**

Spring, 1.5 credits. E. Iankova.

When investments remain domestic political risks are easier for executives to understand and manage. International business opens executives to new forms of risk and to risks that are less well understood. New political cultures, government instability, unpredictability in local tax and regulation regimes, corruption, civil unrest, globalization of trade and economic integration, increasing power of transnational social movements, and international terrorism have raised new challenges to foreign investors, and have demanded new management strategies. The aim of this course is to introduce students to the political risks involved in international business operations and to develop students' general understanding of the field of international political risk analysis and management. The course focuses on the various techniques used by risk assessment agencies in their attempt to assess and analyze political risks on a global scale, and on the various strategies used by foreign investors in their attempt to manage political risks. Through a combination of readings, lectures, and case discussions, the course further intends to develop practical skills in evaluating and assessing political risk on a global scale.

#### **NBA 576(5760) World Geopolitical Environment of Business**

Fall, 3 credits. J. Katz.

The geopolitical face of the world is changing at a pace that few could have envisioned even five years ago. The unification of Germany, the fall of communism and institution of sweeping economic restructuring in the former Soviet Union, the move toward democracy with market economies in eastern Europe, the movement of Europe toward a unified economy, and the flirtations with reform and its implications in China are just a few examples of the changing world environment of business. Topics include developments in western and eastern Europe, the former Soviet Union, the Pacific Rim, Central and South America, and the Middle East and the role and fate of developing countries in the world economy. Guest speakers include leading scholars from Cornell and other universities and leaders in business and government.

#### **NBA 580(5800) Strategies for Global Competitiveness**

Fall, spring, 3 credits. Can be used to fulfill strategy requirement. A. McAdams.

Initially, students explore the role of government in several private-market industrialized nations—Japan, France, Germany, the United Kingdom, and Italy—for lessons the United States might learn and use. Students investigate the impact in each of those countries of government policies on the global competitiveness of the country's firms. Special emphasis is given to differential policies appropriate to each of a range of industries, from the mature to the high tech (including computers, telecommunications, and electronics), and to stages of development in each economy. Possible lessons are then tested for less developed countries that might include Venezuela and Malaysia and newly emergent countries such as Singapore. Classes are run in a discussion format.

#### **NBA 584(5840) International Competitive Strategy**

Fall and spring, 1.5 credits. J. Katz.

Focuses on the development of competitive strategies in the global environment—including the identification of internationally relevant strengths and weaknesses, the movement and use of resources to gain competitive advantage, and strategies to confront competitors, both domestic and multinational.

#### **NBA 586(5860) Cross-National Management**

Fall, 1.5 credits. J. Katz.

Focuses on the differences in managerial style across countries and develops skills to deal with these differences. Most of the material is applicable to all countries, though two specific countries are highlighted each semester.

#### **NBA 587(5870) International Mergers and Acquisitions**

Spring, 1.5 credits. J. Hanks.

Addresses the principal business and legal issues in cross-border mergers and acquisitions, including forms and techniques of combining two businesses, negotiation, pricing and other economic terms, due diligence, issuance of securities, antitrust, duties of managers, and the resolution of employee and other social issues. The graded work is a written proposal for an M&A transaction between two existing companies in different countries prepared by small teams. Proposals are based on publicly available

financial, business, legal, and other documents and data and any other information obtained. The goal of the written work is to simulate the process in which business people, investment bankers, and lawyers work together to structure transactions across national borders. The reading covers the basic business and legal issues most frequently encountered in international mergers and acquisitions. Class discussion occasionally refers to the reading but generally covers other issues.

#### **NBA 590(5900) Business in Transition Economies**

Fall, half semester, 1.5 credits. E. Iankova.

Explores business development and strategy in the transition economies of central and eastern Europe, Russia and the Commonwealth of Independent States, and China. Traces the divergence in the processes of political democratization and economic restructuring, with a special emphasis on marketization, liberalization, and privatization issues. Specifically examines the emergence and consolidation of new business organizations in the course of economic restructuring, as well as foreign investment trends and foreign investors strategies in various transition economies. More specific issues of entrepreneurship, management restructuring, marketing, enterprise employment relations and human resource management, as well as the impact of culture are also discussed. To understand better the pressures for change in the transition economies in their complexity and entirety, students become personally involved in case discussions of organizations and ventures operating in different transition countries and sectors of the economy.

#### **NBA 592(5920) Experience in International Management**

Fall, spring, 1.5 credits. Fee charged for required faculty-approved study trip. J. Katz.

Combines classroom sessions and international experience with an increased awareness of business environments outside the United States. On trips, students visit local businesses, subsidiaries of foreign multinationals, government officials, local business school students, and others. Students also must attend two pre-trip meetings (1 1/4 hours each) and two Saturday meetings during spring semester (2 1/2 hours each). Those meetings are used to present information on international business conditions, industrial structures, management styles, and also to develop cross-cultural skills. A final paper, integrating the material learned in the classroom with their experiences, is required.

#### **NBA 593(5930) International Entrepreneurship**

Spring, 1.5 credits. M. Goldman.

Venture capital firms, corporate venture funds, and "angels" have increased their financing in high-growth start-up activities outside of their countries of origin. This course provides an overview of the diffusion of entrepreneurship institutions outside of the United States vis-à-vis traditional forms of start-up finance (i.e., family backing, intrapreneurship). It also focuses on the process of selecting, financing, managing, and exiting venture capital deals abroad. The course is designed to provide practical insights through the participation of guest speakers involved in various stages of international entrepreneurship activities (e.g., European corporate funds in the United States, venture capital firms in Europe, U.S.-



based venture capital, and "angel" initiatives investing abroad).

**NBA 595(5950) Economics of Financial Crises**

Spring. 1.5 credits. I. Azis.  
Familiarizes students with the analysis of the causes, nature, and consequences of financial crises, and equips them with tools of analyses to better understand the economics of financial instability and alternative strategies for dealing with them. The first part of the course concentrates on financial instability/crisis by way of explaining the empirical episodes of the crisis in various emerging market countries, and elucidating the relevant theoretical concepts in each of the cases. The second part is devoted to discussions of post-crisis episodes, emphasizing the different paths of recovery and major policy responses to the crisis. The latter includes financial and monetary policies and the unsettled relationship between interest rates and exchange rates.

**NBA 599(5990) Business in the European Union**

Fall, half semester. 1.5 credits. E. Iankova.  
Explores the impact of the process of European integration on business organization and strategy. The foundations, institutions, and common policies of the European Union are discussed first. The course further examines how the establishment of the Economic and Monetary Union and the 2004 enlargement to the east are shaping the strategies of multinational corporations with operations in Europe. To understand better the pressures for change in a "deepening" and "widening" European Union in their complexity and entirety, students become personally involved in problem-solving through issue and case discussions, such as determinants and policy of entrepreneurship in a European-U.S. comparison; corporate networks in a European-U.S. comparison; trade policy and the European Union's trade disputes with the United States; competition policy and Microsoft's antitrust battles in European courts; environmental policies and corporate sustainability issues in Europe; the common agricultural policy of the European Union and the impact of global trade talks on European farm subsidies; work conditions in Europe and the Wal-Mart experience with doing retail business in Europe; and a variety of other mini-cases.

**NBA 625(6250) International Marketing**

Fall. 1.5 credits. Recommended: background in core marketing. J. Katz.  
Designed to train students to take a domestic product and successfully expand it into international markets. Discusses market selection, international market research issues, and international marketing strategies. The term project (submitted in three parts throughout the semester) requires students to choose a product and develop a plan for taking it abroad. Because each class includes cases, class preparation is essential. Grading is based on the term project, a final exam, and class participation.

**NBA 642(6420) Global Corporate Citizenship**

Spring. 1.5 credits. E. Iankova.  
Through a combination of readings, lectures and case discussions, and specific individual and group assignments, this course introduces students to the various practices developed by multinational corporations in their attempt

to redefine their role on a world stage as "global citizens"—actively participating in creating a safer, more humane, sustainable world. Students discuss in detail and debate the various manifestations of corporate citizenship, such as community engagement models, philanthropy and corporate social responsibility practices, respect for human rights and international labor standards, development of enhanced environmental policies and practices, creation of public/private partnerships and activities in corporate governance, and redefinition of business ethics on a global scale.

## Management Information Systems

**NBA 518(5180) Data Mining for Marketing, Sales, and Customer Relationship Management**

Spring. 1.5 credits. J. Gehrke.  
Introduces modern data management systems and their use in the business context. Focuses on the capabilities of modern database systems and their role in the enterprise instead of going into technical detail. Topics include data models and modeling, query languages, transactions, database tuning, application servers, service-oriented and three-tier architectures, capacity planning, and data mining. Students perform several hands-on exercises involving a commercial database system.

**NBA 600(6000) The Strategic Role of Information Technology**

Fall, spring. 3 credits. D. Huttenlocher.  
Beyond the hype surrounding the rise and fall of the dot-com era, information technology has had a wide-ranging impact on business activities. For instance, search costs and transaction costs have plummeted, while concurrently new ways of pricing and of organizing commercial transactions have emerged. Such changes are affecting how firms are managed as well as how they interact with their customers, employees, and business partners. This course explores how firms can use information technology to create business value and looks at strategies that can help ensure they capture part of that value. Examines small and large companies in a variety of industries, including financial services, travel, retail, software, and manufacturing. Prior knowledge of information technology is not presumed; relevant technologies are covered in class or in assigned readings. The course format is a combination of lectures and cases.

**NBA 601(6010) Electronic Commerce**

Spring. 3 credits. Letter or S-U grades. L. Orman.  
Electronic commerce, the use of information technology in conducting economic transactions and managing businesses over computer networks, has captured public attention because of its wide-ranging implications for businesses, markets, public institutions, and the general public. Electronic commerce involves a wide variety of cooperating technologies (e.g., communications, networks, databases, expert systems, and multimedia) and affects a wide variety of managerial issues. It created a new emphasis on information technologies and systems in management; led to the development of new technologies and new combinations of existing technologies to support management; and occasionally radically altered business practices and the

role of management. Students in this course learn to conduct economic transactions and manage businesses on the Internet. All major technical and managerial issues are covered through computer exercises on the Internet and case studies and examples of businesses on the Internet.

**NBA 608(6080) The Business of Biotechnology: Taxonomy and Analysis**

Spring. 1.5 credits. B. Ganem.  
Breakthrough scientific discoveries in biotechnology will continue to drive medical advances in the new millennium. As it now enters the post-genomic era, the field of biotechnology comprises some 1,400 U.S. companies having \$13 billion in worldwide sales and \$10 billion in research expenditures. This broad spectrum of biotech businesses presents numerous challenges to professional securities analysts attempting to track progress and map future growth in this sector. This course introduces JGSM students to the main scientific advances in modern biotechnology and life sciences research, with the dual goals of developing new organizational models of this corporate sector and helping students perform financial and business evaluations of current and emerging technologies more effectively.

**NBA 612(6120) Disruptive Technologies**

Fall. 3 credits. Priority given to students with technology of science backgrounds. Prerequisite: working knowledge of computers. D. Greenberg.  
Begins by presenting historical technological advances that created major paradigm shifts for communications. Presents advances in computer technology emphasizing the fundamentals behind the increases in processing power, video and computer graphics capabilities, and network transmission. The second half of the course covers the effect of these scientific advances on many discipline-specific areas including photography, the film industry, the entertainment and animation industry, television broadcasting, publishing, and the computer industry itself. Sessions are devoted to the social and legal issues rising from the rapid advances in electronic communication. In attempting to predict the disruptive changes of the future, it is best to understand the technologies themselves. The course is especially tailored to a business school and industrial concerns and has interactive live demonstrations at the state-of-the-art laboratory of the Program of Computer Graphics. No prior knowledge of computer science is required.

## Management and Organizations

**NBA 522(5220) Negotiations: The Global Perspective**

Spring. 3 credits. Students must attend first class and all classes in which they negotiate. W. Adair.  
Covers all the topics in NBA 666 with a focus on issues particular to an international setting. These include culture (e.g., its effect on strategy, goals, communication), government at the table, currency issues, and ethics. The capstone exercise is a two-party cross-cultural team negotiation matching a student's native culture with that of his or her classmates.

**NBA 663(6630) Managerial Decision Making**

Fall. 3 credits. J. Russo.

Presents practical concepts from the behavioral sciences that can serve as guides to managerial action. Uses lectures, cases, and exercises to acquaint students with new perspectives on decision making, critical thinking, problem solving, and group processes. Taken together, these perspectives offer a trouble-shooter's guide to the uncertainty, complexity, and conflict in the business world.

**NBA 666(6660) Negotiations**

Fall, spring. 3 credits. Staff.

Judgment is the art and science of transforming perception into thought or opinion. Negotiation is the art and science of securing agreements between two or more interdependent parties. The purpose of this course is to understand the theory and processes of negotiation as it is practiced in a variety of settings. It is designed to complement the technical and diagnostic skills learned in other courses. A basic premise is that while a manager needs analytical skills to develop optimal solutions to problems, he or she also needs a broad array of negotiation skills for these solutions to be accepted and implemented. The course highlights the components of an effective negotiation and teaches students to analyze their own behavior in negotiations. It is largely experiential, giving students an opportunity to develop their skills by participating in negotiations and integrating their experiences with the principles presented in the assigned readings and course discussions.

**NBA 668(6680) Leading Teams and Organizations**

Fall. 3 credits. Priority given to M.B.A.s. M. Thomas-Hunt.

Focuses on general principles for successfully leading teams and organizations (the personal development course is NBA 570). Draws on the latest research in team decision making and organizational leadership to address questions such as: what is the difference between leadership and management? how does a leader establish trust and commitment to an organization? and how do leaders transform organizations? Consists primarily of case studies of leaders but also includes some experiential and group activities. Grading is based on class participation, group case analyses, and a final individual case analysis. Priority is given to MBAs.

**NBA 670(6700) Perspectives on Leadership**

Fall. 1.5 credits. D. Radcliffe.

What is leadership? What are its recognized styles? What skills and personal attributes are associated with these leadership styles? How are leadership traits and abilities manifested in different organizations and social environments? This course considers these and other questions on leadership. Most class sessions are discussions of cases comprising excerpts from classic texts in literature, politics, and philosophy. Each case also includes both a contemporary article exemplifying themes found in the classic work and a brief review of relevant leadership theory. The course begins by examining Louis Gerstner's leadership in IBM's major turnaround in the early 1990s. This case serves as a frame of reference for examining two recent contributions to leadership studies:

Daniel Goleman's research on emotional intelligence and Howard Gardner's cognitive approach to leadership. The final paper invites students to work out their own views on leadership.

**NBA 671(6710) Business Ethics**

Fall, spring. 1.5 credits. D. Radcliffe.

Poor moral judgment can ruin a manager's career or even sink a company. In general, an organization cannot survive without the trust of numerous stakeholders, and ethical lapses destroy trust and threaten vital stakeholder relationships. In today's volatile and fiercely competitive business environment, a manager must be able to identify and effectively resolve ethical issues that inevitably arise in the pursuit of business (and career) objectives. This course is designed to enhance students' skills in moral reasoning as it applies to managerial decision-making. It begins by examining normative concepts and principles that typically enter into moral reasoning, then uses those concepts and principles to analyze cases. Discussions seek to understand the moral issues confronting the decision makers in the cases and explore how those issues might be addressed in ethically responsible ways.

**NBA 672(6720) Goal Setting for Personal and Leadership Success**

Spring. 1.5 credits. P. Stepp.

Designed as a follow-up to NBA 570 Leadership Assessment for Managers. Provides structured support for personal change through personal learning plans, learning and development strategies, and feedback and coaching support from peers. Includes a workshop on establishing a personal values statement to help guide personal learning plans and align them with career aspirations. Employs a web-based, follow-through support system to facilitate further leadership growth by prompting students regularly to assess and document their progress. Learning coaching strategies and serving as a coach for the year for a classmate further enhance leadership growth. The course is scheduled throughout the year to allow students time to develop personal goals and provide numerous opportunities to practice coaching.

**NBA 682(6820) Negotiation Essentials**

Fall. 1.5 credits. Not open to students who have taken NBA 666. Staff.

Designed to complement the technical and diagnostic skills learned in other courses at the Johnson School. While a manager needs analytical skills to develop optimal solutions to problems, he or she also needs a broad array of negotiation skills for these solutions to be accepted and implemented. The course is largely experiential, giving students an opportunity to develop their skills by participating in negotiations and integrating their experiences with the principles presented in the assigned readings and discussions.

**Marketing****NBA 620(6200) Marketing Research**

Fall, spring. 3 credits. Prerequisites: NCC 501 and 503 or equivalent. S. Gupta and Y. Park.

Deals with marketing research as a critical support function in corporations. The broad objective is to provide a fundamental understanding of marketing research methods employed by better-managed firms or proposed by leading academicians.

The course is aimed at the manager, the ultimate user of marketing information, who is responsible for the scope and direction of research activities involved in obtaining, analyzing, and interpreting results of research. Covers the use of secondary sources of marketing information for designing studies and collecting primary data. Students are exposed to up-to-date methods in research design, qualitative research, measurement, data collection, and analysis. The emphasis is on evaluating research methods and on interpretation and use of results rather than on mathematical derivations. Students are also exposed to the practical side of marketing research through case studies, problem sets, and projects.

**NBA 621(6210) Marketing Communications**

Fall. 1.5 credits. Prerequisite: NCC 503 (marketing core). D. Stayman.

Designed to give students an understanding of the advertising and promotion management process. Covers the components of a successful advertising campaign and helps students develop an appreciation of the issues involved in advertising planning and decision making. They also learn how recent social science findings and theory can facilitate advertising management.

**NBA 622(6220) Marketing Strategy**

Fall. 3 credits. Prerequisite: NCC 503 (marketing core). S. P. Raj.

A sound marketing strategy is essential for the long-term success of a firm. Marketing strategies, while guided by environmental conditions, also seek to anticipate, exploit, and sometimes shape changes in the environment to gain competitive advantage. This requires an understanding of how customer needs evolve, how product-market boundaries shift, and how competitors are likely to react. The strategic roles of existing and new products need to be assessed, appropriate resource allocations made, and marketing strategies developed to ensure sustained growth. Successful development of marketing strategy requires an equal measure of analytical and creative thinking. This course is designed to give students opportunities to learn about the theoretical and applied perspectives of marketing strategy from readings, case analyses, and guest speakers.

**[NBA 623(6230) Customer-Based New Product Development]**

Fall. 3 credits. Prerequisites: NCC 501 and 503. Not offered 2006-2007. P. Kumar.]

**NBA 626(6260) Consumer Behavior**

Spring. 3 credits. Staff.

Topics include factors that influence response to advertising of various kinds, purchase decisions, product perceptions, response to promotion, consumer satisfaction, and the basic methodologies for understanding consumer behavior.

**NBA 633(6330) Marketing and E-Commerce**

Spring. 3 credits. Y. Park.

Explores the effect of the Internet on marketing. Topics include an overview of the online industry, business models for the Internet, advertising and promotions on the Internet, marketing research on the Internet, loyalty programs for Internet marketing, and disintermediation or channel conflict resulting from Internet distribution. The course comprises industry speakers from Cendant,

CSC, Netcentives, H-P, 1st USA, Catalina marketing, Bausch and Lomb, and others. Course requirements include write-ups on a subset of speakers, and a final report and presentation on an Internet marketing issue of the student's choice. MBA 638 is restricted to M.B.A. II's because the same information is available for M.B.A. I's in the strategy core.

#### **NBA 639(6390) Data-Driven Marketing**

Spring. 3 credits. S. Gupta.

Deals with the use of data to make marketing decisions. Introduces concepts, methods, and applications of decision modeling to address marketing issues such as segmentation, targeting, positioning, promotions, advertising, and sales force decisions. Unlike marketing courses that focus on conceptual material, this course provides skills to translate conceptual understanding into specific operational plans—a skill in increasing demand in organizations today. The course is particularly valuable to students planning careers in management consulting, marketing, and market research. It is designed for students who have some background in quantitative methods and have a willingness to deal with mathematical concepts.

#### **NBA 692(6920) Economics of Pricing**

Fall. 1.5 credits. J. Johnson.

One of the most common and important decisions for a manager to make is the pricing decision. This course provides an economics perspective on the pricing decision. The goal is for students to learn to think rigorously about a variety of pricing issues. Specific topics include price discrimination, peak-load pricing, channel pricing, and durable goods pricing.

### **Operations Management**

#### **NBA 641(6410) Business Logistics Management**

Spring. 3 credits. Prerequisite: NCC 508, ORIE 410, or permission of instructor. L. J. Thomas.

Covers supply-chain integration, which involves strategic management of the values chain from materials to customer. Students discuss operations strategy issues that are important to both manufacturing and service. The course emphasizes written and oral communication skills. About a fourth of the classes are spent on case studies that are analyzed by small groups. There is one midterm exam, but the majority of the grade is evaluated based on projects and class participation. There is an option of replacing some assignments with a "live case," a project with a local company.

#### **NBA 643(6430) Managerial Spreadsheet Modeling**

Fall, spring. 1.5 credits. L. Robinson.

The goal of this hands-on, lab-style course, taught in the Parker Center, is to develop proficiency in quantitative modeling within the environment of Microsoft Excel. Students develop and use spreadsheets to analyze a variety of business problems. The course has two principal components: spreadsheets and models. Spreadsheet topics include principles of good spreadsheet design, the effective presentation of information through spreadsheets (including graphical controls like sliding bars), and advanced Excel features (e.g., data validation, conditional formatting, scenarios). Modeling topics include the art of finding the appropriate level of modeling detail, practice in dealing with vague and

unstructured problems, sensitivity analysis, and working with incomplete and unreliable data.

#### **NBA 647(6470) Advanced Spreadsheet Modeling**

Fall. 1.5 credits. L. Robinson.

The goal of this hands-on lab course, taught in the Parker Center, is to develop proficiency with Excel's quantitative tools of Solver (for optimization) and @Risk (for simulation). Building on their brief introduction in the Managing Operations core course, students use these advanced tools to analyze problems and cases in finance, marketing, and operations. Although the bulk of this course is devoted to case analysis, occasional lectures introduce some advanced features of these two powerful modeling tools, including integer and nonlinear programming and sensitivity analysis within optimization, and correlated random variables, scenario analysis, and valid statistical analysis within simulation.

### **NMI AND NRE RESEARCH AND ADVANCED STUDIES**

#### **NMI 500-502(5000-5020) Directed Reading and Research**

Fall, spring. 1-3 credits. Prerequisite: approval of advisors and faculty members involved in research. Staff.

Students undertake special-interest research under the supervision of faculty members.

#### **NMI 510(5100) Multicultural Work Environments**

Spring. 1 credit. Prerequisite: students whose summer internships are in a country other than that of their citizenship or prior work experience. Students should register for course in spring semester before internship after obtaining an internship offer and completing paperwork for course instructors. International students obtain and process work authorization forms with the International Students office. See Charlotte Rosen (304 Sage Hall) for further details about academic and immigration requirements for NMI 510. C. Rosen and B. Mink.

Independent study. Promotes an understanding of the cultural assumptions we bring to the work environment and the effects of cultural differences on organizational interactions and productivity. Grades are posted in the following fall semester after completion of the course project (a 10-page paper).

### **DOCTORAL SEMINARS**

#### **NRE 502(5020) Doctoral Seminar In Marketing**

3 credits. Prerequisite: permission of instructor; graduate-level course in mathematical statistics or econometrics (may be waived in special cases). Staff.

Introduces students to empirical research in marketing. Although there is a strong focus on the historical development of econometric specifications of consumer choice models (with an emphasis on heterogeneity and issues of dynamic consumption patterns) and Bayesian methods in marketing, the content is to some extent driven by the students. Teaching is interactive, and each student is

expected to present one of the papers studied to the rest of the class and to replicate the results of one of the papers, requiring him or her to write the necessary code and briefly discuss their findings. Students are welcome to sit in on parts of the class (e.g., the section on Bayesian Methods is broad enough that students from other areas may find the presentation useful).

#### **NRE 504(5040) Judgment and Decision Making, Research and Accounting**

3 credits. Prerequisite: Ph.D. students.

M. Nelson and R. Libby.

This seminar provides a rigorous and integrative exposure to those aspects of the literature in accounting, behavioral economics, and psychology that are related to questions of accounting and auditing theory and research.

#### **[NRE 518(5180) Marketing Models**

Spring. 3 credits. Not offered 2006-2007. Staff.]

### **FACULTY ROSTER**

Adair, Wendi, Ph.D., Northwestern U. Asst. Prof., Management and Organizations  
Bailey, Warren B., Ph.D., U. of California, Los Angeles. Assoc. Prof., Finance  
BenDaniel, David J., Ph.D., Massachusetts Inst. of Technology. Don and Margi Berens Professor of Entrepreneurship  
Bhojraj, Sanjeev, Ph.D., U. of Florida. Asst. Prof., Accounting  
Bierman, Harold, Jr., Ph.D., U. of Michigan. Nicholas H. Noyes Professor of Business Administration  
Bloomfield, Robert J., Ph.D., U. of Michigan. Assoc. Prof., Accounting  
Botti, Simona, Ph.D., U. of Chicago. Asst. Prof., Marketing  
D'Souza, Julia, Ph.D., Northwestern U. Assoc. Prof., Accounting  
Dyckman, Thomas R., Ph.D., U. of Michigan. Ann Whitney Olin Professor of Accounting  
Eisenstein, Eric M., Ph.D., U. of Pennsylvania. Asst. Prof., Marketing  
Farahat, Amr A., Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Operations Management  
Frank, Robert, Ph.D., U. of California, Berkeley. Prof., Economics  
Gavirneni, Srinagesh (Nagesh), Ph.D., Carnegie Mellon U. Asst. Prof., Operations  
Greenberg, Donald P., Ph.D., Cornell U. Prof., Management Information Systems  
Grinstein, Yaniv, Ph.D., Carnegie Mellon U. Asst. Prof., Finance  
Gupta, Sachin, Ph.D., Cornell U. Assoc. Prof., Marketing  
Hart, Stuart, Ph.D., U. of Michigan. Samuel C. Johnson Chair in Sustainable Global Enterprise; Prof., Management  
Hass, Jerome E., Ph.D., Carnegie-Mellon U. James B. Rubin Professor of Finance, Krans Faculty Fellow  
Heffetz, Ori, Ph.D., Princeton U. Asst. Professor of Economics  
Hilton, Ronald W., Ph.D., Ohio State U. Prof., Accounting  
Hribar, S. Paul, Ph.D., U. of Iowa. Asst. Prof., Accounting  
Huang, Ming, Ph.D., Stanford U. Professor of Finance

Huttenlocher, Daniel P., Ph.D., Massachusetts Inst. of Technology. John P. and Rilla Neafsey Professor, Computing and Information Systems and Business

Isen, Alice M., Ph.D., Stanford U. S. C. Johnson Professor, Marketing

Jarrow, Robert A., Ph.D., Massachusetts Inst. of Technology. Ronald P. and Susan E. Lynch Professor of Investment Management; Prof., Finance and Economics

Johnson, Justin, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Economics

Kadiyali, Vrinda, Ph.D., Northwestern U. Assoc. Prof., Marketing and Economics

Lee, Charles M. C., Ph.D., Cornell U. Prof., Accounting and Finance, Henrietta Johnson Louis Professor of Management; Director, The Park Center for Investment Research

Libby, Robert, Ph.D., U. of Illinois. David A. Thomas Professor of Management, Prof., Accounting and Behavioral Science

Mannix, Elisabeth, A., Ph.D., U. of Chicago. Assoc. Prof., Management and Organizations

McAdams, Alan K., Ph.D., Stanford U. Prof., Managerial Economics

McClain, John O., Ph.D., Yale U. Prof., Operations Management

Michaely, Roni, Ph.D., New York U. Prof., Finance

Nelson, Mark W., Ph.D., Ohio State U. Prof., Accounting

Nichols, Craig D., Ph.D., Indiana U. Asst. Professor of Accounting

O'Connor, Kathleen, Ph.D., U. of Illinois. Assoc. Prof., Management and Organizations

O'Hara, Maureen, Ph.D., Northwestern U. Robert W. Purcell Professor, Management, Prof., Finance

Orman, Levent V., Ph.D., Northwestern U. Prof., Management Information Systems

Park, Young-Hoon, Ph.D., U. of Pennsylvania. Assoc. Prof., Marketing

Rao, Vithala R., Ph.D., U. of Pennsylvania. Deane W. Malott Professor of Management; Prof., Marketing and Quantitative Methods

Robinson, Lawrence W., Ph.D., U. of Chicago. Assoc. Prof., Operations Management

Russo, J. Edward, Ph.D., U. of Michigan. S. C. Johnson Family Prof., Management, Prof., Marketing and Management and Organizations

Saar, Gideon, Ph.D., Cornell U. Asst. Professor of Finance

Sine, Wesley, Ph.D., Cornell U. Asst. Prof., Management and Organizations

Smidt, Seymour, Ph.D., U. of Chicago. Nicholas H. Noyes Professor of Economics and Finance; Director, Leadership Skills Program

Stayman, Douglas M., Ph.D., U. of California, Berkeley. Assoc. Prof., Marketing

Swaminathan, Bhaskaran, Ph.D., U. of California, Los Angeles. Assoc. Prof., Finance

Thomas, L. Joseph, Ph.D., Yale U. Nicholas H. Noyes Professor of Manufacturing; Assoc. Dean, Academic Affairs

Thomas-Hunt, Melissa, Ph.D., Northwestern U. Asst. Prof., Management and Organizations

Waldman, Michael, Ph.D., U. of Pennsylvania. Prof., Economics; Charles H. Dyson Professor, Management

Weinbaum, David, Ph.D., New York U. Asst. Prof., Finance

Yehuda, Nir, Ph.D., Columbia U. Asst. Professor of Accounting

Zhang, Xiaoyan, Ph.D., Columbia U. Asst. Prof., Finance

## Lecturers

Biloski, Alan J. Ph.D., Cornell U. Lec., Finance

Iankova, Elena A. Ph.D., Cornell U. Lec., International Business

Katz, Jan, Ph.D., Massachusetts Inst. of Technology. Sr. Lec., International Business and Marketing

Mink, Barbara E., M.A., Cornell U. Sr. Lec., Management Communications

Noble-Grange, Angela P., M.B.A., Cornell U. Lec., Management Communications

Nozell, John D., M.B.A., Cornell U. Sr. Lec., Finance

Rosen, Charlotte, Ph.D., Cornell U. Sr. Lec., Coordinator, Management Communications

Shulman, Zachary J., J.D., Cornell U. J. Thomas Clark Senior Lecturer of Entrepreneurship and Personal Enterprise, Sr. Lec., Entrepreneurship

Suwinski, Jan H., M.B.A., Cornell U. Sr. Lec., Business Operations

## Adjunct and Visiting Faculty

Azis, Iwan J., Ph.D., Cornell U. Prof., Economics

Barlett, Joseph W., J.D., Stanford U. Visiting Lec., Entrepreneurship

Grossman, Dale A., J.D., American U. Sr. Lec., Tax and Business Law

Nesheim, John L., M.B.A., Cornell U. Visiting Lec., President, Aladdin Systems, Inc.

Schuler, Richard E., Ph.D., Brown U. Prof., Economics, Prof. Civil and Environmental Engineering

## LAW SCHOOL

### ADMINISTRATION

Stewart J. Schwab, dean and professor of law

Barbara J. Holden Smith, associate dean for academic affairs and professor of law

Claire M. Germain, law librarian and professor of law

Richard D. Geiger, associate dean and dean of admissions and financial aid

Anne Lukingbeal, associate dean and dean of students

Richard F. Robinson, associate dean for administration and finance

Karen V. Comstock, assistant dean for public service

Charles D. Cramton, assistant dean for graduate legal studies

John R. DeRosa, assistant dean for student services

Nan A. Colvin, registrar

The Law School prepares attorneys for both public and private practice. Graduates are trained to provide the highest quality professional services to their clients and to contribute to the development and reform of law and legal institutions. The curriculum is designed to prepare students for admission to the bar in all American states and territories. Students who pursue the three year Doctor of Law degree (J.D.) must have a bachelor's degree or equivalent. Students wishing to concentrate in international law may be admitted to a program leading to the J.D. "with specialization in international legal affairs." The Law School also offers a limited number of students an opportunity to earn both a J.D. degree and an LL.M. (Master of Laws) degree in international and comparative law.

Students may pursue combined graduate degree programs with the Johnson Graduate School of Management; the Department of City and Regional Planning of the College of Architecture, Art, and Planning; the School of Industrial and Labor Relations; the graduate divisions in economics, history, and philosophy of the College of Arts and Sciences; the Université de Paris I (Pantheon Sorbonne); L'Institut d'Etudes Politiques de Paris; and Humboldt University.

Each year a limited number of students from abroad pursue the LL.M. degree (Master of Laws) and the J.S.D. degree (Doctor of the Science of Law). A small number of law graduates also may be admitted as special students, to pursue advanced legal studies without seeking a degree. Students in other graduate programs and qualified undergraduate students registered with the university are welcome in many classes with the permission of the instructor. In addition, highly qualified undergraduates in the College of Arts and Sciences may register in the Law School during their senior year.

For further information, refer to the Law School web site, or contact the Office of the Registrar, Myron Taylor Hall. Course

descriptions are current as of April 2006. For updated law descriptions visit: [www.lawschool.cornell.edu](http://www.lawschool.cornell.edu)

### FIRST-YEAR COURSES

#### LAW 500(5001) Civil Procedure

Yearlong. 6 credits. Letter grades only.

K. M. Clermont, J. J. Rachlinski, F. F. Rossi.

An introduction to civil litigation, from commencement of an action through disposition on appeal, studied in the context of the federal procedural system. Also, a detailed consideration of federalism and ascertainment of applicable law; jurisdiction, process, and venue; and former adjudication.

#### LAW 502(5021) Constitutional Law

Fall. 4 credits. Letter grades only.

B. A. Meyler, S. H. Shiffrin.

A study of basic American constitutional law, including judicial review, structural aspects of the Constitution as developed particularly in light of the passage of the Civil War amendments, and certain of its rights provisions.

#### LAW 504(5041) Contracts

Yearlong. 6 credits. Letter grades only.

R. A. Hillman, R. S. Summers, W. F. Taylor.

An introduction to the nature, functions, and processes of exchange, contract, and contract law. The course focuses on the predominant rules and principles governing contract and related obligation, including the substantive reasons underlying the rules and principles.

#### LAW 506(5061) Criminal Law

Spring. 4 credits. Letter grades only.

S. D. Clymer, S. P. Garvey.

An introductory study of the criminal law, including theories of punishment, analysis of the elements of criminal liability and available defenses, and consideration of specific crimes as defined by statute and the common law.

#### LAW 508(5081) Lawyering

Yearlong. 4 credits. Letter grades only.

J. B. Atlas, J. A. Ciani-Dausch, J. Dole,

A. J. Mooney, U. Weigold.

This course is designed to introduce first-year students to lawyering skills, with primary emphasis on legal writing, analysis, and research. In the context of a law office, students create some of the essential legal writings that lawyers produce. Students determine and investigate the essential facts to support their client's case by interviewing or deposing various witnesses. Students may also write a client letter, using plain English to explain to their client the law and the merits of the case, and advise the client on the best course of conduct. Finally, students develop their oral and written advocacy skills and start thinking about litigation strategy by researching and writing persuasive memoranda or legal briefs for a trial or appellate court. At the end of the year, students orally argue their case. Instruction occurs not only in meetings of the class as a whole but also in individual conferences.

Each student receives extensive editorial and evaluative feedback on each written assignment.

#### LAW 512(5121) Property

Spring. 4 credits. Letter grades only.

G. S. Alexander, E. L. Sherwin.

This basic property law course covers acquisitions of rights in property, estates in land, concurrent ownership, landlord/tenant relations, and regulation of land use.

#### LAW 515(5151) Torts

Fall. 4 credits. Letter grades only.

C. G. Bowman, V. Hans, M. Heise,

J. A. Henderson, Jr., D. Kysar,

W. B. Wendel.

An introduction to the principles of civil liability in the tort field: intentional wrongs, negligence, and strict liability. Attention is also given to the processes by which tort disputes are handled in our legal system.

### GRADUATE COURSES

#### LAW 607(6071) Advanced Legal Research—U. S. Legal Research for LL.M. Students

Fall. 1 credit. Graduate program grading—

H, S, U. Limited to graduate students.

Limited enrollment. Meets first 6½ weeks of term. C. Finger, M. Morrison.

This course introduces LL.M. students to basic legal research in U.S. materials that will be valuable to them in their course work at Cornell and in practice. The focus is on understanding and finding primary legal sources, including statutory codes, session laws, administrative regulations, and court decisions, as well as explanatory materials, such as law reviews and treatises. To a large extent, instruction uses online materials most likely to be available to the students in their future careers. There are short introductory lectures as well as hands-on computer lab and Reading Room sessions. Students complete five exercises using the resources learned in class, and there is no final exam. The final grade is based on the five exercises (20% each).

#### LAW 622(6221) Contracts in a Global Society

Fall. 4 credits. Graduate program grading:

H, S, U. Limited to graduate students.

W. F. Taylor.

This course is designed for foreign-trained lawyers who are familiar with basic contract law in their own country. It surveys the Anglo-American common law of contracts and related civil obligations. The pedagogic approach focuses on the case method and is Socratically based, similar to the traditional first year course in Contracts. Graduate students who wish to study contract law are generally expected to take this course. They are free to enroll instead in the first-year Contracts course, but if they do so, they must take that course for the full year.



**LAW 676(6761) Principles of American Legal Writing**

Fall or spring. 3 credits. Graduate program grading: H, S, U. Limited enrollment.

Limited to graduate students. L. Knight.

This course introduces foreign-trained lawyers to the American legal system and essential principles of legal writing in the U.S. Students have an opportunity to practice some forms of writing common to American legal practice, by drafting documents such as client letters, memoranda, briefs, and pleadings, in the context of representing hypothetical clients.

**LAW 899(8991) Thesis**

Fall or spring. 5 credits. Graduate program grading: H, S, U; J.D./LL.M. program: Letter grades only. Limited to graduate students and students completing joint J.D.-LL.M. program.

Arrangements for a master's thesis are made by the student directly with a faculty member. A faculty member may require the student to submit a detailed outline of the proposed thesis, as well as a summary of previous writing on the subject or other appropriate information. The work is completed during the academic year under the supervision of a law faculty member.

**LAW 990(9901) Graduate Research**

Fall or spring. Limited to J.S.D. students.

**UPPERCLASS COURSES****LAW 600(6001) Accounting for Lawyers**

Spring. 2 credits. S-U or letter grades.

R. A. Sarachan.

This course introduces students to the basic concepts and fundamentals of financial accounting. It focuses on (1) accrual accounting concepts, principles and conventions, (2) presentation of financial statements, (3) interpretation and analysis of financial statements, and (4) the use and misuse of accounting information. The goal is to enable students to critically review a company's financial statements. It is intended primarily for students with little or no prior background in bookkeeping or accounting and is limited to students who have had no more than 6 credit hours of accounting (or its equivalent) or permission of instructor.

**LAW 601(6011) Administrative Law: The Law of the Regulatory State**

Fall or spring. 3 credits. J. Siegal (fall), S-U option available; J. J. Rachlinski (spring). Letter grades only. Limited enrollment.

An introduction to the constitutional and other legal issues posed by the modern administrative state. Topics include: procedural due process, separation of powers, procedural modes of administrative policymaking; judicial review of agency action; and the oversight and control relationships between agencies and Congress or the President. The course provides a working familiarity with the fundamentals of administrative procedure, as well as a larger inquiry into the role of agencies in our constitutional system—and the effect of legal doctrine on shaping that role.

**6051 Advanced Legal Research in Business Law**

Spring. 1 credit. S-U or letter grades. Prerequisite: Lawyering. Meets first 6½ weeks of term. Limited enrollment. J. M. Callihan.

This course introduces students to print and online sources for researching business law. The term "business law" covers a variety of topics such as corporate law, securities, banking, antitrust, employment, and taxation. In addition to revisiting the standard legal research sources, students learn about specialized resources including financial reports, SEC filing, company information, historical and current industry and market research, and economic and financial data. The focus is on research strategy and evaluation of resources. The course includes short lectures, hands-on computer lab sessions introducing students to commercial and free databases, and some instruction by a business librarian on business databases. There are selected readings in lieu of a required textbook, and five assignments using resources learned in class. There is no final exam; final grade is based on the five exercises (20% each).

**LAW 606(6061) Advanced Legal Research—International and Foreign Law**

Fall. 2 credits. S-U or letter grades. Limited enrollment. T. Mills.

Globalization has led to the internationalization of the practice of law. This course provides an overview of research resources, methods, and strategies for international and foreign law. Topics include public and private international law, the European Union, and the United Nations. The course includes lectures followed by computer lab and library training sessions. Selected readings are available online and on reserve; there is no required textbook. There are seven assignments of equal weight on material covered in class, but no final exam.

**LAW 610(6101) Antitrust Law**

Fall. 3 credits. Letter grades only. G. A. Hay.

The antitrust laws of the U.S. protect competitive markets and limit the exercise of monopoly power. Topics include: price fixing, boycotts, and market allocation agreements among competitors; agreements between suppliers and customers; joint ventures; monopolization; and mergers.

**LAW 612(6121) Bankruptcy**

Fall. 3 credits. Letter grades only. Not open to students who have taken Debtor-Creditor Law. T. Eisenberg.

Selected topics in the law of bankruptcy. An overview of the various bankruptcy chapters and a detailed study of the bankruptcy provision of most general applicability. The relationship between the rights of an Article 9-secured creditor and the bankruptcy trustee's power to avoid liens. Related topics in the enforcement of money judgments and the law of fraudulent conveyance.

**LAW 613(6131) Business Organizations [formerly Corporations]**

Spring. 4 credits. S-U option. Limited enrollment. M. Schanzenbach.

An introduction to the legal rules and principles, as well as economic factors, that pattern the conduct of productive enterprise in the U.S. The principal focus is on the large, publicly traded corporation that dominates much of the U.S. business environment, in particular, its financing, control, and the potentially conflicting interests that the form must mediate. Legal topics include shareholder and executive compensation, basic fiduciary obligations, shareholder voting rights, shareholder suits, corporate reorganization and control transactions. We

also devote some attention to partnerships, closely held corporations and other business forms.

**LAW 613(6131) Business Organizations [formerly Corporations]**

Fall. 4 credits. S-U or letter grades. Limited enrollment. M. C. Suchman.

An introduction to the legal rules and principles, as well as some of the economic factors, that pattern the conduct of productive enterprise in the U.S. The principal focus is on the large, publicly traded corporation that dominates much of the U.S. business environment, in particular, its financing, its control, and the potentially conflicting interests that the form must mediate. Legal topics include shareholder and executive compensation, basic fiduciary obligations, shareholder voting rights, shareholder suits, corporate reorganization and control transactions. We also devote some attention to partnerships, closely held corporations and other business forms, and take note of particular industries' and divergent (generally, non-American) jurisdictions' dominant forms of productive organization, to place what is distinctive about the principal American form into bolder relief. No prior background in business law or economics is assumed.

**LAW 615(6151) Chinese Law**

Spring. 3 credits. S-U or letter grades. Z. Cui.

This course examines the law and practice in contemporary PRC. After a brief overview of Chinese legal history and legal development, the course proceeds into specific sections devoted to the overall legal reform, the status and reform of legal actors, and various aspects of commitment and compliance with international human rights standards. A section also deals with Chinese law in a comparative perspective how it is and has been viewed in China and outside. Much of the course material consists of academic articles as well as various reports by, for example, the United Nations. Chinese case law, statutes and other documents are also examined. The course ends with a discussion on possible scenarios on the future of legal development in China.

**LAW 616(6161) Comparative Law: The Civil Law Tradition**

Spring. 3 credits. S-U or letter grades. M. Lasser.

This course introduces students to the institutional and conceptual organization of "civil law" legal systems (which govern most of Western and Eastern Europe and Latin America as well as significant portions of Africa and Asia). It therefore provides a broad overview of "civilian" private law and procedure, criminal procedure, administrative law, and constitutional law. It is particularly interested in the differences between common law and civil law understandings of the relationship between law-making, legal interpretation, and the judiciary.

**LAW 619(6191) Conflict of Laws**

Spring. 3 credits. S-U or letter grades. B. Holden-Smith.

This course focuses primarily on the choice-of-law methods used by courts in the U.S. to decide the applicable law in cases that, in their parties or events, involve more than one state or country. It examines in detail the nature, logic, and constitutionality of such methods. In addition, it devotes substantial attention to recognition and enforcement of judgments and, in particular, to the obligation

imposed by the Constitution's Full Faith and Credit Clause to respect the judgments of other states' courts.

**LAW 619(6192) Congress: Structure, Process and Product**

Spring. 3 credits. Letter grades only.  
Tentative offering. C. Farina.

A course for those troubled by the idea of getting out of law school without knowing more about the institution that enacts statutes and passes the budget than that it is composed of the House and the Senate. We look at the make-up, operation, and formal and informal output of Congress from both the political science and legal perspectives. Part of the grade involves using this information to examine the debate about methods of statutory interpretation.

**LAW 620(6201) Constitutional Law II: The First Amendment**

Spring. 3 credits. S-U or letter grades.  
S. H. Shiffrin.

A comprehensive discussion of freedom of speech, press, and association. The free-exercise-of-religion clause and the establishment clause of the First Amendment are treated less extensively.

**LAW 623(6231) Copyright**

Spring. 3 credits. O. Liivak.

This course focuses on U.S. copyright law and provides a survey of the main doctrinal areas including the definition of authorship, the criteria and scope of protection, infringement and fair use, and related constitutional issues. It explores copyright's impact in modern debates and controversies over Internet liability, peer to peer file sharing, and software and data protection.

**LAW 624(6241) Corporate and White Collar Crime**

Fall. 3 credits. S-U or letter grades.  
S. P. Garvey.

White collar crime is one of the fastest growing areas of specialization in the legal profession today. The collapse of the savings and loan industry, corruption in the health care industry, and the Enron scandal have contributed to a dramatic increase in federal white collar crime prosecutions over the past 20 years. This course examines some of the principal statutes used to prosecute corporate and white collar crime. Theories of liability we consider include traditional white collar offenses like mail and wire fraud, insider trading, false statements, perjury, and obstruction of justice and recent entries such as RICO, money laundering, and laws enacted to combat government contract fraud. In addition, we take an introductory look at the workings of the Federal Sentencing Guidelines.

**LAW 626(6261) Criminal Procedure I**

Fall. 3 credits. S-U or letter grades.  
J. H. Blume.

This course surveys the law of criminal procedure, with emphasis on the constitutional constraints that regulate the pretrial stage of the criminal process. More specifically, it focuses on the law of interrogations and confessions, the admissibility of evidence, and the right to counsel throughout all stages of the criminal process.

**LAW 630(6301) Directed Reading**

Fall or spring. 1 or 2 credits. S-U option only. Arrange directly with instructor. Registration form available from registration site or registrar's office.

An examination of a topic through readings selected by arrangement between the instructor and an individual student or group of students (not exceeding eight).

**LAW 631(6311) Education Law**

Spring. 3 credits. S-U or letter grades.  
M. Heise.

This course focuses on selected legal issues that arise in the public and private education context, with emphasis on the elementary and secondary school setting. Topics include the legal and policy dimensions of the rights of students, parents, educators, and the state with respect to such issues as access to, control over, and regulation of the education setting and institutions. Issues germane to equal education opportunity, school finance, and school governance and regulation receive particular attention.

**LAW 632(6321) Employment Discrimination and the Law (also ILRCB 684)**

Fall. 3 credits. S-U or letter grades.  
For description, see ILRCB 684.

**LAW 633(6331) Employment Law**

Spring. 3 credits. S-U or letter grades.  
A. S. Hyde.

Survey of common law doctrines and selected federal statutes affecting the employer-employee relationship, but not including union formation and collective bargaining. Common law topics include: the "employment at will" rule and its exceptions; employee duties of loyalty, trade secrets, covenants not to compete, and other post-termination obligations; and, employee reputation and privacy interests. Constitutional topics include free speech and privacy rights of public employees. Federal statutory topics include brief introductions to the Employee Retirement Income Security Act, and either federal antidiscrimination law, or the Occupational Safety and Health Act.

**LAW 635(6351) Environmental Federalism and Regulatory Design**

Fall. 1 credit. Meets for two weeks during first half of semester. W. W. Buzbee.

This course studies regulation and federalism through close examination of debates and developments in the world of environmental federalism. After looking at recent Supreme Court cases and the constraints they impose, as well as readings on federalism theory, we cover materials about cooperative federalism; debates over the "race-to-the-bottom" rationale for federal regulation; devolutionary shifts of authority to state and local actors; shifts in regulatory strategy away from "command and control" regulation to decentralized or more market-oriented strategies; increased reliance on cost-benefit analysis; the need to distinguish arguments rooted in federalism principles from decentralization rationales; the implications of regulatory fragmentation and institutional complexity; and materials comparing the institutional competence of federal, state and local actors to fulfill regulatory roles. While much of the material relates to environmental policy, a substantial element draws on a broader literature regarding federalism, regulatory design and regulatory reform.

**LAW 640(6401) Evidence**

Fall or spring. 3 credits. S. D. Clymer (fall), S-U or letter grades. F. F. Rossi (spring). Letter grades only. Limited enrollment. The rules of evidence in civil and criminal cases with emphasis on relevance, hearsay,

authentication, witnesses, experts, and confrontation. The course focuses on the Federal Rules of Evidence, with some attention to how they diverge from the common law.

**LAW 642(6421) Family Law**

Spring. 3 credits. S-U or letter grades.  
C. Bowman.

Broadly understood, family law is the study of state-imposed rules regulating intimacy and intimate relationships in society. In this course we evaluate our assumptions and beliefs about the appropriateness of several current laws regulating families. Substantial attention is devoted to the social and legal consequences of marriage dissolution, including child custody, child support, property distribution, and spousal maintenance. Other topics include: the legal significance of marriage rights and obligations; private ordering within the marital context; non-marital relationships and their regulation; and the legal rights of parents, children, and foster parents in situations of abuse and neglect.

**LAW 643(6431) Federal Courts**

Spring. 4 credits. S-U or letter grades. Prerequisite: Constitutional Law and second semester of Civil Procedure. Students without such background should consult with instructor. T. Morrison.

This course examines the various constitutional and judge-made doctrines that control access to the federal courts to vindicate federal rights. It is particularly valuable for those planning a career in public interest or the public sector, anyone else expecting to litigate extensively in federal court, and students who have or hope to obtain a judicial clerkship. Topics include: case or controversy limitations, including standing; constitutional and statutory limits on jurisdiction; causes of action for constitutional and statutory rights, including 42 U.S.C. § 1983 and Bivens actions; bars to such actions, including the various abstention doctrine and the emerging law on 11th Amendment and sovereign immunities.

**LAW 644(6441) Federal Income Taxation**

Fall or spring. 4 credits. S-U or letter grades. R. A. Green (fall), R. A. Schnur (spring). Limited enrollment.

A basic course designed to develop understanding of tax concepts and ability to work effectively with the Internal Revenue Code, regulations, cases, and other tax materials.

**LAW 646(6461) Financial Institutions [formerly Banking Law]**

Spring. 4 credits. S-U or letter grades. Not open to students who have taken Banking Law and Regulation. R. C. Hockett.

An introduction to the regulatory structures, as well as some of the economic and technological factors, that pattern the conduct of financial intermediation in the U.S. The principal focus is on commercial banks, and to a slightly lesser extent investment companies (mutual funds), insurance companies, pension funds and securities firms in so far as these institutions discharge a common set of economic functions and give rise to a common set of systemic economic risks. Legal topics include entry-, branching- and geographical restrictions; competition-promotion; capital adequacy-, solvency- and other forms of risk-regulation; community-reinvestment; self-regulation; insolvency and deposit insurance. We also devote some attention to "alternative"

financial service providers such as check-cashing services, community development financial institutions and micro-credit providers; and we take note both of divergent (generally, non-American) jurisdictions' dominant modes of financial intermediation and of the "globalization" of finance, both to place what is distinctive about the dominant American forms into bolder relief and better to understand the forces operating behind recent and still unfolding changes to the American (and global) financial and finance-regulatory environments. No prior background in financial law or economics is assumed.

**LAW 647(6471) Health Law**

Fall. 2 credits. S-U or letter grades.

H. R. Beresford.

This course considers legal aspects of the organization, financing, and distribution of health care in the U.S. It emphasizes issues of access, costs, and quality, and address the use of regulation, litigation and market-driven strategies to confront emerging problems. Readings are from a health law casebook, supplemented by occasional handouts of current materials. The goal is to convey an appreciation of the challenges involved in providing health care to those in need and of the role of law and lawyers in meeting these challenges.

**LAW 649(6491) The IPO Process and Deal Structure Alternatives (also NBA 563)**

Fall. 3 credits. Prerequisite: Corporations/Business Organizations. S-U or letter grades. J. Nozell, J. Teitelbaum. Limited enrollment.

For description, see NBA 563.

**LAW 650(6501) Insurance Law**

Fall. 3 credits. S-U or letter grades.

M. Heise.

Insurance is an increasingly important tool for the management of risk by private and public enterprises. This course provides a working knowledge of basic insurance law governing insurance contract formation, insurance regulation, property, life, health, disability, and liability insurance and claims processes. The emphasis throughout is on the links between insurance theory, doctrine, and modern ideas about the functions of private law.

**LAW 651(6511) Intellectual Property**

Fall. 3 credits. S-U or letter grades.

J. Siegal.

A survey of legal mechanisms for protecting intellectual property, including patent, trademark, copyright, and related state-law doctrines.

**LAW 652(6521) International Business Transactions**

Fall. 2 credits. S-U or letter grades.

L. M. Brennan.

Overview of different commercial legal systems. Analysis of private and public law aspects of international business transactions, and the legal rules governing such transactions. Private international law transactions would include international sale of goods, letters of credit and commercial documents. Selection of appropriate mechanism for international business (joint venture, branch, subsidiary, technology license). Overview of Foreign Direct Investment, Debt Financing, and technology transfers. Review of the applicable dispute resolution mechanisms (international litigation, commercial arbitration and other means of international commercial

dispute settlement) including issues such as governing law, choice of forum, and applicable treaties. Analysis of international implications of US law including US Foreign Corrupt Practices Act and US antitrust law.

**LAW 652(6522) International Business Transactions with China**

Spring. 3 credits. Y. Tang.

This course is an introduction to business and commercial law in the People's Republic of China, and examines the legal and practical aspects of doing business with China. After a brief overview of China's political and legal system, we examine basic areas of domestic business legislation, including torts and contract law, the regulation of foreign investment business, the reform of state enterprises, the development of company and securities laws. More specialized topics include arbitration and dispute resolution, the Chinese approach to intellectual property issues, or the use of joint ventures and other foreign investment vehicles. Last, we work through the phases of negotiating a typical equity joint venture contract for the establishment of a Sino-foreign manufacturing enterprise, from the letter of intent and joint feasibility study to the final contract, including the articles of association of the venture and other relevant documents.

**LAW 653(6531) International Commercial Arbitration**

Fall. 3 credits. S-U or letter grades.

(Students who have taken international commercial arbitration course in Paris program receive 1 credit; all others receive 3 credits.) J. J. Barceló III.

A study of arbitration as a dispute resolution process for international trade and business disputes. We analyze institutional and ad hoc arbitration, the authority of arbitral panels, enforcement of agreements to arbitrate, challenging arbitrators, procedure and choice of law in arbitral proceedings, and enforcement of international arbitral awards. We pay special attention to the international convention on the recognition and enforcement of international arbitral agreements and awards (New York Convention) and the UNCITRAL (U.N. Commission of International Trade Law) arbitral rules and model law. We focus on commercial arbitration as a transnational phenomenon and not on arbitration under any particular national system.

**LAW 656(6562) International Monetary Law**

Fall. 2 credits. Availability of S-U option

TBA at first class. J. Lavie.

This course focuses on the legal analysis of international monetary relations. Topics include: the concept of money and monetary systems; the principle of nominalism; monetary sovereignty and exchange arrangements; legal and institutional aspects of the International Monetary Fund; the European Monetary Union; and the role of the Bank for International Settlements in the cooperation between central banks.

**LAW 659(6592) Labor Law**

Fall. 3 credits. S-U or letter grades.

A. S. Hyde.

This course focuses on federal law regulating employee collective action and labor unions. Topics include union organizational campaigns, strikes and other economic weapons, and the negotiation and enforcement of collective agreements. We also consider issues involving employee group

action without formal organization, or through organizations other than labor unions.

**LAW 660(6601) Land Use**

Fall. 2 credits. S-U or letter grades.

E. Penalver.

This course provides a broad introduction to the theory, doctrine, and history of land use regulation. Topics include zoning, homeowners' associations, nuisance, suburban sprawl, eminent domain and regulatory takings. Readings are drawn from the leading cases as well as commentary by scholars in land use law, architecture, and planning.

**LAW 614(6141) Law and Ethics of Business Practice**

Fall. 3 credits. S-U or letter grades.

Pre- or co-requisite: Corporations/Business Organizations or (for graduate students) equivalent course elsewhere. Satisfies professional responsibility requirement. Enrolling does not prohibit enrollment in another professional responsibility course.

S. J. Schwab.

Each week a distinguished guest lecturer from the business world presents a business-law problem. The problems cover a wide variety of topics, such as reincorporating a business from a foreign jurisdiction into Delaware, or complying with the Sarbanes-Oxley audit requirements. Students are assigned to teams. Over the semester, each student writes four 5-page papers on a particular week's topic and provides written comments on other student papers in other weeks, as well as participates in class discussions. No final examination.

**LAW 661(6612) Law and Literature**

Fall. 3 credits. S-U or letter grades.

B. Meyler.

Articles in recent issues of the Yale Law Journal and PMLA, the principal publication of the Modern Language Association, have asserted a crisis in the field of law and literature. This course looks, for the first half of the semester, at the relationship between literary and legal form, and, for the second half, situating readings of literary texts within the context of the historical development of particular concepts in law. New work has illuminated certain correspondences between literary and legal genres, and the relationship between particular genres, like comedy, tragedy, and tragicomedy, and specific visions of justice. With the laws of marriage, property, and inheritance, and insisted on the necessity for their reform. Weekly readings consist in literary works and critical essays on them. The course concludes with a take-home exam.

**LAW 662(6623) Law and Society in China**

Fall. 4 credits. S-U or letter grades. E. Pils.

This course provides a general introduction to Chinese law and its historical and cultural background, and a focused discussion of social conflict and the law in contemporary China. Special attention is paid to the legal and political means available to citizens to protect their rights and interests, particularly against the government. Issues discussed include administrative litigation, constitutional issues, the legal, economic and political aspects of land disputes, and the causes of social unrest. No special attention is paid to commercial law related topics. The intent is to allow students interested in the general questions of law and social justice to investigate them in one (interesting and important) national context. The goal is to use China as a case study to some extent representative of other developing or transitional societies. No particular background in or knowledge of China is required. There

is a take-home exam. Class participation and response papers on readings discussed in class also count toward the final grade.

**LAW 663(6631) Law for High Growth Companies (also NBA 689)**

Fall. 3 credits. S-U grades only. First priority to BRL students in both colleges. Limited enrollment. Z. J. Shulman.

For description, see NBA 689.

**LAW 664(6641) The Law Governing Lawyers**

Spring. 3 credits. Letter grades only. Satisfies professional responsibility requirement. Enrolling in this course does not prohibit enrollment in another professional responsibility course. W. B. Wendel.

This course is intended to provide a comprehensive overview of the law governing lawyers in a variety of practice settings, including transactional, counseling, and civil and criminal litigation. It is not focused merely on the ABA's Model Rules but draws extensively from judicial decisions in malpractice and disqualification cases, the new Restatement of the Law Governing Lawyers, and other sources of law. A major theme is the relationship between state bar disciplinary rules and the generally applicable law of tort, contracts, agency, procedure, and crimes. Another significant theme is the prevention of attorney discipline and malpractice liability through advance planning.

**LAW 665(6651) Law of Branding and Advertising: Trademarks, Trade Dress, and Unfair Competition**

Fall. 2 credits. S-U or letter grades. N. D. St. Landau.

Fundamental trademark, trade dress, and false advertising laws are examined in the context of assisting clients to execute branding and marketing strategies. Special focus is given to branding as it relates to: "consumer products companies;" the impact of e-business and the internet on branding strategies and acquisitions; and complex proof issues in trademark and domain name litigation. Marketing strategies embody fundamental and long-established principles of the trademark laws. The Lanham Act is used to address issues ranging from confusingly similar words and designs, to false and unsubstantiated advertising claims, and public appropriation—and misappropriation—of long-established corporate icons in today's e-commerce world. This course examines the basics of this rapidly changing body of law.

**LAW 666(6661) The Law of the European Union**

Spring. 3 credits. S-U or letter grades. M. Lasser.

This course introduces students to the law and institutions of the European Union. It examines the composition, organization, functions and powers of the Union's governing bodies; analyzes the Union's governing treaties and constitutional law; and studies the Union's decision-making processes. It also explores broader questions of political, economic and legal integration, such as the proper relation between the Union's law and the domestic law of the Union's Member states, and the desirability and feasibility of using the E.U. as a model on which to pattern other transnational agreements.

**LAW 668(6681) International Law and Direct Foreign Investment**

Spring. 3 credits. Letter grades only. M. B. Ndulo.

This course studies legal aspects of direct foreign investments and seeks to identify legal problems that are likely to affect a commercial investment in a foreign country. Inter alia, it deals with the public international law principles and rules governing the establishment by foreign businesses of various factors of production (persons and capital) on the territory of other states and the protection of such investments. Thus, it includes a discussion of economic development and foreign capital; obstacles to the flow of investments to developing countries; guarantees to investors and investment codes; bilateral treaties; nationalization; joint ventures; project financing; transfer of technology; arbitration; investment insurance; unification of trade law; and the settlement of investment disputes.

**LAW 672(6721) Mergers and Acquisitions**

Fall. 3 credits. Letter grades only.

Prerequisite: Corporations/Business Organizations or equivalent for LLMs or permission of instructor. E. Nowicki.

This course examines the principal business and legal issues in the purchase and sale of publicly held businesses. Emphasis is placed on the duties of directors in the acquisitions of publicly held companies (including hostile takeovers).

**LAW 673(6731) Dispute Resolution: Negotiations, Mediation and Arbitration**

Fall. 3 credits. S-U or letter grades. Limited enrollment. J. Meyer, S. Yusem.

During the past decade, the field of alternative dispute resolution has virtually transformed the practice of law. Today, every lawyer has a professional responsibility to his or her clients to consider the most appropriate process available to resolve issues. The course explores the characteristics of negotiation, mediation and arbitration as well as the ethical concerns inherent in them, employing not only Socratic dialogue but also interactive and videotape dispute simulations, enabling the student to engage as a negotiator, dispute resolution advocate, mediator and arbitrator.

**LAW 674(6742) Patent Law and Trade Secrets**

Fall. 3 credits. O. Liivak.

This course focuses on U.S. patent law while also touching on the related law of trade secrets. It covers the core doctrinal elements and policy issues in the field. It explores patent law's impact in diverse areas such as computer-related inventions and biotechnology. No technical background is required.

**LAW 675(6751) Partnership Taxation**

Fall. 3 credits. S-U or letter grades.

Prerequisite: Federal Income Taxation. R. Schnur.

Because of the emergence of limited liability companies as the entity of choice for many start-up and mature businesses, and because many investment funds and similar financing entities are now structured as partnerships or limited liability companies, the subject of partnership taxation has over the past decade or so become increasingly important in business and finance transactions. In addition, LLCs and partnerships retain their traditional role as the vehicles for most real estate ventures. This course covers the basic and

intermediate principles governing the manner in which partnerships and LLCs are taxed under the Internal Revenue Code, and also explores current controversial issues relating to this subject.

**LAW 678(6781) Products Liability**

Spring. 3 credits. Letter grades only.

J. A. Henderson, Jr.

Applications of products-liability doctrine and theory to a variety of problems drawn from or closely approximating actual litigation. An overview of the relevant case law, statutes, and administrative regulations, including the new Restatement Third of Torts: Products Liability.

**LAW 679(6791) Public International Law**

Fall. 3 credits. S-U or letter grades.

M. Ndulo, D. Wippman.

An introduction to the legal rules governing the conduct of states vis-à-vis other states, individuals, and international organizations, with reference to major current events and issues. Topics include the nature, sources, and effectiveness of international law; the establishment and recognition of states; principles concerning state sovereignty, territory, and jurisdiction; the law of treaties; state responsibility; international criminal and humanitarian law; terrorism; and human rights. Special attention is given to the law governing the use of force.

**Law 679(6792) Real Estate Transactions and Deal Structuring (also CRP 629)**

Spring. 3 credits. S/U option available.

D. Funk.

For description, see CRP 629.

**LAW 680(6801) Remedies in Litigation**

Fall. 3 credits. Letter grades only.

E. Sherwin.

This course examines the remedial consequences of lawsuits and the remedial choices open to litigants: essential strategic information for students considering a litigation-oriented practice. It covers compensatory remedies, injunctions, and special remedies such as constructive trusts. It also clarifies the meaning of equity and the role of equity in modern American law, as well as the developing law of unjust enrichment. The focus is on private law (tort, contract, property), but we also cover remedies for enforcement of Constitutional rights and public law.

**LAW 681(6811) Secured Transactions**

Fall. 2 credits. S-U or letter grades.

A. Shapiro.

A study of Article 9 of the Uniform Commercial Code, the law regarding security interests in personal property. In a secured transaction, a creditor may resort directly to particular assets of the debtor, whether tangible or intangible if an obligation is not met. Secured transactions are an integral part of the complex world of commercial finance. They help fuel the economy by enabling debtors to borrow more freely and lenders to better manage risk. On the other hand, if a debtor becomes insolvent, there might be nothing left for other creditors or tort victims because Article 9 enables lenders who take security to claim virtually all the debtor's assets. The first goal of the course is for students to become familiar with the substantive law, and particularly to learn to recognize when Article 9 applies to a transaction, which may not be immediately apparent. Second, working through the intricacies of Article 9 helps students sharpen



their skills in statutory interpretation. Finally, we address theoretical issues involved in security and debt. There is no prerequisite for this course. (Students with particular interest in commercial law may wish to study bankruptcy as well as secured transactions, but this can be done in either order.)

**LAW 682(6821) Securities Regulation**

Fall. 3 credits. S-U or letter grades.  
E. Nowicki.

This course focuses on the regulation of two key aspects of the U.S. capital markets: the primary markets for raising capital from public investors governed by the 1933 Securities Act (33 Act), and trading securities in the secondary market governed by the 1934 Securities Exchange Act (34 Act). We discuss the complex substantive and financial disclosure obligations required under U.S. federal securities laws, including the interaction between the 33 Act and 34 Act schemes via integrated disclosure, the preparation of disclosure documentation, exemptions from disclosure requirements and private placements, the relationship between disclosure and various anti-fraud rules, and the duties of the main participants in securities transactions. Throughout, students are asked to consider the role and development of the Securities and Exchange Commission (SEC), first authorized under the 34 Act, as a significant actor in the rise of the modern regulatory state.

**LAW 682(6822) Social Science and the Law**

Spring. 3 credits. S-U or letter grades.  
V. Hans.

This course examines the relationship of social science to law, focusing on the growing use of social science in the legal system. Over the past several decades, increasing numbers of social scientists have conducted systematic research on the operation of law and legal institutions. At the same time, social scientists themselves are testifying as experts in increasing numbers, encouraging lawyers and judges at both the trial and appellate levels to rely on social science evidence to decide cases. Social science research is also used as a tool in law reform. The aim is to develop a critical analysis of these uses of social science in law and litigation. Are social scientists asking the right questions? Are lawyers, judges, legislators, and legal reformers using social science findings appropriately? Is the law's increasing reliance on social science problematic or advantageous—or both?

**LAW 683(6831) Social Security Law**

Spring. 3 credits. S-U or letter grades.  
P. W. Martin.

The course focuses especially on how Social Security's benefit rules relate to employment, families, and household composition and how its procedures address the challenge of adjudicating the massive numbers of benefit claims that arise each year. It introduces the general features of the Social Security Act's entitlement, benefit formulae, and procedural rules; highlights those that pose the greatest difficulty to administrators and advocates; and surveys current proposals for change. All instruction and discussion takes place on-line.

**LAW 684(6841) Sports Law**

Spring. 2 credits. Recommended prerequisites: Antitrust Law and Labor Law. Meets for 10 weeks. S-U or letter grades.  
W. B. Briggs.

The course traces the development of sports law in the U.S. Particular attention is given to the relationship of sports with antitrust and labor law. Contemporary issues involving arbitration, collective bargaining, amateur athletics, agents, franchise movement, and constitutional law are addressed.

**LAW 686(6861) Supervised Teaching**

Fall or spring. 1 or 2 credits. S-U grades only.

Arrange directly with instructor. Registration form available from registration site or registrar's office.

**LAW 687(6871) Supervised Writing**

Fall or spring. 1, 2, or 3 credits. S-U grades only.

Arrange directly with instructor. Registration form available from registration site or registrar's office.

**LAW 688(6881) Supervised Teaching and Supervised Writing—Lawyering Program Honors Fellows**

Yearlong. 4 credits. S-U grades only.

Prerequisite: application process.

Registration form available from registration site or registrar's office.

Lawyering Program Honors Fellows serve for the full year as teaching assistants in the Lawyering course. With training and guidance from the Lawyering faculty, the Fellows work one-on-one with first-year students on the various writing projects. In addition to meeting regularly with students and reviewing and critiquing their work, Fellows may help design writing and research assignments, prepare model memoranda, participate in role-playing exercises during mock interviewing or negotiating sessions, judge oral arguments, and assist the librarians with research training. The Fellows are also responsible for teaching and holding classes on the Bluebook. Additionally, they mentor the entering students to help them make the most of the foundational first year of law school. The Fellows may hold workshops on basic law school skills and, during the spring semester, under the direction of the Dean of Students, a small group of Fellows may tutor first-year law students.

**LAW 689(6891) Taxation of Corporations and Shareholders**

Fall. 3 credits. S-U or letter grades.  
Prerequisite: Federal Income Taxation.  
R. A. Green.

This course examines the federal income taxation of corporate transactions, including incorporations, dividends, redemptions, liquidations, and reorganizations.

**LAW 690(6901) Terrorism and the Law**

Spring. 3 credits for law students, 4 credits for undergraduates. S-U or letter grades.  
S. D. Clymer and B. K. Sannes.

The course focuses on the ways in which the U.S. legal system has responded to the threat of terrorism. It examines terrorism related developments in laws governing criminal investigations and prosecutions, domestic intelligence gathering, immigration, and treatment of accused terrorists detained by military authorities. It also explores the ways in which terrorism is defined, and how certain groups are designated as terrorist organizations and certain individuals as terrorists. Topics include laws designed to prevent the provision of material support and funding to suspected terrorist organizations; the USA PATRIOT Act; the detention of people

alleged to be "enemy combatants"; the use of electronic surveillance to gather intelligence and prosecute suspected terrorists and their supporters; interrogation and torture; the use of military tribunals for suspected terrorists; and the interplay between intelligence gathering and criminal prosecution. Throughout the semester, we explore the ways in which efforts to safeguard national security pose a threat to liberty and privacy rights. The course is open to second and third year law students and upperclass undergraduate students. There are separate grading curves for law students and undergraduates.

**LAW 692(6921) Trial Advocacy**

Spring. 4 credits. S-U or letter grades.  
Pre or corequisite: Evidence. Limited enrollment. G. G. Galbreath.

This course is a study of the trial. Fundamental skills are taught in the context of challenging procedural and substantive law problems. Each stage of the trial is examined: jury selection, opening, objections, direct examination, cross-examination, exhibits, impeachment, expert witnesses, child witnesses, summation, and pretrial. In addition to weekly exercises on a particular segment of a trial, the student also does a full-day jury trial at the end of the course. Video equipment is used to teach and critique student performance. There are occasional written assignments; class attendance is mandatory.

**LAW 694(6941) Trusts and Estates**

Fall. 4 credits. S-U or letter grades.  
G. S. Alexander.

The course surveys the basic law of succession to property, including wills and intestate succession, and the law of trusts. Students are introduced to aspects of estate planning. While tax aspects of wealth succession are not studied in detail, they are mentioned from time-to-time.

## PROBLEM COURSES AND SEMINARS

All problem courses and seminars satisfy the writing requirement. Limited enrollment.

Admission to all problem courses and seminars determined by lottery.

**LAW 700(7002) Advanced Civil Procedure**

Spring. 3 credits. S-U or letter grades.  
Limited enrollment. Satisfies writing requirement. K. M. Clermont.

A complement to the first-year civil procedure course. Topics normally just touched on in the first year are studied in greater depth. Students produce a short paper every few weeks on assigned problems. This year's topics revolve around complex litigation.

**LAW 703(7031) Advanced Legal Research**

Spring. 3 credits. Letter grades only.  
Prerequisite: Lawyering. Limited enrollment. Satisfies writing requirement.  
P. G. Court, J. Jones, M. Morrison.

This seminar teaches cutting-edge research techniques to prepare students for practice in the law office of the future. It focuses on desktop electronic legal research and covers U.S., international, and foreign law, as well as multidisciplinary research. It is designed to teach students, whose careers will begin in a period of information transition, how to



handle traditional and electronic sources and formats and make efficient choices.

**LAW 705(7052) Advanced Persuasive Writing and Appellate Advocacy**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. B. Bryan.

Students master the art of persuasive writing and oral advocacy. Lecture topics include: knowing your audience; writing a Statement of Facts that appears objective but subjectively persuades; what good judges are taught about good writing; methods to achieve clarity, brevity and logic; issue selection; the effective use of precedent; establishing credibility; understanding non-legal factors that influence decisions; the interplay between judges and their law clerks; appellate procedure and standards of review; the winning opening statement; and handling questions from the bench. Students critique actual briefs, judicial opinions and oral arguments for technique and persuasive value. Guest speakers, including judges of the U.S. Court of Appeals for the Second Circuit and federal prosecutors, provide advice and recommendations. Students apply what they have learned to the drafting of an appellate brief based on an actual court record. The brief is written in stages and followed by one-on-one critiques. Students also present an oral argument. Initial practice arguments are critiqued by the professor and student panels, and the final argument is judged by the professor.

**LAW 705(7051) African Americans and the Supreme Court**

Spring. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. B. Holden-Smith.

Beginning with its first decisions related to the slavery question, the Supreme Court has at times aided and at other times hindered efforts to afford African Americans full citizenship. This seminar explores the relationship between blacks and the Supreme Court by examining the major Court decisions affecting African Americans and attempting to understand those decisions in their historical contexts. We begin with a review of the background and meaning of the constitutional provisions pertaining to the status of blacks in the new nation and ends with an intensive look at *Brown v. Board of Education*.

**LAW 708(7081) Appellate Advocacy and Appellate Courts**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. J. B. Atlas.

This seminar examines the law and skills integral to representing a client on appeal. It is loosely divided into three parts: (1) principles of appellate law, including standards of review, the preservation doctrine, harmless-error analysis, and remedies; (2) the unique role of appellate counsel, including ethical duties to the court and client; and (3) appellate skills, including client counseling, issue selection, brief-writing, and oral argument. Miscellaneous additional topics include motion practice, leave applications, and the role of law clerks in the decision-making process. Students read and analyze the record of a criminal proceeding, assess and research potential appellate issues, and prepare a brief for either the prosecution or defense. Each student also orally argues the case in a moot-court session.

**LAW 709(7091) Biblical Law**

Fall. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. C. M. Carmichael.

Analysis of law and narrative in the Bible from the perspective of ancient law and legal history. Topics include the nature of the law codes, legal issues in the narratives, law and morality, law and religion, the transformation of extralegal relations into legal ones, legal interpretation in antiquity, social factors in legal development, and aspects of criminal, family, and private law.

**LAW 709(7092) Catholic Thought and the Law**

Fall. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. E. Penalver.

With a Catholic majority on the Supreme Court, it is more important than ever to understand the distinctive features of the Catholic jurisprudential tradition. This course serves as a broad introduction to Catholic social teaching as it has developed since the Pope Leo XIII's landmark 1891 encyclical, *Rerum Novarum*. Readings range from church documents to scholarly commentary. Topics include the relationship between morality and law, economic justice and the welfare state, the Theology of Liberation, the death penalty, abortion, and assisted suicide.

**LAW 710(7101) Central Topics in Jurisprudence and Legal Theory**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. R. S. Summers, S. Goldstein.

This seminar addresses four related topics that arise in all discrete law school courses: (1) the overall forms and complementary material or other components of the main functional legal units of a system of law, including those that are institutional such as legislatures and courts, preceptual such as rules and principles, and enforceive such as sanctions and remedies, (2) the distinctive bearing of various concepts of justice on the makeup and operation of functional legal units and other phenomena of law, with four weekly sessions on procedural justice, (3) the special and extensive nature of the resources of reason and argument in the law, and (4) the major facets of the "legal positivism vs. natural law" debate. Assigned materials include a recent book by Prof. Summers; selected jurisprudential readings, judicial opinions, statutes, and other primary sources. There is extensive opportunity for discussion. The grade is based on a paper and class discussion.

**Law 716(7162) Contemporary American Jury**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. V. Hans.

This course evaluates claims about the benefits and drawbacks of the contemporary American jury. Drawing on the work of legal scholars and social scientists, we explore a range of topics relating to criminal and civil juries, including: jury selection; the use of jury consultants; juror perceptions of attorneys, evidence, and experts; individual and group decision-making processes; jury instructions; jury deliberations; damage awards; juries in death penalty cases; and jury reform. By studying legal and empirical scholarship about the jury, participants should develop insights into jury trial functioning and policy debates over the jury's role.

**LAW 716(7163) Contract Law in the Electronic Age**

Spring. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. R. A. Hillman.

This seminar covers the law governing various aspects of E-Commerce, with a focus on the law of software contracts. Topics include electronic standard forms, terms after payment, copyright and patent preemption of software contracts, choice of law, software quality issues, and the open-source software movement.

**LAW 717(7171) Corruption Control**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. R. C. Goldstock.

This seminar analyzes the types of corruption that exist in both the public and private sectors, the means by which a variety of criminal and nontraditional remedies may be used to reduce the frequency and impact of corrupt activities, and the constitutional and statutory problems implicated by such approaches.

**LAW 716(7165) Criminal Law Theory**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. S. P. Garvey.

This seminar explores a variety of theoretical issues arising within the substantive criminal law. In particular, we discuss various justifications for state punishment and theories of excuse, the heat of passion defense, the legitimacy of imposing punishment for negligence, the relevance of resulting harm to criminal liability, the defenses of duress and insanity, and the doctrine of imperfect self-defense.

**LAW 719(7191) eLaw**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. P. W. Martin.

An exploration of the impact of the digital information and communication technology on how core activities of the "law" are carried out. The seminar traces the rapid spread of electronic systems of creation, storage, and dissemination of primary legal information, beginning with the emergence of viable commercial online systems in the 1980s. It looks at the current state of and issues raised by electronic self-publication on the part of legislative bodies, courts, and administrative bodies and investigate other issues of law and practice generated by the transformation of a paper and print-based legal system to one premised on nearly ubiquitous access to computers and electronic communication. Among the latter are questions of copyright, citation practice, "official publisher" designation, the role of the commercial sector and NGOs like Cornell's Legal Information Institute in the dissemination and application of law, post-release editorial revision, the privacy interests of those involved in legal proceedings, filing formats, and adjudicative procedures. While the course focuses initially on these phenomena and issues as they are playing out within the U.S., student projects may pursue any of these topics from a comparative perspective.

**LAW 719(7193) Estate Planning Issues for Gay and Lesbian Couples**

Fall. 3 credits. Letter grades only. Prerequisite: Trusts and Estates. Limited enrollment. Satisfies writing requirement. G. Alexander.

This seminar explores special problems and issues that gay and lesbian couples may face in planning their estates and the challenges facing lawyers who plan the estates of gay or lesbian clients. Topics include the status of gay and lesbian partners under intestacy laws and elective share statutes, the effective of domestic partnership and civil union statutes on inheritance rights between gay and lesbian partners, special problems of adoption and its effect on intestate succession and construction of class gifts, and will contests involving wills of gay or lesbian decedents. Materials include cases, statutes, and articles. The grade is based on class participation and a final paper.

**LAW 726(7261) Feminist Jurisprudence**

Spring. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. C. Bowman.

This seminar examines the role of law, and, more generally, the role of the state, in perpetuating and remedying inequities against women. After studying the historical emergence of sexual equality law in the U.S., we discuss several paradigmatic feminist legal theories, including formal equality, MacKinnon's "dominance" theory, relational feminism, pragmatic feminism, and various anti-essentialist theories. We then apply these analytical structures to various substantive areas of law of particular concern to women, including but not limited to rape and other types of violence against women; abortion, surrogacy and other reproductive rights issues; pornography; prostitution; and problems encountered by women in the legal profession.

**LAW 729(7291) Global and Regional Economic Integration: The WTO, EU, and NAFTA**

Fall. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. J. J. Barceló III.

The seminar studies the process of international economic integration occurring both globally and regionally. In the global context it takes up a basic introduction to WTO law and selected problems. In the regional context it takes up a basic introduction to the European Union, including the institutional and lawmaking processes, the direct effect and supremacy of EU law, and the development of the four freedoms (goods, services, persons, and capital). A basic introduction to NAFTA is also included. Student seminar papers may deal with issues arising within any of the three regimes. Comparative studies are encouraged.

**LAW 731(7311) Immigration and Refugee Law**

Fall. 3 credits. S-U or letter grades. Prerequisite: Constitutional Law. Limited enrollment. Satisfies writing requirement. S. W. Yale-Loehr.

This course explores the evolving relationship between U.S. immigration policy and our national purposes. Immigration plays a central role in contemporary American life, significantly affecting our foreign relations, human rights posture, ethnic group relations, labor market conditions, welfare programs, public services, and domestic politics. It also raises in acute form some of the most basic problems that our legal system must address, including the rights of insular minorities, the concepts of nationhood and sovereignty, fair treatment of competing claimants for scarce resources, the imperatives of mass administrative justice,

and pervasive discrimination. In approaching these questions, the course draws on diverse historical, judicial, administrative, and policy materials.

**LAW 732(7321) International Criminal Law**

Spring. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. M. B. Ndulo.

The seminar examines the questions surrounding international criminal law as a separate discipline and the sources of and basic principles underlying the subject. Particular attention is paid to the question of jurisdiction over international crimes. It considers international crimes such as aggression; war crimes, crimes against humanity, terrorism, and torture. It also considers the treatment of past human rights violations in post conflict situations. It further considers procedural aspects of international criminal law and the forums that deal with international crimes. In that context, it looks at the structure, jurisdiction and jurisprudence of Truth Commissions; the International Criminal Court (The Rome Statute); the former Yugoslavia Tribunal; Rwanda Tribunal and extradition and mutual legal assistance. The format is class discussions of assigned readings. Final assessment is based on participation in class discussions and a written paper on a subject within the themes of the seminar. Paper topics must be submitted to the instructor for review no later than the third week of class. Each student gives a class presentation based on his or her paper.

**LAW 734(7341) International Environmental Law**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. D. A. Kysar.

In recent decades, recognized environmental problems have expanded in scope from primarily national and regional threats into challenges of a truly global character. Correspondingly, international environmental law has grown from a relatively minor branch of international law primarily concerned with questions of state responsibility for cross-border pollution, into an expansive area of international law covering numerous environmental issues and involving a wide range of international organizations. This seminar analyzes and assesses the various principles and rules of international law that have been developed to deal with problems of global environmental import, including the processes by which they have been drafted, implemented, and enforced. Specific topics may include control of air and water pollution, environmental disasters, disposal of hazardous wastes and trade in hazardous chemicals, ozone depletion, climate change, conservation of natural resources and biological diversity, management of international rivers, and the relationship between environmental protection and economic development. No prerequisites.

**LAW 734(7342) International Financial Institutions**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. R. C. Hockett.

An introduction to the practices and legal regulation of, as well as some opportunities and policy concerns raised by, cross-border financial intermediation. We begin with an overview of the principal instruments and

institutions through which suppliers and users of financial capital and risk-bearing services are brought together. Next we cover the internationally relevant features of the domestic regulatory regimes that govern the largest and now increasingly "globalized" domestic financial institutions and markets. Next we cover the principal gaps in and challenges faced by these domestic regimes. The discussion of global gaps and challenges takes us to the emerging "international financial architecture." Three main concerns animate our study: (a) the dangers of systemic risk that the international financial system must address, (b) the fairness and efficiency of the distribution of financial opportunity that the system yields, and (c) the political legitimacy of the processes by which the legal contours of the global financial system are established and structured. No specific degree of expertise in financial or international law or economics is required, but prior course work or experience in one or more of these fields enhances classroom discussion. Take-home exam or paper option.

**LAW 733(7332) International Women's Rights**

Fall. 3 credits. Letter grades only. M. E. Greenberg.

Since the Fourth World Conference on Women in 1995 and the Beijing Platform for Action, the focus on women's rights has expanded in several ways: further engaging women all over the world, reaching beyond international frameworks to the national and community levels, focusing more on involving men as well as women in understanding and promoting respect for women's rights, and paying particular attention to economic and social rights. There has also been more regional collaboration for women's rights. This new seminar lays preliminary foundations regarding what a "right" is and reviews the history of international women's rights activism. It then covers the major international laws and institutions, most notably CEDAW and the Commission on the Status of Women, the Rome Statute and International Criminal Court, and the Beijing Platform for Action; and some regional illustrations as well. The seminar shifts midway to the problems of realizing rights at the national level and community levels. We look at Constitutions and national legislation with a focus on property, employment, and political rights. We consider issues of legal literacy and access to law, and look at work by regional women's networks and non-governmental organizations. Throughout, we consider how religion and culture, gender equality objectives, and gender mainstreaming relate to achieving lasting respect for women's rights. Requirements are participation in seminar discussions, suggesting discussion questions for one class session, a take-home midterm exam, and a final paper.

**LAW 737(7371) Islamic Law and History**

Spring. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement. D. S. Powers.

This course is designed to introduce law students to the terminology, principles, and concepts of classical Islamic law. After discussing the origins and evolution of Islamic law, we turn first to the organization of qadi courts (procedure and evidence) and then to specific areas of the law, e.g., personal status, the intergenerational transmission of property, commerce, and crime. The application of legal doctrine to actual disputes are analyzed

through the reading of expert judicial opinions or fatwas (in English translation) issued in connection with medieval and modern court cases. No prerequisites.

**LAW 741(7411) Law and Higher Education**

Spring. 3 credits. S-U or letter grades.

Prerequisite: Constitutional Law or Administrative Law. Limited enrollment.

Satisfies writing requirement. J. J. Mingle.

Higher education is a complex, idiosyncratic institution. Universities and colleges have a unique mission—teaching, research, and public service—and a uniquely challenging task of accommodating the various constituencies and organizations, both internal and external that influence how they are managed and how policies are shaped. This seminar explores the dynamic tensions, high expectations, and complex legal-policy issues universities and colleges face in fulfilling their mission.

**LAW 741(7412) Law and Humanities Colloquium**

Spring. 3 credits. Letter grades only.

Limited enrollment. Satisfies writing requirement. B. Meyler.

This colloquium brings together scholars working at the forefront of legal history, law and literature, law and culture, and critical theory from the institutional vantage points of both law and the humanities. Presenters are asked to speak not only about their specific research but to address where their work is situated within new developments in law and humanities as a whole. The first three weeks are a seminar designed to apprise students of the history of law and humanities within this history. The rest of the course is organized around a series of speakers, some from Cornell and some from other universities. Students convene for a half hour at the beginning of the session, which is then opened to a larger community, including faculty members, for the talk itself. Students are required to write six three- to five-page papers responding to the speakers' pre-circulated talks; these are due in advance of the class session and shown to those lecturing to prompt and enhance discussion. Those who wish to take the course for credit must attend the first class.

**LAW 754(7541) Law and Violence Against Women**

Spring. 3 credits. Letter grades only.

Limited enrollment. Satisfies writing requirement. E. A. Sussman.

This seminar examines violence against women from theoretical and practical perspectives. It begins with a general introduction to various feminist theories, including among them: equality feminism, difference feminism, dominance feminism, anti-essentialist feminism, and post-modernism. We examine these theories to provide us with frameworks for analyzing concrete manifestations of violence against women in society, including: domestic violence, rape, sexual harassment, pornography, and prostitution. We seek to apply theories to practice and use the issues that arise in legal practice to further cultivate/refine the theories. By focusing on both theory and practice, students collectively work toward developing legal strategies for contending with violence against women. We encourage students to critique existing frameworks and to assume the role of social movement lawyers. Students write a

substantial research paper focusing upon a substantive problem related to violence against women.

**LAW 756(7561) Legal Aspects of Commercial Real Estate Development**

Spring. 3 credits. Letter grades only.

Limited enrollment. Satisfies writing requirement. J. E. Blyth.

Through the use of several written memoranda and one oral presentation, this seminar addresses considerations basic to commercial real estate development. It focuses on purchase agreements, options, rights of refusal, and memoranda thereof; representations and warranties; disclosure required of brokers and sellers; attorneys as brokers; notarial misconduct; conveyancing and surveys; commercial leases; conventional financing; conflicts between commercial tenants and institutional lenders; alternatives to conventional financing; title insurance; attorney opinion letters; and choice of real estate entity. About half of the semester is devoted to commercial leases, conventional financing, and alternatives to conventional financing.

**LAW 757(7571) Legal Narratives**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement.

E. L. Sherwin.

This seminar takes an in-depth look at the factual, legal, and social background of notable legal decisions. It is based on a recently published series of texts presenting the "stories" behind well-known first year cases. After reading and discussing a selection of cases from these sources, each student prepares and presents his or her own case history of a case selected by the student, working from briefs, related legal material, secondary sources, and, if possible, contacts with lawyers and parties. Grades are based on papers and presentations.

**LAW 759(7593) Income Taxations of Corporate Mergers and Acquisitions**

Spring. 3 credits. S-U or letter grades.

Limited enrollment. Satisfies writing requirement. R. A. Schnur.

This advanced seminar first reviews the basic federal income tax principles governing taxable and non-taxable corporate mergers and acquisitions, and then introduces students to some of the more complex transactional tax issues and explores how these tax concepts are utilized in structuring acquisition transactions. The emphasis is on domestic rather than cross-border acquisitions. There is no final examination, but students are asked to prepare several planning memoranda directed at different merger and acquisition fact patterns.

**LAW 760(7601) Organized-Crime Control**

Fall. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement.

R. C. Goldstock.

This seminar explores the challenges organized crime poses to society and to traditional law enforcement techniques. Students undertake a simulated investigation using physical and electronic surveillance, the analysis of documentary evidence, and the examination of recalcitrant witnesses before the grand jury. The RICO statute is explored in detail as well as a variety of non-criminal remedies including forfeiture and court-imposed trusteeships.

**LAW 761(7611) Philosophical Foundations of Legal Ethics**

Fall. 3 credits. Letter grades only.

Limited enrollment. Satisfies writing requirement and professional responsibility requirement. W. B. Wendel.

This seminar examines legal ethics from the standpoint of moral and political philosophy. We examine such questions as the relationship between ordinary morality and professional obligations; whether professionals may be blamed morally for their clients' ends or for activities taken pursuant to professional roles; and the relationship between legal and political institutions and moral values. In addition to reading classic and recent articles, we apply theoretical models to practical ethical dilemmas faced by lawyers. No background in philosophical ethics is presumed. We begin with a brief introduction to the subject through Bernard Williams's short book, *Ethics*. This seminar satisfies law school and ABA professional responsibility requirements but is not intended as preparation for the MPRE or an introduction to the law governing lawyers.

**LAW 767(7671) Psychological Expert Testimony in the Courts**

Fall. 3 credits. S-U or letter grades. Limited enrollment. Satisfies writing requirement.

J. J. Haugaard, A. J. Mooney.

This seminar is cross-listed in the Law School and in the College of Human Ecology. Second and third year law students, graduate students in the Department of Human Development and graduate students in the Psychology Department may enroll. Students explore the use of expert psychological testimony in legal proceedings. Law students and psychology students work together to present current, accurate psychological testimony in a simulated courtroom setting. Law students teach psychology students to offer testimony and to withstand cross-examination. Psychology students assist law students to conduct cross and direct examinations in a particular area of psychological knowledge by educating the law student in that particular area. Together the students explore the scientific and ethical limitations of what an expert's testimony may include. All students enhance their oral advocacy skills, and law students enhance their writing skills by preparing motion memos, trial briefs or written closing arguments.

**LAW 768(7682) Religion and the State**

Spring. 3 credits. S-U or letter grades.

S. H. Shiffrin.

An examination of legal, historical, sociological, theological, and political theoretical perspectives on the relationship between religion and the state.

**LAW 777(7771) The Supreme Court**

Spring. 3 credits. Letter grades only.

Limited enrollment. Satisfies writing requirement. T. W. Morrison.

This seminar examines the U.S. Supreme Court from a variety of perspectives. From a historical standpoint, we look at the origins of the Court, variations in its work over time, and changes in its relationship to the other branches of government and American society more broadly. From a political science standpoint, we consider the institutional development and behavior of the Court as well as empirical evidence about the Court's decisions. From a doctrinal standpoint, we study trends in certain areas of the Court's jurisprudence, and also examine some of the

cases on the Court's 2006-07 docket. Readings include Supreme Court cases, legal briefs, and academic writing in law, history, and political science. The principal writing requirement is a final research paper, but interested students may be able to help prepare a Supreme Court brief or briefs instead.

#### **LAW 778(7782) Transnational Labor Standards**

Fall. 3 credits. Letter grades only. Limited enrollment. Satisfies writing requirement. A. S. Hyde.

Numerous public and private institutions attempt to regulate basic labor conditions in countries with low labor standards. The seminar examines these institutions critically, examining for each the law on the books, the actual achievements, and the theoretical potential in light of economics of trade. We start with a brief introduction to the economics of trade and then examine the following public and private institutions that attempt to regulate labor standards: the International Labor Organization and its standards; U.S. employment laws with extraterritorial effects; health and safety standards enforced in U.S. tort suits; labor standards enforced under the Alien Tort Statute; labor standards in U.S. trade laws; labor standards in trade agreements; proposals to add labor standards to the trade rules enforced by the World Trade Organization; labor standards enforced by international lending institutions; transnational union cooperation and the resulting labor standards; and corporate codes of conduct and other labor standards unilaterally maintained by corporations, often in response to consumer pressure by activists.

## **CLINICAL COURSES AND EXTERNSHIPS**

All clinical courses and externships have limited enrollment.

Admission to all clinic courses is instructed selected.

#### **LAW 780(7801) Asylum and Convention Against Torture Appellate Clinic**

Spring. 4 credits. S-U or letter grades. Limited enrollment. S. Kalantry, S. W. Yale-Loehr.

Students write appellate briefs to the Board of Immigration Appeals on behalf of clients who have petitioned to remain in the U.S. because they fear persecution or torture in their home countries. These clients have represented themselves pro se in Immigration Court. During the first part of the semester students learn substantive and procedural asylum and Convention Against Torture (CAT) law, such as the nature of persecution, grounds for asylum and CAT claims, and the practical and social effects of these laws on new immigrants who seek asylum or CAT relief. Classes may also cover practical knowledge needed for effective representation, such as advanced research and writing skills. During the second half, students work in teams of two on appellate briefs that not only entail serious legal analysis but may require sociocultural and political research, so the students can effectively write about the conditions of the client's home country. Students communicate with clients (although some may be incarcerated and many are out-of-state).

Students may also locate expert and other witnesses and draft affidavits and motions. The cases provide a basis for more in-depth substantive learning as well as practical skills and attorney-client issues. In class, each team discusses the legal and practice issues that arise in their case, so all students can benefit from and assist with each case.

#### **LAW 781(7811) Capital Punishment Clinic: Post-Conviction Litigation**

Spring. 4 credits. S-U or letter grades. Prerequisite: permission of instructor; Criminal Procedure or criminal law experience preferred. Limited enrollment. J. H. Blume.

Death penalty post-conviction litigation: investigation and the preparation of petitions, memoranda, and briefs. This course is taught as a clinic. Students work on two or possibly three capital cases. Case selection depends on pedagogical factors and litigation needs of the inmates. Students read the record and research legal issues. Some students are involved in investigation, while others assist in the preparation of papers. All students are included in discussions regarding the necessary investigation, research, and strategy for the cases.

#### **LAW 783(7832) Criminal Defense Trial Clinic**

Spring. 4 credits. S-U or letter grades. Prerequisite: Evidence recommended or permission of instructor. Limited enrollment. L. Salisbury.

Students represent defendants in non-felony, non-jury criminal cases. The course has both a classroom and courtroom component. The classroom component focuses on all aspects of handling a criminal case, including criminal law and procedure, ethics, trial strategy, plea bargaining and trials. The courtroom component involves attendance at court proceedings, including pre-trial conferences. Each student interviews clients and witnesses, prepares clients and witnesses for trial, conduct negotiations, does legal research, conducts fact investigation, prepares discovery demands and engages in motion practice.

#### **LAW 783(7831) Full-Term Externship**

Fall or spring. 12 credits. S-U grades only. Prerequisite: permission of instructor. Limited enrollment. G. G. Galbreath (fall), J. M. Miner (spring).

Students earn 12 credit hours as externs working full time at approved placement sites during the fall semester of their third year. Written application for the course must be submitted to the instructors in March of the preceding spring semester. The instructors review the applications and grant students conditional approval, contingent on acceptance by the placement and identification of an attorney at the placement who will supervise and mentor the extern. In addition to his or her work responsibilities for the placement, the extern prepares weekly journal entries, provides samples of written work product, engages in regular electronic communication with the instructors, hosts the instructors for a site visit, and does a written evaluation of the placement experience.

#### **LAW 785(7855) International Human Rights Clinic**

Fall. 4 credits. S-U or letter grades. Limited enrollment. G. Gutierrez.

This clinic focuses on challenges to U.S. detention, interrogation, and rendition policies and practices in the global war on terror.

As we review the substantive international legal framework, clinic students research U.S. practices that violate domestic and international human rights prohibitions against torture; cruel, inhuman and degrading treatment; arbitrary detention; and enforced disappearances. During the first class, we review the various clinic projects and students submit preference forms. Clinic projects may include preparing urgent appeals to treaty bodies on behalf of individual clients, working on human rights litigation in U.S. federal court or international regional courts, drafting monitoring submissions to treaty bodies, and drafting research reports. These projects involve legal research and writing, meetings with human rights attorneys, and client interviews.

#### **LAW 786(7861) Judicial Externship**

Fall or spring. 4 credits; 6-credit option possible if student and placement are willing to have student there two days a week. S-U or letter grades. Limited enrollment. G. G. Galbreath.

Students work with a trial court judge. Work involves courtroom observation, conferences with the judge, research and writing memoranda, and drafting decisions. The emphasis is on learning about judges, judicial decision-making process, and trials. Weekly class meetings include readings and discussions of topics related to the externship experience. While the primary focus is the student's work at the placement, each student also does class presentations, weekly journal entries, provides written work samples and meets individually with the faculty member.

#### **LAW 787(7871) Labor Law Clinic**

Spring. 4 credits. S-U or letter grades. Limited enrollment. A. B. Cornell.

Students are given a practical opportunity to learn labor law, while making meaningful contributions to the labor movement and working people. This clinic combines a substantive component with practical experience. Students advise labor unions on a variety of legal issues that surface during the semester and may have the opportunity to represent unions in different forums. Students communicate directly with union representatives and are required to sort through the facts, research the issues, and provide information and advice. Students routinely draft legal memoranda, prepare and file pleadings and briefs as required. They may have the opportunity to represent unions at hearings, mediation or arbitration. Those who do not have that opportunity are invited to observe hearings before the National Labor Relations Board, State Board or attend an arbitration. Effort is made to expose students to the nature of collective bargaining. A small number of students have the opportunity to dedicate their clinical time to international labor law. A small number have the opportunity to dedicate their clinical time to international labor law. Interested students can support the ongoing work of the International Commission for Labour Rights, which has several country-specific projects. Student contribution in this area is likely to be research oriented.

#### **LAW 788(7881) Law Guardian Externship**

Fall or spring. 4 credits. S-U or letter grades. Limited enrollment. J. M. Miner.

Students are placed at the Tompkins County Law Guardian office, where they assist the attorneys in the representation of children in



abuse and neglect cases, juvenile delinquency proceedings, and PINS (Person in Need of Supervision) cases. Students also may have their own cases, in which they assume primary responsibility for the representation. Duties may include interviewing, investigation, drafting memoranda and motions, and trial preparation. Students meet several times with the instructor during the semester. Bi-weekly journals are also required.

#### **LAW 790(7901) Legislative Externship**

Fall and spring. 3 credits. S-U or letter grades. Students selected by Assemblywoman Lifton. Limited enrollment. B. Strom.

Students work with the local New York State Member of Assembly. Work involves drafting legislation, tracking legislation for constituents, legal research and writing, and responding to constituent requests that particularly require legal research of an explanation of law. The emphasis is on learning about legislative process, drafting of legislation, understanding the reasons for statutory ambiguity, and developing various skills. Students meet informally several times with the faculty supervisor related to the externship experience.

#### **LAW 791(7911-2-3) Neighborhood Legal Services Externship 1, 2 or 3**

Fall or spring. 4 credits. S-U or letter grades. Limited enrollment. B. Strom.

Classroom component is provided by Clinical Skills 1, 2 (fall), or 3 (spring) depending on whether the student has previously been enrolled in a course in which Clinical Skills 1 was a component. Cases involve the representation of clients of a legal services office, the Ithaca office of Neighborhood Legal Services (NLS). Along with case handling, this externship includes a classroom component, provided by Clinical Skills 1, 2, or 3. The classes are devoted to the development of lawyering skills and issues related to professional responsibility and the role of an attorney. In addition, each student meets periodically with the faculty supervisor for review of the placement experience.

#### **LAW 792(7921) Prosecution Trial Clinic**

Fall. 4 credits. S-U or letter grades. Prerequisite: Evidence or permission of instructor. Limited enrollment. R. A. Sarachan.

This course gives students the opportunity to prosecute non-felony non-jury trials in Ithaca City Court. It has both a classroom component and a courtroom component. The classroom component involves lecture, discussion and trial simulation exercises. Topics include criminal law and procedure, prosecution ethics, trial strategy and preparation, trial conduct including direct and cross-examination, plea-bargaining and professional judgment. The courtroom component involves regular attendance at Ithaca City Court's non-jury terms. Students observe and critique trials and prosecute offenses including traffic tickets, city code violations, non-felony penal law violations among others. Each student is expected to conduct multiple trials during the semester, depending on docket volume. During the semester students are also expected to prepare witnesses (typically police officers), conduct plea-bargaining negotiations, case research and fact investigation, respond to discovery demands, and engage in motion practice and appellate practice as needed.

#### **LAW 793(7931) Public Interest Clinic 1**

Fall or spring. 4 credits. S-U or letter grades. Limited enrollment.

G. G. Galbreath, J. Miner, B. Strom.

Students handle civil cases for low-income clients of the Public Interest Clinic under the supervision of clinic faculty. Students interview and counsel; investigate and analyze facts; interrelate substantive and procedural law with facts in the context of actual representation; develop strategies to handle clients' problems; identify and resolve professional responsibility issues; do legal writing; negotiate and settle cases; and represent clients in hearings. Classroom component is provided by the Clinical Skills 1 class, in which students develop interviewing, counseling, and advocacy skills through the use of readings, videotapes, discussions, and simulation exercises.

#### **LAW 793(7932) Public Interest Clinic 2**

Fall. 4 credits. S-U or letter grades.

Prerequisite: Public Interest Clinic 1 or a clinic course that included Clinical Skills 1 classroom component. Limited enrollment.

G. G. Galbreath, J. Miner, B. Strom.

Students handle civil cases, participate in a classroom component, Clinical Skills 2, and help supervise participants in Public Interest Clinic 1. Cases are handled as described in the course description for Public Interest 1. Students represent the clinic's clients in both federal and state courts. Clinical Skills 2 builds on the skills taught in Clinical Skills 1.

#### **LAW 793(7933) Public Interest Clinic 3**

Spring. 4 credits. S-U or letter grades.

Prerequisite: Public Interest Clinic 1 or clinic course that included Clinical Skills 1 classroom component. Limited enrollment.

G. G. Galbreath, B. Strom.

Students handle civil cases, participate in a classroom component, Clinical Skills 3, and help supervise participants in Public Interest Clinic 1. Cases are handled as described in for Public Interest 1. Students represent the clinic's clients in both federal and state courts. Clinical Skills 3 builds on the skills taught in Clinical Skills 1 and 2.

#### **LAW 795(7951-2) US Attorney's Office Clinic 1 or 2**

Fall or spring. 6 credits. S-U grades only. Limited enrollment. C. E. Roberts.

In this course law students work 12-15 hours per week for the U.S. Attorney's Office in Syracuse, N.Y. Each student works for an Assistant U.S. Attorney. Students perform research and writing and trial assistance as needed. They may qualify to appear in court under the supervision of their attorney and are encouraged to observe court proceedings in the U.S. Courthouse. They also attend a weekly two hour seminar at Cornell. The seminar focuses on writing in practice, including critiques of briefs, motions, and a petition for certiorari. Additional topics include federal criminal and civil practice, prosecutorial discretion, and habeas corpus. Guest speakers may include judges, a special prosecutor, and U.S. Department of Justice officials.

#### **LAW 796(7961-2) Water Law in Theory and Practice 1 and 2**

Fall and spring. 3 credits. S-U option only. Limited enrollment. Spring enrollment limited to students who were enrolled in Fall 2005 offering. K. S. Porter.

This course presents water law in theory and in practice, providing students practical opportunities to learn water law and to

experience its multiple aspects through meaningful contribution. Water law is the framework for protecting water resources and their uses. However, law relating to water is diverse, complex and often uncoordinated. This complexity is confounded by the inter-relationship between land and water. It is highly desirable for those involved with any aspect of the water sector to be aware of and understand relevant water law. It is also desirable to also understand how and why our water law has evolved, and to what extent it is effective in meeting its purposes. Compared to the western U.S., eastern water law has long had a low profile. Evolving water resource issues in the east, especially in their watershed context, now compel greater recognition. This course provides for research and practical experience, working with leading agencies and partners engaged in these watersheds. Students select and undertake projects in conjunction with these partners. They communicate directly with the leaders and staff involved in the watershed issues and are expected to compile relevant facts, critically research the issues, and provide information and conclusions in appropriate forums. The students participate in a Water Law Colloquia. Depending on student interest there is opportunity to undertake a project in association with the Land Use Law Center, Pace University. Students interested in comparative aspects of water law have an opportunity for a project on U.S. and European Water Law. The Water Resources Institute has excellent contacts in the United Kingdom.

## **NON-PROFESSIONAL COURSES-NOT OPEN TO LAW STUDENTS**

#### **LAW 313 Government (3131) The Nature, Functions, and Limits of Law**

Spring. 4 credits. Letter grades only.

Undergraduates only. A. Riles.

A general-education course for students at the sophomore and higher levels. Law is presented not as a body of rules but as a set of techniques for resolving conflicts and dealing with social problems. We analyze the roles of courts, legislatures, and administrative agencies in the legal process, considering also constitutional limits on their power and practical limits on their effectiveness. Readings consist of judicial and administrative decisions, social scientific articles, and commentaries on the legal process.

#### **LAW 402(4021) Competition Law and Policy**

Spring. 4 credits. S-U or letter grades. No legal training or background required.

ECON 101 (Elementary Microeconomics) or its equivalent is a prerequisite; no advanced mathematics is used. G. A. Hay.

This course is intended for non-law students; interested law students should take the Antitrust Law course. The course examines issues that arise when a country attempts to implement and maintain a "competition policy" as a way of promoting economic growth and efficiency. The basic reading material starts with actual cases (most of them arising under U.S. antitrust law) and uses those cases to probe the legal, economic and broad policy issues that the cases raise.



**LAW 405(4051) The Death Penalty in America**

Fall. S-U option available. 4 credits.  
Undergraduates only. J. H. Blume,  
S. L. Johnson.

The death penalty gets increased media attention due to high profile death row exonerations and has long been under siege for other reasons. This course surveys the legal and social issues that arise in the administration of the death penalty. The reading is largely comprised of reported death penalty cases, but is augmented by a variety of other sources, including empirical studies of the death penalty and the litigation experience of the professors. Although we focus on capital punishment as practiced in the U.S., we also consider international and comparative perspectives. Guest speakers provide a range of views, and law students with experience working on capital cases lead discussion sections.

**LAW 408(4081) Law, Science, and Sustainability**

Fall. 4 credits. S-U or letter grades.  
Undergraduate and non-law graduate students only. D. A. Kysar.

This course concerns legal, scientific, and political dimensions of the emerging sustainability paradigm—that is, society's efforts to promote development and economic growth while maintaining the collective impact of human activity within environmentally sustainable parameters. Topics include: alternative policy frameworks for the pursuit of sustainable development; the nature of environmental risk and how it is assessed by both experts and the public; the interaction between law, politics, and the scientific enterprise; the status of non-nationals, future generations, non-human life forms, and other political outsiders; and, most important, the variety of legal tools that have been or could be used to promote sustainability. These theoretical topics are examined in conjunction with case studies of specific domestic and global environmental issues. This course is intended for upper level undergraduate and graduate students from a variety of fields and adopts a broadly interdisciplinary approach. As a result, no prior study in law is required.

**FACULTY ROSTER**

Alexander, Gregory S., J.D., Northwestern U.  
A. Robert Noll Prof.  
Barcelo, John J. III, S.J.D., Harvard U. William  
Nelson Cromwell Professor of International  
and Comparative Law  
Blume, John H., J.D., Yale U. Prof.  
Bowman, Cynthia G., J.D., Northwestern U.  
Visiting Prof.  
Buzbee, William W., J.D., Columbia U. Visiting  
Prof.  
Cui, Zhiyuan, Ph.D., U. of Chicago. Visiting  
Prof.  
Clermont, Kevin M., J.D., Harvard U. James  
and Mark Flanagan Professor of Law  
Clymer, Steven D., J.D., Cornell U. Prof.  
Cornell, Angela B., J.D., U. of Washington.  
Lec. in Law  
Eisenberg, Theodore, J.D., U. of Pennsylvania.  
Henry Allen Mark Professor of Law  
Farina, Cynthia R., J.D., Boston U. Prof.  
Garvey, Stephen P., J.D., Yale U. Prof.  
Germain, Claire M., M.L.L., U. of Denver.  
Edward Cornell Law Librarian and Professor  
of Law

Green, Robert A., J.D., Georgetown U. Prof.  
Hans, Valerie P., Ph.D., U. of Toronto. Prof.  
Hay, George A., Ph.D., Northwestern U.  
Edward Cornell Professor of Law and  
Professor of Economics, College of Arts and  
Sciences  
Heise, Michael, Ph.D., Northwestern U. Prof.  
Henderson, James A., Jr., LL.M., Harvard U.  
Frank B. Ingersoll Professor of Law  
Hillman, Robert A., J.D., Cornell U. Edwin H.  
Woodruff Professor of Law  
Hockett, Robert C., J.S.D., Yale U. Asst. Prof.  
Holden Smith Barbara J., J.D., U. of Chicago.  
Prof.  
Hyde, Alan S., J.D., Yale U. Visiting Prof.  
Johnson, Sheri L., J.D., Yale U. Prof.  
Kalantry, Sital, J.D., U. of Pennsylvania. Lec.  
in Law  
Kysar, Douglas A., J.D., Harvard U. Prof.  
Lasser, Mitchel. Ph.D., Yale U. Prof.  
Lavie, Jean-Pierre, Ph.D., Graduate Institute  
of International Studies. Visiting Prof.  
Lehman, Jeffrey S., J.D., U. of Michigan. Prof.  
of Law  
Liivak, Oskar, J.D., Yale U. Visiting Asst. Prof.  
Martin, Peter W., LL.B., Harvard U. Jane M. G.  
Foster Professor of Law  
Meyler, Bernadette A., Ph.D., U. of California  
Davis. Asst. Prof.  
Morrison, Trevor W., J.D., Columbia U. Assoc.  
Prof.  
Ndulo, Muna B., D. Phil., Trinity C. Prof.  
Nowicki, Elizabeth A., J.D., Columbia U.  
Visiting Assoc. Prof.  
Penalver, Eduardo, J.D., Yale U. Assoc. Prof.  
Pils, Eva Marie, Ph.D., U. of London. Visiting  
Asst. Prof.  
Rachlinski, Jeffrey J., Ph.D., Stanford U. Prof.  
Riles, Annelise, Ph.D., U. of Cambridge. Prof.  
and Prof. of Anthropology, College of Arts  
and Sciences  
Rossi, Faust F., J.D., Cornell U. Samuel S.  
Leibowitz Professor of Trial Techniques  
Schanzenbach, Max M., Ph.D., Yale U. Visiting  
Asst. Prof.  
Schwab, Stewart J., Ph.D., U. of Michigan. Prof.  
Sherwin, Emily L., J.D., Boston U. Prof.  
Shiffrin, Steven H., J.D. Loyola U. of Los  
Angeles. Prof.  
Siegal, Jonathan, J.D., Yale U. Visiting Prof.  
Siliciano, John A., J.D., Columbia U. Vice  
Provost and Prof.  
Simson, Gary J., J.D., Yale U. Prof.  
Suchman, Mark C. Ph.D., Stanford U. Visiting  
Assoc. Prof.  
Summers, Robert S., LL.B., Harvard U. William  
G. McRoberts Research Professor in  
Administration of the Law  
Taylor, Winnie F., LL.M., U. of Wisconsin. Prof.  
Wendel, W. Bradley, J.S.D., Columbia U. Prof.  
Wippman, David, J.D., Yale U. Prof.

**Legal Aid Clinic**

Galbreath, Glenn G., J.D., Case Western  
Reserve U. Sr. Lec.  
Miner, JoAnne M., J.D., U. of Connecticut. Sr.  
Lec. and Director  
Strom, Barry, J.D., Cornell Sr. Lec.

**The Lawyering Program**

Atlas, Joel J.D., Boston U. Sr. Lec.  
Ciani Dausch Jessica, J.D., Georgetown U. Lec.  
Dole, Joseph C., J.D., Yale U. Lec.  
Mooney, Andrea J., J.D., Cornell U. Lec.  
Weigold, Ursula, J.D., Texas U. Visiting Lec.

**Academic Library Staff**

Callihan, Jean, Head of Research Services and  
Lec. in Law

Court, Pat, Associate Law Librarian and Lec.  
in Law  
Finger, Charlie, Collection Development,  
Research Attorney, and Lec. in Law  
Germain, Claire M., LL.B., U. of Paris. Edward  
Cornell Law Librarian and Professor of Law  
Gillespie, Janet M., M.S., Cornell U.  
Administrative Supervisor/Access Service  
Jones, Julie, Research Attorney and Lec. in Law  
Mills, Thomas, Research Attorney and Lec. in  
Law  
Morrison, Matt, Research Attorney and Lec.  
in Law  
Pajerek, Jean M., M.L.S., SUNY-Albany. Head  
of Technical Services

**Members of Other Faculties Associated with the Law School**

Carmichael, Calum M., B. Litt., Oxford U.  
Prof., College of Arts and Sciences  
Cheyfitz, Eric, Ph.D., Johns Hopkins U. Ernest  
I. White Professor of American Studies and  
Humane Letters and Prof., College of Arts  
and Sciences  
Haugaard, James J., Ph.D., U. of Virginia.  
Prof., College of Human Ecology  
Lieberwitz, Risa L., J.D., U. of Florida. Assoc.  
Prof., School of Industrial and Labor  
Relations  
Porter, Keith S., LL.M., De Montford U., U.K.  
Director of N.Y.S. Water Resources Institute  
and Senior Extension Associate, College of  
Agriculture and Life Sciences  
Powers, David S., Ph.D., Princeton U. Prof.,  
College of Arts and Sciences  
Shulman, Zachary, J.D., Cornell U. J. Thomas  
Clark Senior Lecturer of Entrepreneurship  
Johnson Graduate School Of Management  
Wells, Martin T., Ph.D., U. of California. Prof.,  
School of Industrial and Labor Relations

**Adjunct Faculty Members**

Beresford, H. Richard, M.D., U. of Colorado.  
Blyth, John E., Dr.jur., Goethe U.  
Brennan, Lorraine M., J.D., Suffolk U.  
Briggs, W. Buckley, J.D., Georgetown U.  
Bryan, Bruce R., J.D., Fordham U.  
Goldstein, Stephen, J.D., Georgetown U.  
Goldstock, Ronald G., J.D., Harvard U.  
Greene, Mark I. J.D., U. of Pennsylvania,  
Greenberg, Marcia E., J.D., Northwestern U.  
Gutierrez, Gitanjali S., J.D., Cornell U.  
Hall, Richard, LL.M., Harvard U.  
Harmon, Yvette, J.D., Cornell U.  
Knight, Leslie, J.D., L1. of California, Davis.  
Meyer, Judith P., J.D., Cornell U.  
Mingle, James J., J.D., U. of Virginia.  
Radice, Anthony M., J.D., Cornell U.  
Roberts, Charles E., J.D., Syracuse U.  
Salisbury, Lance, J.D., Cornell U.  
Sarachan, Robert A., J.D., Indiana U.  
Bloomington.  
Schnur, Robert A., J.D., Harvard U.  
Shapiro, Amy, J.D., Harvard U.  
St. Landau, Norman D., J.D., Antioch C.  
Sterio, Milena J.D., Cornell U.  
Sussman, Erika, J.D., Cornell U.  
Tang, Yang.  
Yale Loehr, Stephen W., J.D., Cornell U.  
Yusem, Stephen G., J.D., U. of Pennsylvania.

## DIVISION OF NUTRITIONAL SCIENCES

### ADMINISTRATION

Patrick Stover, director

J. Thomas Brenna, director of undergraduate studies

Charles McCormick, associate director of undergraduate studies

Christine Olson, director of graduate studies, field of nutrition

### THE DIVISION

Nutritional science draws upon the chemical, biological, and social sciences to understand the complex relationships between human health, nutritional status, food and lifestyle patterns, and social and institutional environments. Understanding these relationships includes the study of the metabolic regulation and function of nutrients, nutrient requirements throughout the life span, the role of diet in reducing risk of chronic disease, the nutritional quality of foods, and interventions and policies designed to promote the nutritional health of individuals, communities, and populations.

The focus of this broad field of study at Cornell is the Division of Nutritional Sciences, which brings together specialists from many disciplines. Faculty members are involved in undergraduate and graduate teaching, research, and extension of research-based knowledge throughout New York State, the nation, and the world.

The division is affiliated with both the College of Human Ecology and the College of Agriculture and Life Sciences. The undergraduate program in Nutritional Sciences is offered to students enrolled in both colleges. The undergraduate program in Human Biology, Health, and Society is offered through the College of Human Ecology. A program of study in nutrition for biological science majors is offered in collaboration with the undergraduate program in biology. Graduate study in the field of nutrition is administered by faculty members throughout the university.

### FACILITIES

Most of the faculty members of the division work in Savage Hall, Kinzelberg Hall, and Martha Van Rensselaer (MVR) Hall. In addition to housing offices, classrooms, and seminar rooms, these buildings contain research facilities, specialized laboratories, a human metabolic research unit, and computer facilities. Savage Hall also has a graduate reading room.

### UNDERGRADUATE PROGRAMS

The Division of Nutritional Sciences (DNS) offers three programs leading to a B.S. degree:

**Nutritional Sciences (NS)**, College of Human Ecology: this program provides students with a strong foundation in the broad field of nutritional sciences as well as thorough training in chemistry and biology. Students may prepare for a variety of career interests, including medicine and other health careers, fitness and sports nutrition, nutrition counseling, clinical nutrition, dietetics, nutritional biochemistry, community nutrition, and nutrition education.

**Nutritional Sciences (NS)**, College of Agriculture and Life Sciences: this program is for students who want strong training in human nutrition combined with supportive course work in agriculture and the life sciences. Strong preparation in biology, chemistry, and math is required. Students in the Nutrition, Food, and Agriculture program supplement the nutrition curriculum with courses in areas such as food science, animal science, plant science, advanced biology, business and economics, education, and communication.

**Human Biology, Health, and Society (HBHS)**, College of Human Ecology: established in 1997, this program gives students a strong foundation in biology. It then goes on to explore human health issues from the perspectives of both biology and the social sciences. Students complete a rigorous curriculum in the natural sciences and then, choosing from a wide array of courses offered in the College of Human Ecology, focus their studies on health issues of their choice. Students can explore such topics as gene expression and metabolism related to disease states, biological and social aspects of growth and development, and policies and programs influencing health.

The division also offers the **Program of Study in Human Nutrition for biological sciences majors** who may be enrolled in the College of Agriculture and Life Sciences or College of Arts and Sciences. The Program of Study in Human Nutrition offers biology majors courses on the nature and biochemical function of essential and nonessential nutrients, nutrient requirements, the role of nutrients in gene expression, and the role of diet in both risk of chronic disease and treatment of existing disease states. Students in this program of study are encouraged to complete a diverse set of advanced courses that afford a perspective on current knowledge of nutrient requirements and function and how this knowledge can be put to use. With the exception of a core course in the structure and function of nutrients, the course requirements are unspecified.

Faculty advisors work with individual students to develop a curriculum that fits the students' interests. As part of their program, students are encouraged to obtain laboratory experience either through course work or research. Students completing the program in nutrition most often choose to continue their education in medical or graduate school and pursue careers in the applied

aspects of nutrition or in laboratory-based or epidemiological research.

### THE CURRICULUM

Undergraduate students in these programs complete the requirements of their colleges as well as the courses required by the program of their specific interest.

Both the NS and HBHS programs require a rigorous sequence of courses in chemistry and biology, including introductory chemistry and biology, organic chemistry, biochemistry, and physiology. A minimum competency in college algebra is required with an additional math and/or statistics requirement for some programs and career paths. Students in the HBHS major also complete a course in physics and two additional courses in advanced biology.

All students complete the introductory course NS 115 Nutrition, Health, and Society. The NS program requires the completion of four other core courses: NS 245 Social Science Perspectives on Food and Nutrition; NS 345 Nutritional and Physicochemical Aspects of Foods; NS 331 Physiological and Biochemical Bases of Nutrition; and NS 332 Methods in Nutritional Sciences. Students in these programs also must select a minimum of 9 credits in advanced courses in the nutritional sciences.

The HBHS major requires 15 credits of advanced electives that explore health issues from primarily a biological or a social perspective. These courses are offered by faculty in several departments within the College of Human Ecology.

Undergraduate students in these programs have a faculty advisor with whom they meet at least twice a year. Advisors help students plan their course schedules and can suggest opportunities for individual study or experience outside the classroom.

In both undergraduate programs the correct sequencing of biology, chemistry, and/or nutrition courses is very important. Students considering these programs should obtain detailed information about course requirements from the division's Academic Affairs office, 335 MVR. This office offers a wide range of advising materials to help students develop a program of study that matches their interests and needs.

### CAREER OPTIONS AND COURSE PLANNING

Requirements for the programs are the minimum set of courses necessary for a bachelor's degree in these fields. Students should supplement their requirements with elective courses and other learning experiences that will prepare them for entry-level jobs or advanced study in their field(s)

of interest. A summary of suggested electives for different career interests follows:

#### **Medicine and Other Health Careers:**

Recommended courses for pre-med students include calculus and two semesters of physics. Specific information about medical school admissions requirements can be obtained from the university's Health Careers office, 203 Barnes Hall. Students interested in other health careers should acquire specific information about those requirements. Courses of interest may include those related to the biological and social determinants of health; human growth, development, and behavior through the life course; interpersonal communications; advanced biology; sociology; psychology; and ethics.

**Dietetics:** Students who wish to work in the areas of clinical nutrition, nutrition counseling, sports nutrition, community nutrition, or food and nutrition management should complete the academic requirements for The American Dietetic Association (ADA). Courses in foods, nutrition and disease, microbiology, management, statistics, and nutritional care are added to the courses required for the nutrition programs. For more information about meeting ADA requirements, contact the DNS Academic Affairs office, 335 MVR.

#### **Exercise, Nutrition, and Health Promotion:**

Students should complete a course in physiology and a course in anatomy after introductory biology. Students can complete the Applied Exercise Science Concentration at Ithaca College, which includes courses in kinesiology, exercise physiology, and biomechanics. Students who wish to apply to graduate schools to study physical therapy should complete a year of introductory physics, a course in statistics, a course in ethics, and three courses in psychology. Students should check the specific requirements of their schools of interest. For information about the Applied Exercise Science Concentration, contact the DNS Academic Affairs office, 335 MVR.

#### **Biomedical Research/Nutritional**

**Biochemistry:** Recommended electives include calculus, physics, genetics, advanced biology and chemistry, toxicology, and nutritional sciences courses related to the physiology, biochemistry, and metabolism of different nutrients and disease states.

#### **Public Health and Community Nutrition:**

Suggested electives include courses in communications, education, human development, policy analysis and management, maternal and child nutrition, geriatric nutrition, nutrition and disease, and food economics.

**Nutrition, Food, and Business:** Recommended electives include courses in management, marketing, economics, communications, hotel administration, and food science.

**Nutrition and Agriculture:** Recommended electives include courses in food science, animal science, plant sciences, international agriculture, agricultural economics, biological sciences, and rural sociology.

**International Nutrition:** Recommended electives include courses in language, anthropology, agricultural economics, policy, economics, rural sociology, international agriculture, and nutritional sciences related to maternal and child health and problems of developing nations.

**Biology and Behavior:** Recommended electives include courses in psychology, human development, and neurobiology.

#### **Food, Nutrition, and Health Policy:**

Recommended electives include courses in economics, sociology, government, policy analysis, and management.

## SPECIAL EXPERIENCES

Undergraduates can enhance their experiences by participating in structured field experiences or study abroad. Academic credit can be earned for field experiences in a community agency, health care facility, or business. The Urban Semester in the College of Human Ecology provides students with an opportunity to study and gain field experience in New York City. All students intending to spend a semester off-campus in field experience or study abroad must plan their courses well in advance to be sure that all program requirements can be met.

## INDEPENDENT STUDY ELECTIVES

Independent study courses (NS 400, 401, 402) can be used to obtain credit for more diverse or intensive experience than the classroom can offer, whether this involves laboratory work, library research, or field study. Any student interested in independent study should obtain the sponsorship of a faculty advisor and the approval of the director of undergraduate studies or consider applying to the honors program.

## HONORS PROGRAM

The honors program, which leads to a B.S. degree with honors in the College of Human Ecology or a B.S. degree with distinction in research in the College of Agriculture and Life Sciences, gives official recognition to students who have demonstrated excellence in their academic work and their capacity for independent study.

In addition to fulfilling the requirements for a major, students in the honors program take seminars in designing and evaluating research, complete an original piece of research (at least 6 credits of NS 499), and prepare an honors thesis. The honors project may be laboratory or field research or deal with policy and program development. For more information, students should contact Professor J. Thomas Brenna, B38 Savage Hall, or Professor Carole Bisogni, 328 MVR.

## COURSES RECOMMENDED FOR NONMAJORS

Courses in nutritional sciences can strengthen programs of study in biological sciences, biology and society, communications, food science, human development, human services, and other fields.

NS 115 Nutrition, Health, and Society is open to all students. After NS 115, nonmajors with limited backgrounds in chemistry and biology may elect NS 245 Social Science Perspectives on Food and Nutrition; NS 247 Food for Contemporary Living; NS 275 Human Biology

and Evolution; NS 306 Nutritional Problems of Developing Nations; NS 315 Obesity and the Regulation of Body Weight; NS 347 Human Growth and Development: Biological and Behavioral Interactions; NS 450 Public Health Nutrition; NS 451 Epidemiology and Health of Human Communities. Nonmajors with strong backgrounds in chemistry and the biological sciences may consider NS 331 Physiological and Biochemical Bases of Human Nutrition, as well as many advanced nutritional sciences courses, such as NS 345 Nutritional and Physicochemical Aspects of Foods; NS 431 Mineral Nutrition and Chronic Disease; NS 441 Nutrition and Disease; NS 455 Nobel Prizes in Biomedical Research; and NS 475 Mechanisms Underlying Mammalian Development Defects.

## GRADUATE PROGRAMS

Graduate study is administered by the field of nutrition, a group of about 40 faculty members from throughout the university who have a common interest in nutritional problems. In the M.S. and Ph.D. degree programs, students may specialize in molecular and biochemical nutrition, human or animal nutrition, community nutrition, or international nutrition. Research is emphasized in all graduate programs. Field experience may be an important component of concentrations in community, international, and public health nutrition and nutrition education. Teaching experience and participation in the graduate student seminar (NS 703) are important aspects of graduate training.

The specialties and interests represented by faculty in the field of nutrition provide almost unlimited opportunity for graduate study. Cornell's extensive laboratory and agricultural facilities ensure that students interested in experimental nutrition have exceptional choices and thorough training. As the largest faculty in the country devoted to the study of human nutrition, the field includes specialists in biochemical, metabolic, epidemiological, and sociocultural research. Opportunities to work with community and federal agencies are available to students interested in applied nutrition and public policy. Students in international nutrition are expected to conduct their thesis research abroad.

For more information about the graduate program, students should visit the web site or contact the director of graduate studies, field of nutrition, Cornell University, 335 MVR Hall, Ithaca, NY 14853-4401, 255-2628, [nutrition\\_gfr@cornell.edu](mailto:nutrition_gfr@cornell.edu), or [www.nutrition.cornell.edu/grad.html](http://www.nutrition.cornell.edu/grad.html).

## COURSES

### **NS 115(1150) Nutrition, Health, and Society**

Fall. 3 credits. S-U grades optional.

D. Levitsky.

Discusses the facts and fallacies concerning the role that nutrition, exercise, and other health behaviors play in preventing disease, maintaining good health, and maximizing athletic performance. Emphasis is on understanding the biological mechanisms through which good nutrition and regular exercise affect psychological and physical health.

**NS 116(1160) Personalized Concepts and Controversies**

Fall. 1 credit. Limited to 10 students per sec. Prerequisite: freshman or transfer standing. Corequisite: NS 115. S-U grades only. J. Swanson.

Provides students enrolled in NS 115 individualized assistance in many skills including using computers to analyze diets, finding and using scientific references, understanding and criticizing scientific articles, and reviewing material presented in lectures.

**NS 120(1200) Nutrition and Health: Issues, Outlooks, and Opportunities**

Spring. 1 credit. Limited to 120 students. Prerequisite: freshman, sophomore, or junior standing or permission of instructor. Not an introductory nutrition course for nonmajors. S-U grades only. C. You.

For students interested in exploring careers in the broad fields of food, nutrition, and health. Experts representing different areas discuss their work, focusing on current issues and trends as well as the requisite knowledge and skills. This course introduces many of the disciplines that are drawn upon in addressing human problems related to food, diet, and health. Students explore career opportunities through a variety of assignments.

**NS 122(1220) Nutrition and the Life Cycle**

Spring. 3 credits. Prerequisite: one semester college biology or NS 115. P. Brannon.

The biology of the life cycle including development, growth, maturation and aging and its impact on nutritional requirements of humans from the zygote to the elderly is considered. How to meet these nutritional requirements is discussed relative to the feeding issues and context of each major life stage. The course emphasizes the critical analyses of beneficial and adverse outcomes of various nutrient intakes and dietary patterns on the nutritional status and well-being through integration of nutrition and other health sciences in understanding nutritional needs during the life cycle.

**[NS 222(2220) Maternal and Child Nutrition]**

Fall. 3 credits. Limited to 50 students. Prerequisites: NS 115 and college biology or permission of instructor. Students must preregister in 335 MVR. S-U grades optional. Not offered 2006–2007. P. Brannon.

Focuses on the biological bases of nutritional requirements in pregnancy, lactation, infancy, and childhood through adolescence. Stresses critical analyses of beneficial and adverse outcomes of diverse nutrient intakes and dietary patterns, assessment of nutritional status, and the integration of nutrition, other life sciences, and social conditions in understanding nutritional needs during these life stages. Topics include oral contraception and health; relationships between maternal diet and pregnancy outcomes; breast- and formula feeding; childhood and adolescent obesity; and the nutritional needs of young children and adolescents.]

**NS 230(2300) Sophomore Seminar: Functional Foods; Where Food Science and Nutrition Meet (also FD SC 230(2300))**

Spring. 2 credits. Limited to 15 students; priority given to sophomores who have completed two first-year writing seminars and an introductory course in either food

science or nutritional sciences.

S. J. Mulvaney and R. Parker.

Functional foods are foods whose nutrient composition has been modified to achieve targeted health outcomes. This course explores the interface where nutritional science and food science can work together to design and produce foods to meet certain health goals using a case study approach. Each case study involves interdisciplinary discussion and a writing assignment that includes both technical (e.g., scientific basis for diet-health claims) and nontechnical (e.g., personal experience and opinions related to functional foods) content.

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**NS 245(2450) Social Science Perspectives on Food and Nutrition**

Fall. 3 credits. Prerequisite: NS 115. S-U grades optional. C. Bisogni and J. Sobal. Uses theories, concepts, and methods from the social sciences to examine food, eating, and nutrition. Uses the food choice process as a conceptual model for examining the scope of social science aspects of nutrition.

**NS 247(2470) Food for Contemporary Living**

Fall and spring. 2 credits. Limited to 32 students per sec. Highly recommended: NS 115. Students must preregister in 335 MVR during course enrollment period. S-U grades optional. Lab coat required. E. Gier.

During this laboratory course, the understanding of food ingredients and techniques of food preparation is applied to positive nutritional practices and health promotion goals. Course content includes food science principles, nutrition principles, food safety and sanitation, sensory evaluation, and social-cultural influences on food choices. The course explores basic food science principles through food preparation, recipe modification, and sensory evaluation (taste testing required). The course introduces students to basic cooking skills and techniques and recipe modification. Each student prepares assigned recipes during each lab. Assignments and projects introduce students to basic menu planning and meeting nutritional requirements while restricted to a budget. Lab performance and a lab practical factor into final student evaluation; thus attendance at all labs is expected.

**[NS 275(2750) Human Biology and Evolution (also BIOEE/ANTHR 275(2750))]**

Fall. 3 credits. S-U grades optional by permission of either instructor. Not offered 2006–2007. K. A. R. Kennedy and J. D. Haas.

For description, see BIOEE 275.]

**NS 300(3000) Special Studies for Undergraduates**

Fall or spring. Prerequisite: permission of instructor. S-U grades optional. DNS faculty.

Special arrangements can be made to establish equivalency for courses not transferred from a previous major or institution. Students prepare a description of the study they want to undertake using a form available from the college registrar's office. The form, signed by both the instructor directing the study and the associate director for academic affairs, is filed at course registration or during the change-of-registration period.

**NS 306(3060) Nutritional Problems of Developing Nations**

Fall. 3 credits. Prerequisite: NS 115. S-U grades optional. Offered alternate years; not offered 2007–2008. R. Stoltzfus.

Students gain an overview of the most important nutrition problems facing developing countries today and an in-depth understanding of the nutrition problems of one country, chosen as a case study for the course. The course uses the health/care/nutrition framework to analyze the causes of these nutrition problems. Instruction is through lectures and readings. Evaluation is through individual assignments, a group project, and exams.

**[NS 315(3150) Obesity and the Regulation of Body Weight (also PSYCH 613(3150))]**

Spring. 3 credits. Prerequisites: junior or senior standing; NS 115, PSYCH 101. S-U grades optional. Offered alternate years; next offered 2007–2008. D. Levitsky.

Multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, the genetics of obesity, the role of activity and energy metabolism, the psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.]

**NS 320(3200) Introduction to Human Biochemistry**

Fall. 4 credits. Prerequisites: one year college biology; one year college general chemistry; and CHEM 257 or 357–358; or permission of instructor. S-U grades optional. P. Stover.

Presents the principles of biochemistry within the context of human health and disease. Teaches the metabolism of carbohydrates, lipids, proteins, and selected micronutrients from a perspective that emphasizes their role in supporting the structure and physiological functions of the major organs of the body. Incorporates the concepts of enzyme catalysis, enzyme regulation, hormone action, and bioenergetics within this framework. Covers the fundamental concepts of eukaryotic DNA structure, function, and gene expression with reference to their importance in regulating metabolism and the impact of a changing nutrient environment.

**NS 331(3310) Physiological and Biochemical Bases of Human Nutrition**

Spring. 4 credits. Prerequisites: BIOBM 330 or 331, or NS 320, or equivalent. S-U grades optional. C. McCormick.

Examines the biochemical and physiological bases of human nutritional requirements. Uses an integrated approach to cover the digestion and metabolism of nutrients (carbohydrates, proteins, lipids, vitamins, and minerals). Metabolic and chronic diseases related to nutrition are discussed throughout the semester. The discussion sections and problem

sets provide an opportunity to examine in greater depth selected topics from lecture.

**NS 332(3320) Methods in Nutritional Sciences**

Fall. 3 credits. Limited to 18 students per sec. Prerequisites: undergraduate biochemistry; NS 345, NS 331 preferred or concurrent registration. Students must preregister for lab in 335 MVR during course preregistration. One evening prelim. M. N. Kazarinoff.

Laboratory introduction to principles and analytical techniques of nutritional research. Emphasizes analytical concepts and skills required to determine nutrient function and nutritional status of individuals. Topics include methods of nutrient, metabolite, and enzyme analysis in body fluids; methods for assessing individual food intake and nutritional status; and methods for assessing the composition of foods.

**NS 341(3410) Human Anatomy and Physiology**

Spring. 4 credits. Limited to 18 students per lab. Prerequisite: college biology; **limited to DNS majors; must be NS, NS/CALS/ or HBHS major.** Recommended: NS 115. Students must complete lab permission forms in 335 MVR during course enrollment period. Attendance required at first lab or placement forfeited. For further information, go to 335 MVR. Letter grades only. V. Utermohlen.

Introduces human anatomy and physiology with particular emphasis on aspects of relevance to the nutritional sciences and medicine. Covers all major organ systems. Laboratories emphasize location, recognition, and description of anatomical structures. Testing of physiological functions focuses on tests with nutritional and medical relevance.

**NS 345(3450) Nutritional and Physicochemical Aspects of Food**

Spring. 3 credits. Prerequisite: college organic chemistry or biochemistry. S-U grades optional. B. Parker.

Studies the nutritional, physical, and chemical properties of foods including composition, food structure, enzymic and nonenzymic phenomena, processing/preparation, and how these relate to food quality. Also discusses issues related to food safety and regulation.

**NS 346(3460) Introduction to Physicochemical Aspects of Foods—Laboratory**

Spring. 1 credit. Limited to 18 students per sec. Prerequisites: dietetics students in DNS; NS 345 or concurrent registration; college organic chemistry and permission of instructor during course registration. Students must obtain permission of instructor forms from and return them to 335 MVR. Letter grades only. B. Parker.

Laboratory exercises are designed to illustrate principles related to food quality and ingredient functionality and to introduce students to the analytical methodology associated with food evaluation.

**NS 347(3470) Human Growth and Development: Biological and Behavioral Interactions (also HD/B&SOC 347[3470])**

Spring. 3 credits. Prerequisites: BIO G 101 or 109 or equivalent; HD 115 or PSYCH 101 or equivalent. Offered alternate years; not offered 2007-2008. J. Haas and S. Robertson.

For description, see HD 347.

**[NS 361(3610) Biology of Normal and Abnormal Behavior (also PSYCH 361[3610])]**

Spring. 3 credits. Limited to 40 students. Prerequisites: senior standing only; BIO G 101-102 and PSYCH 101 or permission of instructor; fundamental knowledge of biology and psychology. S-U grades optional. Not offered 2006-2007. B. Strupp.

Serves as a critical evaluation of biological factors thought to influence behavior and/or cognitive functioning. Biological, psychological, and societal influences are integrated. Topics include nutrition and behavior, psychiatric disorders, developmental exposure to environmental toxins and abused drugs, biopsychology of learning, memory, intelligence, and related cognitive disorders.]

**NS 398(3980) Research in Human Nutrition and Health**

Fall. 1 credit. Requirement for students in honors research program sponsored by DNS. Open to all students. S-U grades only. J. T. Brenna and C. Bisogni.

Lecture course focusing on the structures and practice of professional research conducted in human nutrition and health, a field that encompasses questions ranging widely from subcellular components to population-level issues. Introduces the various approaches and methods used by researchers and addresses the topics of ethics and research controls. Describes the structure of scientific literature, preparation of research proposals, roles of scientific organizations, and funding sources. Students are required to attend and report on research seminars on campus.

**NS 400-401-402-403(4000-4010-4020-4030) Special Studies for Undergraduates**

Fall or spring. Variable to 3 credits. S-U grades only. DNS faculty.

For advanced independent study by an individual or group of students who want to study a field of nutritional sciences not otherwise provided through course work in the division or elsewhere in the university. Students prepare a description of the study they want to undertake on a form to be signed by the instructor directing the study and the director of undergraduate studies. The form, available from the division office, is filed at course registration or within the change-of-registration period along with an add/drop slip in the Human Ecology registrar's office. To ensure review before the close of the course registration or change-of-registration period, students should submit the special-studies form to the director of undergraduate studies as early as possible.

**NS 400(4000) Directed Readings**

Study that predominantly involves library research and independent reading.

**NS 401(4010) Empirical Research**

Study that predominantly involves data collection and analysis or laboratory or studio projects.

**NS 402(4020) Supervised Fieldwork**

Study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

**NS 403(4030) Teaching Apprenticeship**

Study that includes assisting faculty with instruction.

**NS 421(4210) Nutrition and Exercise**

Spring. 3 credits. Limited to 12 students per sec. Prerequisites: BIOAP 311 or NS 341 and NS 115 or 331; nutrition majors or permission of instructor; priority given to seniors. S-U grades optional. S. Travis.

Examines the interaction between nutrition, exercise, and athletic performance. Topics include the biological, psychological, and sociological aspects of nutrition as it relates to exercise performance. Lectures cover current research on nutritional needs in response to exercise, including fluids, energy nutrient requirements and caloric distribution, supplementation, ergogenic aids, pre-/post-event recommendations. Makes applications to various sports. Critical thinking skills are enhanced by critiques of studies on sports nutrition-related topics and the evaluation of popular sports nutrition claims. Students learn educational strategies for communicating with the recreational and professional athlete, coach, and trainer.

**NS 425(4250) Nutrition Communications and Counseling**

Spring. 3 credits. Limited to 20 students. Prerequisites: NS 115, 245; junior or senior standing; dietetics/nutrition majors preferred. Letter grades only. S. Travis.

Students learn the theoretical basis of effective health promotion communications and develop effective nutrition communication skills through application in a variety of settings. The course provides hands-on experiences in counseling, educational program development, and oral and written communications.

**NS 431(4310) Mineral Nutrition and Chronic Disease**

Fall. 3 credits. Prerequisite: NS 331 or permission of instructor. S-U grades optional. C. McCormick.

Students evaluate the evidence from primary literature that dietary calcium, sodium, and iron play an important role in the development of osteoporosis, hypertension, and anemia, respectively. An additional goal of the course is to review the molecular processes that are involved in the homeostasis of each mineral and the recommendations for daily nutrient intakes. Class discussion of key research articles is conducted and evaluated.

**NS 441(4410) Nutrition and Disease**

Fall. 4 credits. Prerequisites: NS 331 and physiology course. S-U grades optional. V. Utermohlen.

Studies the anatomical, physiological, and metabolic abnormalities in acute and chronic illness and the role of nutritional therapy in their prevention and care. Topics include nutritional assessment, nutritional pharmacology, starvation, infection, trauma, cancer, diabetes mellitus, and renal, cardiovascular, pulmonary, skeletal, neurological, liver, and gastrointestinal disorders.

**NS 442(4420) Implementation of Nutrition Care**

Fall. 3 credits. Prerequisites: NS 115, 247, concurrent registration in NS 441 (or equivalent background in either course). S-U grades optional. Evening prelim. E. Gier.



Develop skills necessary to implement medical nutrition therapy (MNT). Emphasizes the acute care setting, although long-term care and outpatient settings are addressed. Students develop a working knowledge of the nutrition care planning process and an understanding of the application of appropriate nutrition principles and interventions in clinical nutrition practice involving acute and chronic disease conditions. Course content includes principles of MNT, menu planning for disease states, the role of other allied health practitioners in assuring nutritional health, and reimbursement and legislation in dietetics practice. Students have the opportunity to perform basic nutrition assessment skills in a local clinical and/or long-term care setting.

#### **NS 450(4500) Public Health Nutrition**

Spring. 3 credits. Prerequisites: NS 115 and one course dealing with population-level studies (e.g., NS 245, HD 250, PAM 303, D SOC 101/200). Students must complete section forms in 335 MVR during course enrollment period. K. Rasmussen and D. Pelletier.

Public health nutrition is the major professional career track for nutritionists outside of dietetics. It deals with efforts to improve the diets and nutritional status of whole populations by working at the community, state, and national levels. This course helps prepare students to work in public health nutrition by describing methods used in the assessment of nutrition problems, the development of nutrition-related policies, and the delivery of health, nutrition, and food assistance programs.

#### **NS 451(4510) Epidemiology and Health of Human Communities**

Fall. 3 credits. Pre- or corequisite: one semester of statistics. Intended for advanced undergraduates and graduate students interested in health, human biology, nutrition, or epidemiology. E. Frongillo.

Examines through a series of case studies the role of epidemiological investigation in understanding, assessing, and improving the health and nutrition of human communities and populations. Students read and discuss scientific research and public policy literature on specific topics of current interest. Emphasis is on the conceptualization of epidemiology as an ecological science that studies the interdependence and interaction of humans with their social, cultural, and physical environment.

#### **NS 452(4520) Molecular Epidemiology and Dietary Markers of Chronic Disease**

Spring. 3 credits. Prerequisites: upper-level biology course, introductory statistics (can be taken concurrently), or permission of instructor. S-U grades optional. P. Cassano.

Introduces chronic disease epidemiology and covers the natural history of the major chronic diseases affecting the U.S. population. Focuses on the use of biological markers in understanding the etiology of cardiovascular disease, cancer, and lung disease. Integrates biological and epidemiological information as well as public health considerations and concepts related to the prevention of disease. Topics include gene-nutrient interaction in relation to cardiovascular risk, micronutrients and cancer risk, and nutritional influences on the immune system in relation to asthma risk. The course provides a health context

that enriches the learning experience in other advanced courses, particularly in biology and nutrition.

#### **NS 455(4550) Nobel Prizes in Biomedical Research**

Spring. 3 credits. Prerequisites: college biochemistry and/or cell biology (e.g., BIOBM 330, 331–332, 432, NS 320). S-U grades optional. D. Manor.

Covers in detail key topics in biomedical research through discussions of selected Nobel prizes. For each specific biomedical problem addressed, the discussion encompasses detailed analysis of the relevant experiments and ensuing data, evaluation of the impact of the findings on public health, and retrospective assessment in view of present-day knowledge. The course focuses mainly on breakthroughs associated with two major public health issues: infectious diseases and cancer. Other topics discussed include vitamins, lipid metabolism, prions, and technical breakthroughs such as DNA synthesis, mutagenesis, and PCR.

#### **NS 457(4570) Economics of Hunger and Malnutrition (also ECON 474[4740])**

Spring. 3 credits. Prerequisites: ECON 101 and introductory statistics, or permission of instructor. S-U grades optional. D. Sahn.

Focuses on the analysis of global hunger and malnutrition. Students analyze the dimensions, causes, and solutions to hunger and malnutrition, particularly in developing countries. Grades are based on a midterm and a final exam, a term paper, and class participation.

#### **[NS 475(4750) Mechanisms Underlying Mammalian Developmental Defects (also BIOAP 475[4750])**

Spring. 3 credits. Prerequisites: BIOBM 330, 331–332 or 333 (may be taken concurrently). Offered alternate years; not offered 2006–2007. D. Noden and P. Stover.

Developmental defects are present in nearly 5 percent of humans. Drawing upon current research, this course explores the causes of birth defects, emphasizing the interplay between genetic and environmental factors in the regulation of developmental processes. Emphasis is on nutritional disruptors, teratogens, and regulatory gene networks that are well characterized through animal studies and are associated with morphological, physiological, reproductive, or behavioral abnormalities in humans.]

#### **NS 488(4880) Applied Dietetics in Food Service Systems**

Spring. 3 credits. Limited to 27 students. Prerequisites: introductory food service management course, BIOMI 290. White lab coat required. Fee for special supplies/training and activities: approx. \$60. E. Gier.

Students gain experience in facility design; equipment selection, use, and care; job analysis and evaluation; human resources planning; management of financial resources; recipe development and volume food production; computer-assisted management; employee training; and applied safety and sanitation standards. Through planning and executing a themed event, students develop other skills required to operate/manage a food service program. The application of quality management in food service operations and facility management is stressed. Laboratories are arranged through Cornell Dining. Completion of a professional portfolio is

required. ServSafe training and examination is conducted; successful completion results in ServSafe certification.

#### **NS 490(4900) Manipulating the Mouse Genome (also BIOGD 490[4900])**

Fall. 1 credit. Prerequisites: BIOGD 280, 281, or 282 and BIOBM 330, 332 or 333, or NS 320. S-U grades optional. P. Soloway.

Functional genomic analysis has benefited enormously from experimental manipulation of the genomes of many organisms. The mouse has been the model of choice for such studies in mammals. This course explores the tools available for experimental manipulation of the mouse genome, including transgenesis, gene targeting, gene trapping, chemical mutagenesis, and cloning by nuclear transplant. Also discussed are use of recombinant inbred mice for complex trait analysis. Readings from the scientific literature focus on seminal applications of these methods.

#### **NS 499(4990) Honors Problem**

Fall and spring. Credit TBA. Prerequisite: acceptance into honors research program.

Students who have been accepted into the honors research program work on their projects under the guidance of their faculty mentors. Honors research students must complete a minimum of 6 credits of NS 499, typically spread over two or more semesters. The student and the mentor determine the appropriate number of credits for each semester. Research activities may include reviewing the literature, writing a proposal, developing research methods, collecting data in the field or laboratory, analyzing data, and writing the honors thesis.

#### **NS 600(6000) Special Problems for Graduate Students**

Fall or spring. Credit TBA. Prerequisite: graduate students recommended by their chair and approved by instructor in charge. S-U grades optional. DNS faculty.

Emphasizes independent advanced work. Experience in research laboratories in the division may be arranged.

#### **[NS 602(6020) Lipids (also BIOAP 619[6190])**

Fall. 2 credits. Not offered 2006–2007. A. Bensadoun.

Advanced course on the molecular aspects of lipid transport. Topics include plasma lipoproteins, molecular biology of lipoprotein receptors, transcriptional regulation of cholesterol homeostasis, lipid transfer factors, lipolytic enzymes, and molecular aspects of atherosclerosis.]

#### **NS 603(6030) Mineral Nutrition: Metabolic, Health, and Environmental Aspects (also AN SC 603[6030])**

Fall. 2 credits. Prerequisites: biochemistry, physiology, and nutrition courses. Letter grades only. Offered alternate years; not offered 2007–2008. X. G. Lei and C. C. McCormick.

Advanced course that emphasizes metabolism, gene regulation, antioxidant, and genetic defects related to mineral nutrition. Team-taught lectures cover topics ranging from single-gene mutation to social and environmental aspects of mineral nutrition and mineral-related disorders. Effective approaches to improve global mineral nutrition by agriculture and food systems are discussed.

**NS 605(6050) Nutritional Biochemistry Colloquium**

Fall and spring. 1 credit. S-U grades only. Nutritional biochemistry faculty.

Graduate seminar series that focuses on recent advances in biochemical nutrition. Weekly presentations are made by faculty members, postdocs, and graduate students and are based on the primary literature. The presentations are followed by a discussion involving all participants.

**NS 607(6070) Nutrition as an Integrating Discipline: Concepts and Paradigms**

Fall. 3 credits. Prerequisite: course work or experience in nutrition or permission of instructor. M. N. Kazarinoff, R. Parker, and DNS faculty.

Overview course for beginning graduate students and advanced undergraduates that introduces them to the full breadth of nutritional science disciplines, including quantitative and qualitative sciences. Suitable for seniors as an integrating course. The course presents concepts and paradigms of molecular biology, biochemistry, clinical nutrition, epidemiology, anthropology, economics, program planning and administration, policy development, and ethics. The course uses vitamin A as the example. Emphasis is placed on the integration of factual and conceptual knowledge to solve nutrition problems in human societies.

**NS 608(6080) Epigenetics (also BIOGD 608(6080))**

Fall. 2 credits. Prerequisites: BIOGD 281 and BIOBM 330, 332, or 333 or NS 320. Letter grades only. P. Soloway.

Epigenetic effects refer to reversible alterations in chromatin structure that can stably and heritably influence gene expression. These changes include covalent modifications to DNA itself or to proteins bound to DNA as well as noncovalent remodeling of chromatin. This course examines selected epigenetic phenomena described in several eukaryotes, mechanisms regulating these effects, and their phenotypic consequences when normal regulation is lost. Reading materials are from current literature, and participation in class discussion is required.

**NS 610(6100) Proteins and Amino Acids: Human Nutrition and Metabolism**

Fall. 3 credits. Prerequisites: undergraduate chemistry through biochemistry; undergraduate course work in biology or physiology. S-U grades optional. M. Stipanuk.

This course will cover (1) basic concepts of protein and amino acid chemistry, digestion and absorption, food sources and bioavailability, protein turnover, requirements, deficiencies, and inborn errors of metabolism; (2) Eukaryotic protein synthesis and degradation; and (3) Metabolism of amino acids and other nitrogenous compounds (e.g., nucleotides).

**[NS 611(6110) Molecular Toxicology (also TOX 611(6110))]**

Spring. 3 credits. Prerequisite: TOX 610 or permission of instructor. Offered alternate years; not offered 2005-2006. S. Bloom, R. Dietert, D. Muscarella, and B. Strupp. Focuses on the metabolism of drugs and environmental toxicants to reactive forms that can modify DNA and proteins and induce target organ toxicity as well as mutations and cancer. Also emphasizes factors and pathways

that can modulate toxic effects, including polymorphic drug-metabolizing enzymes, stress-activated signal transduction, and DNA repair. Discusses the uses of molecular and cellular stress markers for assessment of toxicant exposure and health risks.]

**[NS 614(6140) Topics in Maternal and Child Nutrition]**

Fall. 3 credits. Prerequisites: for undergraduates only; NS 331, 222, or 347, BIOAP 311 or NS 341, and permission of instructor. Next offered 2007-2008. K. Rasmussen.

Advanced course on the role of nutrition during pregnancy and lactation. The feeding and growth of infants and children in health and disease is considered. Critical evaluation of current literature is emphasized via lecture, discussions, and a term paper.]

**NS 615(6150) Nuclear Hormone Receptors**

Spring. 2 credits. S-U grades optional. N. Noy.

Focuses on hormone-gene interactions mediated by the superfamily of ligand-inducible transcription factors termed nuclear hormone receptors. Lectures address the mechanisms of action, regulatory features, and biological activities of nuclear receptors, including steroid-, retinoic acid-, and peroxisome proliferator-activated receptors. Also discusses the use of nuclear receptors as therapeutic targets in disease states such as cancer and diabetes.

**NS 617(6170) Teaching Seminar**

Fall or spring. 0 credits. Prerequisite: DNS graduate students or permission of instructor. S-U grades only. DNS staff and D. Way.

Provides individualized instruction focusing on development of teaching skills for guiding learning in lecture, discussion, and laboratory setting, and reflection on the impact of these skills on teaching and learning. Students identify the aspects of the specific teaching assignments they wish to develop and work with instructors on independent learning projects that may include preparation for lecturing, preparation of exams, efficient grading, and so on. Optional videotaping provides opportunities for practice and analysis.

**NS 618(6180) Teaching Experience**

Fall or spring. 0 credits. Prerequisite: DNS graduate students or permission of instructor. S-U grades only. DNS staff.

Designed to provide experience in teaching nutritional sciences by direct involvement in college courses under supervision of a faculty member. The aspects of teaching and the degree of involvement vary, depending on the needs of the course and the experience of the student.

**NS 619(6190) Field of Nutrition Seminar (also AN SC 619(6190))**

Fall or spring. 0 credits. S-U grades only. Faculty and guest lecturers.

Lectures on current research in nutrition.

**NS 625(6250) Community Nutrition in Action**

Fall. 3 credits. Prerequisite: dietetic interns. S. Travis.

Provides students enrolled as dietetic interns with supervised, in-depth experiences in a community nutrition program and fosters the integration of research, theory, and practice.

Through placements in community programs, students gain experience in program administration and in assessing, designing, implementing, and evaluating food and nutrition programs for targeted populations through public and private organizations. In weekly seminars (and other seminars and observations as arranged) students integrate theory and practice, reflect upon their placement experience, learn about community nutrition research, and explore the many issues facing community food and nutrition practitioners.

**[NS 630(6300) Anthropometric Assessment]**

Spring. five weeks. 1 credit. Prerequisite: NS 331 or equivalent and permission of instructor. Offered alternate years; next offered 2007-2008. J. Haas.

Topics in this lecture/lab course include biological basis of anthropometry for nutritional status assessment, quality control of anthropometric data, applications to special groups (infants, children, adolescents, pregnant women, and the elderly), statistical analysis and presentation of anthropometric data, references standards and interpretation, measurement techniques of anthropometry, and body composition assessment.]

**NS 635(6350) Introduction to Community Nutrition Research for Dietetic Interns**

Fall. 2 credits. Prerequisites: enrollment in Cornell Dietetic Internship Program or equivalent background and research placement. C. Bisogni.

Introduces the paradigms, concepts, methods, and issues involved in community nutrition research. Dietetic interns conduct individual research projects at their community nutrition placement sites. Lectures, readings, and activities support students as they design their projects, develop research methods, collect data, and interpret findings. Students write a proposal, apply for human subjects approval, collect data, prepare a written report, and present an oral report and a poster session.

**NS 637(6370) Epidemiology of Nutrition**

Spring. 3 credits. Prerequisites: graduate standing; BTRY 601 and concurrent registration in BTRY 602 or equivalent knowledge; basic knowledge of nutritional aspects of growth and development and nutritional biochemistry. P. Cassano and J-P. Habicht.

Covers principles of nutritional epidemiology, impact assessment of nutrition intervention programs, and nutritional surveillance. Presents principles of using nutritional information in decision making. Shows how the biochemistry and physiology of nutrition can be related to epidemiological assessment and research strategies.

**[NS 638(6380) Epidemiology of Nutrition Seminar]**

Spring. 3 credits. Prerequisites: graduate students planning field intervention studies; permission of instructor; NS 637.

Covers the meta-analysis, design, measurement, and analytic issues involved in developing, implementing, and analyzing studies of field interventions with nutritional impact.]

**NS 640(6400) Social Science Theories in Nutrition**

Fall. 3 credits. Limited to 20 students. Prerequisite: graduate standing. J. Sobal.

Social science theories from sociology, psychology, anthropology, economics, political science, geography, and history that contribute to understanding food, eating, and nutrition are discussed to understand how paradigms, theories, and models apply to nutrition topics, issues, and problems.

**NS 642(6420) Globalization, Food Security, and Nutrition (also AEM 642[6420])**

Fall. 2 credits. Prerequisites: permission of instructor, graduate standing, and basic understanding of economics and nutrition. Letter grades only. P. Pinstrip-Andersen.

Directed readings course with a weekly 50-minute discussion session. The course is aimed at graduate students in nutrition, agricultural economics, and other relevant fields, who wish to explore how globalization may affect poverty, food security, and nutrition in developing countries and how national policies and international agreements and institutions may influence the outcome. The discussion sessions are based on assigned readings for each week.

**NS 644(6440) Community Nutrition Seminar**

Fall and spring. 1 credit. S-U grades only. A. Gillespie.

Sponsored by the Cornell Community Nutrition Program. Graduate students and faculty learn about current research in the program and related fields within and outside Cornell and about community nutrition theories and research methodologies. The seminar also provides a forum to discuss participants' own research and current issues in community nutrition.

**NS 646(6460) Seminar in Physicochemical Aspects of Food**

Spring. 1-3 credits. Prerequisite: college organic chemistry or biochemistry. S-U grades optional. B. Parker and B. Lewis.

Introduces physicochemical aspects of food to graduate students who have had limited or no work in this area. Uses the lectures of NS 345 as a basis for supplementary readings and critical review of research on selected topics.

**NS 650(6500) Assessing Food and Nutrition in a Social Context**

Fall. 4 credits. Prerequisite: social sciences course. Letter grades only. D. Pelletier and G. Peltó.

Food and nutrition problems in developed and developing countries may manifest themselves in biological or functional terms, but their causes and solutions ultimately are rooted in the sociopolitical world. This course provides multidisciplinary perspectives and some policy analytic frameworks needed to assess and analyze the social context of nutrition problems. The course is relevant to developed and developing countries and to research and practice related to community nutrition as well as nutrition policy.

**NS 660(6660) Special Topics in Nutrition**

Fall or spring. 3 credits max. each semester; because topics change, may be repeated for credit. Prerequisite: permission of instructor. DNS faculty.

Designed for students who want to become informed in any specific topic related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a

group of students, and/or selected lectures of another course already offered.

**[NS 680(6800) International Nutrition Problems, Policy, and Programs]**

Spring. 3 credits. Prerequisite: permission of instructor. T R TBA. Offered alternate years. International Nutrition faculty.

Designed for graduate students who want to learn about the important nutritional problems of developing countries. The major forms of malnutrition related to poverty and their underlying causes are discussed. Emphasis is placed on programs and policies that can help poor countries and communities improve their nutritional and health status.]

**NS 685(6850) Empirical Methods for the Analysis of Household Survey Data: Applications to Nutrition, Health, and Poverty (also ECON 771[7711])**

Spring. 3 credits. Prerequisites: intermediate microeconomics, intermediate statistics or econometrics (through multiple regression and limited dependent variable models), or permission of instructor. D. Sahn.

Focuses on empirical methods for the analysis of household survey data. Students examine a series of measurement and modeling issues focused on health and nutrition, education, and poverty. In addition, they explore methods to evaluate social programs. Course readings and data that are used for hands-on empirical exercises are largely from Africa and Asia.

**NS 690(6900) Trace Element and Isotopic Analysis (also CHEM 628[6280])**

Fall. 3 credits. Prerequisite: CHEM 288 or 390, 302 or CHEM 208 and MATH 112, or permission of instructor. Primarily for graduate students and advanced undergraduates. S-U grades optional. Offered alternate years. J. T. Brenna.

Survey course in modern high-precision isotope ratio mass spectrometry (IRMS) techniques and trace/surface methods of analysis. Topics include dual inlet and continuous flow IRMS, thermal ionization MS, inductively coupled plasma MS, atomic spectroscopy, ion and electron microscopies, X-ray and electron spectroscopies, and biological and solid state applications. The first five weeks focus on IRMS instrumentation and are offered as a separate 1-credit special topics course (NS 660).

**NS 698(6980) International Nutrition Seminar**

Fall and spring. 0 credits. No grades given. E. A. Frongillo.

Consists of presentations by Cornell faculty and graduate students and invited outside speakers. Speakers cover a range of topics relating to nutritional problems, policy, and programs in nonindustrialized countries.

**NS 699(6990) Special Topics in International Nutrition**

Fall and spring. 3 credits max. each semester; because topics change, may be repeated for credit. Prerequisite: permission of instructor. International Nutrition faculty.

Designed for graduate students, mainly those with a concentration in international nutrition, who wish to become familiar with some specific topic related to international nutrition that is not adequately covered in an existing

course. It consists of tutorial study on an agreed-upon topic.

**NS 702(7020) Seminar in Toxicology (also TOX 702[7020])**

Fall or spring. 1 credit. S-U grades only. Staff.

Covers varied topics in biochemical, genetic, nutritional, veterinary, and regulatory toxicology, ecotoxicology, and environmental chemistry. Includes presentations of basic research studies, fundamental concepts, and research activities involving environmental problems of a toxicological nature. Presentations are given by speakers from Cornell and visitors.

**NS 703(7030) Seminar in Nutritional Sciences**

Fall and spring. 1 credit. Prerequisite: for undergraduates, permission of instructor. S-U grades only. DNS faculty.

Presentations of original articles pertinent to the nutritional sciences. Students read and learn how to critically analyze and interpret original articles published in a wide variety of journals. Students learn how to make professional presentations and how to critique the presentations given by others.

**NS 899(8990) Master's Thesis and Research**

Fall or spring. Credit TBA. Prerequisite: permission of graduate committee chair and instructor. S-U grades optional. DNS graduate faculty.

**NS 999(9990) Doctoral Thesis and Research**

Fall or spring. Credit TBA. Prerequisite: permission of graduate committee chair committee and instructor. S-U grades optional. DNS graduate faculty.

## FACULTY ROSTER

Bensadoun, Andre, Ph.D., Cornell U. Prof., Nutritional Sciences/Physiology  
Bisogni, Carole, Ph.D., Cornell U. Prof.  
Brannon, Patsy, Ph.D., Cornell U. Prof.  
Brenna, J. Thomas, Ph.D., Cornell U. Prof. and Director of Undergraduate Studies  
Campbell, T. Colin, Ph.D., Cornell U. Jacob Gould Schurman Emeritus Professor of Nutritional Biochemistry  
Cassano, Patricia, Ph.D., U. of Washington. Asst. Prof.  
Chen, Junshi, M.D., Peking Medical Coll. (China). Adjunct Prof.  
Devine, Carol M., Ph.D., Cornell U. Assoc. Prof.  
Dollahite, Jamie, Ph.D., U. of Texas. Assoc. Prof. and EFNEP Leader  
Frongillo, Edward, Jr., Ph.D. Cornell U. Assoc. Prof.  
Gillespie, Ardyth, Ph.D., Iowa State U. Assoc. Prof.  
Haas, Jere D., Ph.D., Pennsylvania State U. Nancy Schlegel Meinung Professor in Maternal and Child Nutrition  
Habicht, Jean-Pierre, Ph.D., Massachusetts Inst. of Technology. James Jamison Professor of Nutritional Epidemiology, Emeritus  
Kazarinoff, Michael N., Ph.D., Cornell U. Assoc. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology  
Levitsky, David A., Ph.D., Rutgers U. Prof.  
Lewis, Bertha A., Ph.D., U. of Minnesota. Assoc. Prof.  
Manor, Danny, Ph.D., Albert Einstein Coll. of Medicine. Asst. Prof.

McCormick, Charles, Ph.D., North Carolina State U. Assoc. Prof. and Asst. Dir., Undergraduate Studies  
Noy, Noa, Ph.D., Tel-Aviv U. (Israel). Prof.  
O'Brien, Kimberly, Ph.D., U. Connecticut. Assoc. Prof.  
Olson, Christine M., Ph.D., U. of Wisconsin. Prof. and Dir., Graduate Studies  
Parker, Robert S., Ph.D., Oregon State U. Assoc. Prof.  
Pearson, Thomas, Ph.D., Johns Hopkins U. Adjunct Prof.  
Pelletier, David, Ph.D., Pennsylvania State U. Assoc. Prof.  
Pelto, Gretel, Ph.D., U. of Minnesota. Prof.  
Rasmussen, Kathleen M., Sc.D., Harvard U. Prof.  
Rivera, Juan, Ph.D., Cornell U. Adjunct Asst. Prof.  
Sahn, David, Ph.D., Massachusetts Inst. of Technology. Prof.  
Sobal, Jeffery, Ph.D., U. of Pennsylvania. Assoc. Prof.  
Soloway, Paul, Ph.D., Princeton U. Assoc. Prof.  
Stipanuk, Martha H., Ph.D., U. of Wisconsin. Prof.  
Stoltzfus, Rebecca, Ph.D., Cornell U. Assoc. Prof.  
Stover, Patrick, Ph.D., Medical Coll. of Virginia. Assoc. Prof.  
Strupp, Barbara, Ph.D., Cornell U. Assoc. Prof.  
Travis, Susan, M.S., Colorado State U. Lec.  
Utermohlen, Virginia, M.D., Columbia U. Assoc. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology

#### **Other Teaching Personnel**

Gier, Emily, M.B.A., Binghamton U. Lec.  
Swanson, Joy, Ph.D., Cornell U. Res. Assoc.  
You, Cha-Sook, Ph.D., Cornell U. Teaching Supp. Spec.

#### **Joint Appointees**

Bauman, Dale, Prof., Animal Science/Nutritional Sciences  
Miller, Dennis, Prof., Food Science/Nutritional Sciences

## OFFICER EDUCATION

Military instruction began at Cornell University in 1868 under the provisions of the Morrill Act of 1862. Since that time, officer education has been highlighted by the construction of Barton Hall in 1914 and the establishment of a formal Reserve Officers Training Corps (ROTC) unit in 1917. The program evolves to keep pace with the latest military changes and emphasizes the development of leadership and managerial skills.

The Officer Education Programs prepare students for a commission as an officer in either the United States Army, Navy, Air Force, or Marine Corps. Each service program is headed by a senior military officer who also serves as a full professor on the Cornell faculty.

### MILITARY SCIENCE

Lieutenant Colonel Brian R. Page, Artillery, United States Army, Professor of Military Science and Commanding Officer

Major Dean Swartwood, Brigadier, Executive Officer, Engineer, United States Army Reserves

Major Richard Brown, Engineer, United States Army Reserves

Captain Kurt Belawske, Aviation, United States Army

### United States Army ROTC Program

The primary objective of the Army Officer Education Program at Cornell is to commission the future officer leadership of the United States Army. Intermediate objectives are to provide students with an understanding of the fundamentals of responsibility, integrity, and self-discipline, as well as an appreciation of the citizen's role in national defense. The application of the decision-making process to a variety of situations is given major emphasis as a valuable aid in developing leadership potential. These objectives are achieved through a program normally covering four years. A two-year program is available for those who qualify. The program includes specific courses in military science, more general academic subjects that assure a well-rounded education, practical training in leadership through participation in the Cadet Corps (including attendance at one five-week summer camp at Ft. Lewis, Wash.), and the opportunity to participate in a number of extracurricular activities. This combination prepares the student for commissioning and effective performance in the many branches of the Army. The student's academic major, academic performance, leadership ability, personal desires, and the needs of the Army determine the branch of the Army into which the student is commissioned upon graduation.

### Requirements for Enrollment

Applicants must be citizens of the United States and be able to obtain a Secret level security clearance before being commissioned as lieutenants. (Noncitizens may enroll in

selected portions of the program.) Students must meet Army medical requirements. Overall sound mental and physical condition is essential; students are required to undergo periodic physical fitness tests. Enrollment and continuation in the program is subject to the approval of the Professor of Military Science. Enrollment in specific courses by students not formally enrolled in the program must be approved by course instructors. Contracted students must register for letter-grade military science classes and leadership laboratories for the purpose of commissioning into the United States Army.

### Four-Year Program

The Four-Year Program is open to students in their freshman year or, with the approval of military and university authorities, to sophomores in a five-year degree program. Veterans of the Armed Forces of the United States and students entering Cornell with AROTC credit from secondary or military schools (Junior Division AROTC) may receive advanced standing, if qualified. Under the Four-Year Program students enroll in the Basic Course (MIL S I and II) during the first two years, and the Advanced Course (MIL S III and IV) during the next two years. A total of 12 credits of military subjects are taken. In addition, academic enrichment courses are required in such fields as written communications, computer science, and military history. All cadets attend a five-week camp, with pay, between their junior and senior years. All cadets participate in physical fitness training three days per week. Each year selected cadets are sent to the Army Airborne School, Winter Survival School, and Air Assault Course, depending upon availability and student standings within the ROTC program.

### Scholarships

Scholarships are awarded on the basis of merit and may be available for two, three, or four years. AROTC scholarships are awarded each year to entering freshmen and students in the freshman and sophomore classes. Scholarships pay up to full tuition and mandatory fees. Scholarship cadets and enrolled juniors and seniors also receive between \$300 and \$500 a month for up to 10 months a year. Scholarship cadets also receive \$900 per year toward the cost of textbooks.

### Service Obligations

ROTC graduates may serve on active duty, in the Army Reserve, or in the National Guard, depending upon the needs of the Army and the leadership abilities of the cadet. Officers beginning active duty attend the Officer Basic Course (normally 10 to 16 weeks) of their assigned branch. Upon completion, officers are assigned to a unit and location determined by the desires of the individual and the requirements of the Army. Officers selected for reserve duty attend the Officer Basic Course, after which they are released to reserve status.

ROTC graduates have the option of serving four years on active duty and four years in reserve status; however, some may serve eight years on reserve duty.

### Graduate Study

Active duty deferments, or educational delays, may be granted to individuals who want to attend graduate school at their own expense. Requests will be considered on the basis of the needs of the service. Admission to graduate school is the student's responsibility.

### Military Science Courses

All cadets take one course and a leadership laboratory each semester in military science. The number of hours a week spent in the classroom varies from semester to semester, as does the credit received for each course.

#### Freshman Year (MIL S I)

##### MIL S 101(1101) Foundations of Officership

Fall. 1 credit. Required. K. Belawske. Students examine the U.S. defense structure in terms of organization, mission, personnel, and relationships among and between military forces and branches and departments of the government. The U.S. Army force structure is examined at all levels. The complexities and magnitude of operating the defense organization are studied to provide a framework for subsequent instruction. Students develop skills in conducting oral and written presentations.

##### MIL S 102(1102) Foundations in Leadership

Spring. 1 credit. Required. K. Belawske. Allows students to develop a basic understanding and appreciation of theories of social and organizational psychology and behavior as they apply to the military setting. Attention is given to leader types, the source and exercise of authority, and the impact of varying styles of leadership, resource management, motivation, and organizational effectiveness. The student is instructed in the concepts of integrity, ethics, and professionalism. Classes on historical events and strategy are also presented.

#### Sophomore Year (MIL S II)

##### MIL S 201(2201) Individual Leadership Studies/Teamwork

Spring. 1 credit. Required. Prerequisite: MIL S 102 or permission of instructor. C. McFall.

Students learn the basic principles of group dynamics at the level of the smallest military unit, the squad. Troop-leading procedures are introduced through case studies and role-playing exercises. Leadership theories introduced in MIL S 102 are examined in a variety of realistic settings. The practical application of behavioral theories is explored in the context of small military organizations. The course also provides practical knowledge of the various forms of topographic representation. Students use maps



in terrain association and land navigation. Knowledge of topography is complemented by an orientation on significant environmental influences of physical, social, and climatic factors. Portions of the course offer experience in land navigation and orienteering.

#### **MIL S 321(3321) Armed Conflict in Society**

Fall. 2 credits. Required. R. Brown. Provides practical knowledge in American military history. It is primarily an overview course designed to provide an understanding of the art and nature of warfare and particularly how warfare has affected the United States. The course consists of three primary areas of instruction with an emphasis on American military history. The first area of instruction addresses the art and theory of modern warfare. It analyzes America's first attempt at war, the American Revolution, and ends with the development of modern warfare under Napoleon Bonaparte. The second phase focuses on America at war in the 19th century. It places particular emphasis on the American Civil War and the strategy of annihilation versus the strategy of attrition. The final phase looks at warfare in the 20th century and finishes with an analysis of the future of warfare for the military of the United States.

#### **Junior Year (MIL S III)**

#### **MIL S 301(3301) Leadership and Problem Solving**

Fall. 2 credits. Required. R. Brown. After an initial introduction to techniques of presenting briefings, students are provided with a broad understanding of the principles and application of teamwork in military organizations. Particular emphasis is given to the leadership responsibilities of the commander as the team coordinator. This course helps students develop an understanding of the roles and contributions of the various branches of the Army in support of the military team.

#### **MIL S 302(3302) Leadership and Ethics**

Spring. 2 credits. Required. Prerequisite: MIL S 301. R. Brown. Takes on the nature of decision making and the tactical application of the military team. Through the use of conferences and extensive practical exercises, students develop familiarity with the factors influencing a leader's decisions and the process of planning, coordinating, and directing the operations of military units through operation plans and orders.

#### **Senior Year (MIL S IV)**

#### **MIL S 401(4401) Leadership and Management**

Fall. 2 credits. Required. B. Page. Provides an overview of the functions, responsibilities, and interrelationships among small-unit leaders, the commander, and the staff. Discussions focus on actions of small-unit leaders, communication skills, army operations, the logistical support of the army in the field, and the army training system. The course focuses on the dynamics of leadership in battle through the detailed analysis of a series of case studies. Just war theory, ethics, and professionalism are also addressed in a seminar fashion.

#### **MIL S 402(4402) Officership**

Spring. 2 credits. Required. B. Page. A continuation of MIL S 401. Conferences and seminars examine the techniques of effective military leadership, with special attention given to professionalism and ethical considerations in the armed forces during both peacetime and conflict. Army operations and basic doctrine are also discussed. This is a capstone course designed to prepare the student for commissioning.

### **Practical Leadership Training**

#### **All Army Officer-Education Students**

No credit is given for leadership training, but participation is required for successful completion of the AROTC program. Students receive physical education credit for the laboratory. Each semester, cadets register for the appropriate leadership laboratory, consisting of physical fitness training three times per week, two hours of military training each week, and one or two weekend training exercises per semester.

#### **MIL S I Leadership Laboratory I**

Fall.	Spring.
0 credits. S-U.	0 credits. S-U.
MIL S 151(1111)	MIL S 152(1111)

MIL S I cadets meet for two hours each week to learn a variety of military skills including rappelling, first aid, drill and ceremonies, weapons familiarization, and physical fitness training.

#### **MIL S II Leadership Laboratory II**

Fall.	Spring.
0 credits. S-U.	0 credits. S-U.
MIL S 251(2211)	MIL S 252(2211)

Cadets meet for two hours each week as members of the cadet organization to participate in practical leadership exercises. Types of practical activities include rifle marksmanship, orienteering, drill and ceremonies, signal communications, physical fitness training, first aid, tactics, and field exercises.

#### **MIL S III Leadership Laboratory III**

Fall.	Spring.
0 credits.	0 credits.
Required. S-U.	Required. S-U.
MIL S 351(3311)	MIL S 352(3311)

Cadets meet for two hours a week and occasional weekends to prepare for a five-week summer camp that follows their junior year. Emphasis is placed on the development of individual practical and leadership skills. Cadets rotate through leadership positions to practice applying decision-making skills in a myriad of situations.

#### **MIL S IV Leadership Laboratory IV**

Fall.	Spring.
0 credits.	0 credits.
Required. S-U.	Required. S-U.
MIL S 451(4411)	MIL S 452(4411)

Senior cadets plan and operate the leadership laboratory programs for MIL S I-III cadets. The development of planning and supervisory skills is emphasized. Cadets have an opportunity to practice leadership skills developed during previous ROTC training and summer camp experiences. Includes two to three hours a week devoted to physical fitness.

### **Professional Military Education (PME) Requirements**

In addition to the ROTC classes and leadership laboratories listed above, a number of courses are required as part of the contracted student's academic program. These courses are offered by the university and round out the student's professional education. The PME component of the ROTC program requires at least one college course in each of the following areas: communication skills, military history, and an introduction to computers. These courses must be completed before graduation and commissioning. Courses that meet these requirements are approved by the Professor of Military Science.

### **NAVAL SCIENCE**

TBA, United States Navy, Professor of Naval Science and Commanding Officer, Naval ROTC Unit

Lieutenant Colonel David Taylor, United States Marine Corps

Lieutenant Garland Buchanan, United States Navy

Lieutenant Raymond Gamicchia, United States Navy

Lieutenant Christopher Hedrick, United States Navy

The objective of the Naval Officer Education Program is to prepare students for service as commissioned officers in the United States Navy or United States Marine Corps; this is done by supplementing undergraduate education with instruction in essential concepts of naval science and by fostering qualities of leadership, integrity, and dedication to country. The program is compatible with most undergraduate major fields of study, including five-year baccalaureate degree programs.

The program covers four years and combines specific courses in naval science and specified academic subjects. These courses supplement weekly professional development sessions in which the practical aspects of naval science and leadership procedures are stressed. It also includes at least one summer-at-sea period.

Though the Navy-Marine Corps Program has been designed to prepare future officers, naval science courses are open to all students at Cornell as space limitations allow.

### **Requirements for Enrollment**

An applicant for the Naval ROTC program at Cornell must be a citizen of the United States. Applicants must have reached their 17th birthday by June 30 of the entering year and be less than 27 years of age on June 30 of the calendar year in which they are commissioned. Waivers of the upper age limit may be available for applicants who have prior active duty military service. Applicants must also meet physical and medical requirements. Interested students can visit the Naval ROTC Unit in Barton Hall or contact their local officer recruiter.

### **Programs**

There are two programs: the Scholarship Program and the College Program. The two programs differ primarily in benefits given to the student.

## Scholarship Program

The Scholarship Program provides approximately 1,000 scholarships in more than 70 universities nationwide to selected students who want to serve in the Navy or Marine Corps. Financial support is provided to students during college preceding the award of the baccalaureate degree.

### Benefits

The program offers scholarships that provide *full tuition* and are not need-based. While on scholarship, students also receive money for instructional fees, textbooks, nonconsumable supplies, and a stipend of \$250–\$400 a month for a maximum of 40 months.

Successful completion of the Scholarship Program leads to a commission in the Navy or Marine Corps Reserve. At Cornell University, over 90 percent of NROTC students have a scholarship. Students entering NROTC without a prior scholarship award are entitled to compete for two- or three-year scholarships controlled by the Chief of Naval Education and Training.

### Entering the Scholarship Program

There are three ways to enter the Scholarship Program:

1. by applying to the national competition each year. This process entails filling out and submitting an appropriate application; being interviewed; having a physical examination; and applying to, and being accepted by, one of the colleges or universities throughout the country that offers an NROTC program.
2. by enrolling in the College Program at Cornell and being recommended by the Professor of Naval Science for a scholarship after at least one semester in the program.
3. by entering through the Two-Year Scholarship Program.

## College Program

Two College Programs are available. Both lead to a commission in the Naval or Marine Corps Reserve.

Starting in the junior year, each of these programs provides textbooks for naval science courses, uniforms, and a subsistence allowance of \$350–\$400 a month.

The regular College Program is four years long. Academic requirements for students in this program are somewhat fewer than those for scholarship students, as noted in the curriculum section of this book.

The Two-Year College Program begins the summer before the junior year; students attend a required program, with pay, at the Naval Science Institute in Newport, R.I.

## Summer Training

Each summer, students in the Scholarship Program spend approximately four to six weeks on a Navy ship, or participate in a naval activity that may take place anywhere in the world, for on-the-job training. College Program students attend one summer training session of the same duration between the junior and senior years.

## Active Duty Requirements

Scholarship midshipmen commissioned in the Navy or Marine Corps Reserve serve on active duty for a minimum of four years. College program midshipmen commissioned in the Naval or Marine Corps Reserve serve a minimum of three years. In some cases, following commissioning, specialized training such as aviation or nuclear power will add additional active duty requirements.

### Choice of Assignment

Graduates have the opportunity to request the duty they prefer upon graduation. These requests are given careful consideration, and every effort is made to assign newly commissioned officers to their duty of choice.

Among the assignments available are duties in naval aviation as either a pilot or naval flight officer, on submarines, and on surface ships. Other specialties, such as special warfare or medical service corps, may be available on a limited basis.

## Marine Corps Options

The United States Marine Corps is an integral part of the Naval Services and is commanded by the Commandant of the Marine Corps. One-sixth of the NROTC scholarship students may be Marine selectees who will be designated Marine-option midshipmen. Upon successful completion of the program they will be appointed second lieutenants in the United States Marine Corps.

Marine-option midshipmen follow the same program as other NROTC midshipmen for the first two years. Beginning with the junior year, Marine-option midshipmen are taught Marine-oriented courses by a Marine Officer Instructor. For First Class summer training (after the junior year), Marine-option students travel to Quantico, Va., where they undergo six weeks of intensive training known as the USMC Officer Candidate School. Upon commissioning the following year as second lieutenants, they are assigned to the Basic School at Quantico, Va. After the Basic School, the Marine officer is assigned duty in a variety of occupational fields. Among the duties available are infantry, aviation, artillery, tracked vehicles, engineering, communications, electronics, supply, administration, and computer science. The officer may serve on board naval vessels or at shore installations of the Marine Corps or Navy, either in this country or overseas.

The Marine Corps has a postgraduate training system similar in objectives and organization to that of the Navy. Marine officers selected for aviation receive flight training at the Naval Air Station, Pensacola, Fla., along with their Navy counterparts.

## Curriculum

A student has three categories of requirements to fulfill as a midshipman. The first of these requirements is a weekly naval professional development session each semester. The second requirement is a naval science course each semester. The last set of requirements consists of further courses prescribed by the Navy to meet the growing need for more and better technically educated junior officers.

## Naval Professional Laboratories

**NAV S 141-142, 241-242, 341-342, or 441-442(1141, 2241, 3341, 4441)**

All students in the program participate in a two-hour professional development session each week. The session is held from 2:30 until 4:30 on Wednesday afternoons and consists of both drill and professional information briefings. Students gain experience in actual leadership situations and learn the fundamentals of seamanship, military formations, movements, commands, discipline, courtesies, and honors. During information briefings, special emphasis is given to applied leadership as it relates to the administrative and managerial aspects of a Navy or Marine Corps officer's duties.

## Naval Science Courses

All Navy and Marine midshipmen take one naval science course each semester during their freshman and sophomore years. Navy-option students continue to take a naval science course each semester during their junior and senior years. Marine-option students have slightly different curriculum requirements for their junior and senior years.

### Freshman Year (Navy and Marines)

**NAV S 101(1101) Fundamentals of Naval Science**

Fall. 0 credits. G. Buchanan.

Involves a study of fundamental aspects of naval science. This includes contributions to sea power, different warfare communities involved in the physical development of naval forces, and study of resource management and naval science prospects for the future. Naval uniforms, customs, and traditions are also covered.

**NAV S 102(1102) Sea Power and Maritime Affairs**

Spring. 3 credits. G. Buchanan.

Discussions examine the history of the Navy as a force in diplomacy and an instrument of U.S. foreign policy. Relationships between Congress and the military for determining the national defense policy are also explored. An integrated examination of current events and issues lends historical perspective throughout the course.

**NAV S 157(1480) Small Boat Sailing (also PE 1480)**

Fall and spring. Physical education credit. Instructor TBA.

This is a course of instruction in basic sailing skills and safety principles. Students sail small boats on Cayuga Lake. Focus is on U.S. Navy Class B inshore skipper certifications.

### Sophomore Year (Navy and Marines)

**NAV S 201(2201) Leadership and Management I**

Fall. 3 credits. C. Klyne and D. Taylor.

The theme of the course is the "evolving role of the manager, organizational decision maker, and leader." The course begins by briefly covering the theoretical principles of management and progresses through practical skills used by managers and leaders. Lectures, reading assignments, films, and discussions provide students with an excellent opportunity to consider complex managerial and leadership issues. The goal of this course is for students to begin to develop a sound personal leadership philosophy that will enable them to more effectively accomplish

the assigned responsibilities of leading men and women in today's demanding and high-tech naval environment.

**NAV S 202(2201) Naval Ship Systems I (also M&AE 201[2010])**

Fall. 3 credits. C. Hedrick.

Introduces primary ship-systems and their interrelationships. Basic principles of thermodynamics, propulsion, mechanical operation, internal communications, electronics, ship structure, and other marine systems are covered.

**Junior Year (Navy)**

**NAV S 301(3050) Principles of Navigation (also BEE 305[3050])**

Spring. 4 credits. R. Gamichchia.

Introduces the fundamentals of marine navigation emphasizing piloting and electronic navigation procedures. Covers coordinate systems, chart projections, navigational aids, instruments, compass observations, time, star identification, use of the nautical almanac, and study of tides and currents. Electronic navigation systems are discussed.

**NAV S 302(3302) Naval Operations**

Fall. 3 credits. R. Gamichchia.

Covers the application of the nautical rules and maneuvering board in order to avoid collisions at sea. Other aspects of naval surface ship operations that are introduced include visual and electronic communications methods, tactical disposition of forces, ship handling theory, and deck seamanship topics.

**Senior Year (Navy)**

**NAV S 401(4401) Naval Ships Systems II (Weapons)**

Spring. 3 credits. C. Hedrick.

Examines the principles and theories used in the development of naval weapons systems. Initially, extensive study is made of detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, stabilizing, tracking, and weapons control and delivery.

**NAV S 402(4402) Leadership and Ethics**

Spring. 3 credits. TBA.

Reviews a variety of topics important to the naval officer for both professional and managerial development. The material is designed to provide the midshipman with an understanding and appreciation of leadership and ethics in preparation for assignments in the naval service. Through the use of lectures, case studies, and role-playing, the student learns various aspects of naval leadership and ethical decision making. Marine-option students may also take this course.

**Junior or Senior Year (Marine Options)**

**NAV S 310(3310) Evolution of War**

Spring. 3 credits. D. Taylor.

A study of warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and governing policy. This course examines the historical evolution of warfare, including principles of war, development of weapons and their effects on how war wages, and the political goals associated with specific adversaries through history.

**NAV S 410(4410) History of Amphibious Warfare**

Spring. 3 credits. D. Taylor.

The history of the development, theory, techniques, and conduct of amphibious operations from 490 BC to the present. Special emphasis is placed on amphibious operations conducted in the central Pacific during World War II and on the future of amphibious operations.

**Other Required Courses**

**Navy-Option Scholarship Program**

To be eligible for a commission in the United States Navy, midshipmen must successfully complete all the requirements for a baccalaureate degree in any field of study offered by Cornell University, and complete courses in the following subjects (specified courses to be approved by the Professor of Naval Science):

American military affairs or national security policy (one semester)

English (one year)

calculus (one year)

calculus-based physics (one year)

computer science (one semester)

The calculus requirement must be satisfied by the end of the sophomore year and the physics requirement by the end of the junior year.

Although free choice of academic majors is permitted, students are encouraged to pursue majors in engineering and the physical sciences so that they may be best prepared to meet the technological requirements of the modern Navy.

**Navy-Option College Program**

Navy-option College Program students must complete one year of college-level study in mathematics, physical science, and English as a prerequisite for commissioning. The mathematics course must be completed by the end of the junior year; the physical science course by the end of the senior year. In addition, one semester of computer science is required. College Program students who desire entry into the Navy-option Scholarship Program should fulfill all of the requirements applicable to Navy-option scholarship students if they wish to be eligible for a scholarship controlled by the Chief of Naval Education and Training.

**Marine Option**

Any midshipman, in either the Scholarship Program or the College Program, who completes all of Cornell University's degree requirements in any academic major is eligible for a commission in the U.S. Marine Corps or U.S. Marine Corps Reserve. Marine-option students take the same naval science courses and naval professional laboratories as Navy-option students for the freshman and sophomore years. During the junior and senior years, Marine-option students have slightly different naval science course requirements than their Navy-option counterparts. Two semesters of courses (a minimum of 3 hours each) in the area of American Military Affairs or National Security Policy are required. One semester of a modern foreign language must be completed.

**Extracurricular Activities**

The NROTC midshipman at Cornell is offered a broad range of activities, including sail training and a comprehensive intramural sports program. Midshipmen participate in a myriad of social events, including the annual Navy/Marine Corps Birthday Ball.

**DEPARTMENT OF AEROSPACE STUDIES**

Colonel Peter Gray, United States Air Force, Professor of Aerospace Studies and Commander, Air Force ROTC Detachment 520

Captain Marcus A. Whitten, United States Air Force

TBA, United States Air Force

The objective of the Air Force Officer Education Program at Cornell is to prepare men and women for positions as officers in the United States Air Force. The program is designed to teach students about the mission and organization of the Air Force, the historical development of airpower, leadership, and management. Students study national security policy and the role of the military in a democratic society. This program includes specific courses in aerospace studies and practical leadership laboratories. Additionally, the Department of Aerospace Studies seeks to inform and engage noncadet students about the U.S. military, in general, and the USAF, in particular.

**Requirements for Enrollment**

The Air Force Officer Education Program is open to any qualified undergraduate or graduate student enrolled in any major field of study. An applicant must be a United States citizen to become a commissioned officer. Noncitizens may enroll and will receive certificates acknowledging completion of the course but cannot receive a commission. U.S. permanent residents who are naturalized by their date of graduation may receive a commission.

All applicants receive physical examinations at no cost and must meet certain physical requirements to be accepted. Students who are interested in qualifying for flying categories (pilot, navigator, or air battle manager) must meet more stringent physical requirements each semester. In addition, students enrolled in the commissioning program must meet specified physical fitness requirements each semester.

Though the program is designed to prepare future Air Force officers, academic courses in the Department of Aerospace Studies are open to all students at Cornell without incurring any military obligation.

**Four-Year Program**

The Four-Year Program is open to all qualified freshmen. Sophomores may also enter a condensed version of the four-year program in coordination with the AFROTC staff.

Veterans of the U.S. armed forces, students entering Cornell from military schools, or high school students with documented JROTC or Civil Air Patrol involvement may receive advanced academic standing, subject to approval by the Professor of Aerospace Studies.

The Four-Year Program consists of General Military Courses (GMC) and Professional Officer Courses (POC). For four-year scholarship cadets, the first year of the GMC carries no military commitment, and students may withdraw at any time. For nonscholarship cadets, both years of the GMC carry no military commitment, and students may withdraw at any time.

### General Military Course

Students in General Military Courses (GMC) take a 1-credit Aerospace Studies course each semester. During the freshman year, the student examines the organization and mission of the United States Air Force and the environment of the Air Force officer. In the sophomore year, the student studies the history and development of American air power. In both years, officership and professionalism within the United States Air Force are emphasized.

Students also spend two hours a week in a leadership laboratory. Leadership laboratories provide cadets with an opportunity to put into practice the skills they have learned in their aerospace studies classes. These laboratories focus on the development of officer qualities through activities such as drill and ceremonies, group leadership problems, confidence-building exercises, and guest lecturers. Typically, all students participate in summer field training for four weeks between their sophomore and junior years; some students may complete field training between their junior and senior years.

### Professional Officer Course

The Professional Officer Courses (POC) provide a two-year advanced program of instruction. Students who are accepted for the POC must have successfully completed or validated the basic course and must meet academic and physical standards. Each cadet accepted into the POC must sign an agreement to complete the program and accept, if offered, a commission in the United States Air Force upon graduation.

Classroom study in the POC is a 3-credit course each semester. In the junior year, cadets study Air Force leadership and management at the junior officer level. During the senior year, cadets study the elements of national security and the military's role in American society. Leadership laboratory requires two hours a week in the junior and senior years. In leadership laboratory, cadets are exposed to advanced leadership experiences and apply principles of leadership learned in the classroom.

### Two-Year Program

The Two-Year Program consists of the last two years (Professional Officer Courses) of the regular Four-Year Program plus a five-week summer training course.

The Two-Year Program is open to all qualified students with two years of academic study remaining at Cornell (graduate or undergraduate) or at schools supported under a crosstown agreement. Availability of this program depends on the cyclical accession needs of the Air Force; therefore, interested students should contact the Unit Admissions Officer for current information.

### Scholarships

The Air Force offers three- and four-year scholarships to high school seniors and one-, two- and three-year scholarships to college students. Four-year scholarships are offered on a competitive basis to high school seniors. Scholarship information can be obtained from a high school guidance counselor, from Air Force ROTC officers at Cornell (AFROTC phone number is 255-4004), from a local Air Force recruiter, via the web at [www.afrotc.com](http://www.afrotc.com), or from the Air Force ROTC scholarship section, Maxwell AFB, AL 36112-6106, 334-953-2869. The deadline for submitting a four-year scholarship application is December 1 of the year preceding the academic year in which a student wants to enter the program. Students should apply early.

#### Scholarships for two and three years.

Applications for these scholarships should be made to the Professor of Aerospace Studies during the freshman, sophomore, or junior years of college. All selections are based on the student's major, scores achieved on the Air Force Officer Qualifying Test, the student's overall grade point average, and the recommendation of the Professor of Aerospace Studies. Scholarships include amounts ranging from \$3,000 per year to full tuition and fees. There is a monthly \$300-\$450 nontaxable allowance during the school year. A \$600 per year textbook allowance is included in every scholarship. Scholarships do not include the cost of room and board. All AFROTC scholarships are merit-based, not need-based.

### Fees

An initial uniform deposit of \$50 is required on entry into AFROTC. Before commissioning, cadets may purchase uniforms with their deposit or return uniforms and receive their deposit back.

### Benefits

All cadets in the advanced program (POC)—whether they are on scholarship or not—receive a \$400-\$450-a-month, nontaxable subsistence allowance during the academic year. During the four- or five-week summer field training (see below), each cadet receives a pay allowance plus an allowance for travel to and from the field site. Textbooks and supplies required for Department of Aerospace Studies courses are provided.

All cadets are eligible to participate in AFROTC-sponsored field trips made to Air Force bases throughout the country as well as voluntary summer programs for professional development. Scholarship and advanced cadets (POC) are entitled to space-available travel on Air Force aircraft flying within the continental United States.

### Field Training

Two types of field training are available: a four-week course for cadets in the Four-Year Program and a six-week course for Two-Year Program applicants.

Field training is designed to stimulate the development of military leadership skills through meaningful experiences. The curriculum consists of aircraft, aircrew, and survival orientation; junior officer training; physical training; small arms training; team building and leadership training. The six-week training program includes 60 hours of

Air Force ROTC academic course work that substitutes for the freshman and sophomore Aerospace Studies courses. Cadets are evaluated for their officer potential at field training.

Cadets may also volunteer for one of many Advanced Training Programs. These programs include but are not limited to the Air Force Academy Free-Fall Parachute Training, Technical Research and Development Internships, the Academy Soaring Program, Army Airborne Training, and language and cultural immersion programs.

### Commissioning Obligations

All students who successfully complete the AFROTC advanced program (POC) must be awarded a baccalaureate degree and then tendered a commission, and enter the Air Force as second lieutenants.

Second lieutenants commissioned in nonflying categories are required to serve on active duty for four years. Pilots are required to serve on active duty for 10 years after completing flying training. Navigators and Air Battle Managers serve eight and six years, respectively, after completing training.

### Air Force Careers

The Air Force assigns new officers to a career field based on mission requirements, educational background, and officers' preferences. Students in the engineering-scientific category may be assigned to practice in their specialty in research and development, communications, electronics, aeronautics, astronautics, the biological sciences, computer design and maintenance, meteorology, space, or other engineering and scientific fields. Graduates in the nontechnical category can anticipate assignments in manpower management, information management, logistics, law enforcement and investigation, intelligence, personnel, public affairs, transportation, accounting and finance, and other career fields. Specializations for language and cultural studies majors are also available.

Any undergraduate major is suitable for those who are qualified and interested in entering the space and missile career fields or in becoming pilots, navigators, or air battle managers. After completion of flying training, personnel are assigned to a specific type of aircraft.

### Curriculum

Students in the Four-Year Program are required to take all courses listed below. Students in the Two-Year Program are required to take all of the courses listed for the junior and senior years. There are no prerequisites for any Aerospace Studies courses.

#### Freshman Year

#### **AIR S 161(1161) The Foundations of the United States Air Force I**

Fall. 1 credit. Instructor TBA.

This is a survey course designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer career opportunities, war and the American military, and Air Force heritage.

Leadership Laboratory is mandatory for AFROTC cadets and complements this course by providing cadets with followership experiences.

**AIR S 162(1162) The Foundations of the United States Air Force II**

Spring. 1 credit. Instructor TBA.

Continuation of AIR S 161. Topics include Air Force core values, human relations, team building, communication skills, and officer leadership.

**Sophomore Year**

**AIR S 211(2211) The Evolution of USAF Air and Space Power I**

Fall. 1 credit. Colonel P. Gray.

This course is designed to examine general aspects of air and space power through a historical perspective. The course covers a time period from the first balloons and dirigibles to the role of air power in Afghanistan. Historical examples are provided to illustrate the development of Air Force capabilities and functions to demonstrate the evolution of what has become today's USAF air and space power. The course examines several fundamental truths associated with war in the third dimension, and provides students with an understanding of the general element and employment of air and space power from an institutional, doctrinal, and historical perspective. In addition, students continue to discuss the importance of the Air Force core values.

**AIR S 212(2212) The Evolution of USAF Air and Space Power II**

Spring. 1 credit. Colonel P. Gray.

Continuation of AIR S 211.

**Junior Year**

**AIR S 331(3331) Air Force Leadership Studies I**

Fall. 3 credits. Instructor TBA.

This course is a study of leadership required of an Air Force junior officer; it has applicability to any entry-level professional as a junior executive. The course investigates theories and styles of leadership, power and influence, the meaning and function of followership in the military context, critical thinking, problem solving and team building, group conflict management, situational leadership, and management functions and principles. Films and case studies are used for analysis of theories and principles studied. Students receive instruction and practice effective writing (e.g., background and position papers) and briefing skills (e.g., informative and advocacy briefings) for professional communications; students practice both modes of communication. The course also provides professional officer education in terms of defining professional and unprofessional relationships, working with civilian personnel, and the profession of arms. The course is open to any student. For officer candidates, a mandatory leadership laboratory complements this course.

**AIR S 332(3332) Air Force Leadership Studies II**

Spring. 3 credits. Open to any student. Instructor TBA.

A continuation of AIR S 331. The course investigates advanced skills in leadership: dynamic subordination; effective supervision; essentials of counseling; corrective supervision; professional authority, responsibility, and accountability. The course

also investigates the meaning and application of ethical and moral leadership, professional officer ethics, military ethics in joint operations, and the core values of the USAF. Film and case studies are used for analysis of course content. Written and briefing practice continues. For officer candidates, a mandatory leadership laboratory complements this course.

**Senior Year**

**AIR S 401(4401) National Security Affairs/Preparation for Active Duty I**

Fall. 3 credits. M. Whitten.

This course is concerned with the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Other topics include the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Continued emphasis is given to refining communication skills. A mandatory leadership laboratory complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles described in this course.

**AIR S 402(4402) National Security Affairs/Preparation for Active Duty II**

Spring. 3 credits. M. Whitten.

Continuation of AIR S 401.

**Leadership Laboratory Courses**

All Air Force cadets spend two hours a week throughout the academic year in a leadership laboratory, for which no academic credit is given. Occasionally laboratories are held at times other than the normally scheduled period. All cadets are expected to participate in a formal dinner and to meet minimum physical fitness and weight standards each semester. Leadership lab is open to students qualified to compete for an Air Force commission.

**AIR S 141-142(1141) Initial Military Experiences**

Fall and spring. 0 credits. Required. S-U grades.

Introduction to the responsibilities, life, and work of an Air Force officer. Basic knowledge of drill and ceremonies, military courtesies, and the wearing of the uniform. This course includes a field trip to a local military installation.

**AIR S 241-242(2241) Intermediate Military Experiences**

Fall and spring. 0 credits. Required. S-U grades.

Designed to help students develop skill in giving commands for drill and ceremonies. Students are also introduced to the Air Force base environment in which the officer functions. Career areas available based on academic majors are described. Students participate in military drills and ceremonies and go on a field trip to a local military installation.

**AIR S 341-342(3341) Junior Officer Leadership Experiences**

Fall and spring. 0 credits. Required. S-U grades.

Cadets assume leadership responsibilities similar to those of a junior officer. Emphasis is on the importance of applying effective human relations skills in dealing with superiors, peers, and subordinates. Cadets also gain insight into the general structure

and progression patterns of selected Air Force officer career fields.

**AIR S 441(4441) Advanced Leadership Experiences**

Fall. 0 credits. Required. S-U grades.

Cadets assume command leadership responsibilities to operate a military organization. Cadets apply effective leadership and managerial techniques with individuals and groups and participate in self-analysis of leadership and managerial abilities.

**AIR S 442(4442) Precommissioning Laboratory**

Spring. 0 credits. Required. S-U grades.

Factors that facilitate transition from civilian to military life are reviewed. The need for military security, base services and activities, personal finances, travel regulations, and social obligations are introduced.



## DEPARTMENT OF PHYSICAL EDUCATION AND ATHLETICS

### ADMINISTRATION

Alan E. Gantert, director

### COURSES

The courses and fees described in this catalog are subject to change or cancellation at any time by official action of Cornell University. For current fee information on physical education courses, call 255-4286; for outdoor education courses, call 255-6183 or visit [www.coe.cornell.edu](http://www.coe.cornell.edu).

Enrollment in any course is limited by the space available. Other restrictions are included in the course description. Most courses are coeducational. The specific time and place of class meetings, as well as information about fees, are available at the physical education course registration or may be found on "Bear Access," a package of software for accessing a variety of network services at Cornell. Course fees are billed through the Office of the Bursar.

Additional course offerings may be listed at registration, as the curriculum is frequently reviewed and changed. Drop deadlines for outdoor education courses are earlier than university deadlines, and often earlier than physical education deadlines. Cornell Outdoor Education (COE) courses may be added any time by calling 255-6183, or registering at [www.coe.cornell.edu](http://www.coe.cornell.edu).

### Aquatic Courses

#### PE 1100 Swimming, Introduction to

Fall, spring, and summer (six weeks). Instruction and practice in skills leading to passing the basic swimming proficiency test.

#### PE 1101 Swimming, Advanced Beginning

Spring. Ideal for all who have taken one semester of Beginning Swimming, regardless of whether the test was successfully completed. Areas of special emphasis are the crawl stroke and rotary breathing, back crawl, elementary backstroke, diving, treading water, and underwater swimming. The primary objective is to strengthen the student's confidence and competence.

#### PE 1102 Swimming, Intermediate

Fall and spring. Practice of basic skills and five basic strokes: front crawl, back crawl, elementary backstroke, breaststroke, sidestroke.

#### PE 1103 Swimming, Advanced

Fall and spring. Practice of nine strokes: front crawl, back crawl, elementary backstroke, breaststroke, inverted breaststroke, sidestroke, overarm sidestroke, trudgeon, and butterfly.

#### PE 1104 Swimming Conditioning

Fall and spring. Prerequisite: reasonable swimming ability. Introduction to, and practice of, different training methods. Final objective: to swim

2,500 yards during class period. Primarily a conditioning and not an instructional course.

#### PE 1110 Lifeguard Training

Fall and spring. Fee charged. Prerequisite: swimming test consisting of 500 yards, demonstrating three strokes, treading water without the use of hands, and retrieving a brick from 7 feet of water. Three classes per week.

American Red Cross certification course. Practice and execution of lifeguarding first aid and CPR skills and techniques. Certification is awarded in lifeguarding, first aid, O2, AED, and CPR upon satisfactory completion of the course.

#### PE 1111 Lifeguard Training Instructor

Spring. Fee charged. Prerequisites: current Red Cross ICT or instructor card, written and skill tests in lifeguarding, first aid, and CPR techniques. Students must not miss first class. 2 classes a week.

American Red Cross lifeguarding instructor and CPR-FPR certifications are awarded upon successful completion.

#### PE 1120 Water Safety Instructor

Spring. Fee charged. Prerequisite: passing of written and skill water tests given on first day.

American Red Cross water safety instructor certification is awarded upon satisfactory completion of the course. This is not a course for a casual participant. Approximately 45 hours of work is required.

#### PE 1130 Scuba, Open-Water

Fall, spring, and summer (six weeks). Fee charged.

Program includes classroom work, skill training in a pool, and open-water training in Cayuga Lake. P.A.D.I. open-water certification awarded upon successful completion.

#### PE 1131 Scuba, Advanced Open-Water

Fall and spring. For those who have completed open-water course. Fee charged.

Advanced-level open-water training in Cayuga Lake.

#### PE 1132 Rescue Diver

Fall and spring. For those who have completed Advanced Open-Water Scuba certification. Fee charged.

Advanced course for scuba divers interested in learning rescue and safety techniques.

#### PE 1133 Dive Master

Fall and spring. Open only to those who have completed Rescue Diver course. Fee charged.

Advanced-level scuba course. Note: This is a long, time-consuming course, which requires the student to be in good physical and swimming shape.

#### PE 1134 Specialty Scuba Diving

Fall and spring. Fee charged. Courses offered in the following specialty diving areas: navigation, search and recovery, night diving, deep diving, underwater photography, wreck, multi-level, boat, tropical fish identification and buoyancy control, and underwater naturalist.

#### PE 1135 Scuba Diving Trips

Spring, offered during spring intersession period. Fee charged.

Scuba trips to various destinations such as the Bahamas. Locations change from year to year. See the information sheet at the registration table.

### Bowling Courses

#### PE 1300 Bowling

Fall and spring. Fee includes shoe rental. For the beginning and intermediate bowler.

#### PE 1301 Intermediate Bowling

Fall and spring. Fee charged. For players with previous bowling experience (e.g., bowling classes, yaba, tournament). Skills emphasized are timing, balance, and release.

### Dance Courses

Develop flexibility, coordination, and the ability to perceive and reproduce phrases of dance movement with rhythmic accuracy, clarity of body design, and fullness of feeling. Auditions are required for admission to all advanced courses, since they require the mental and physical ability to perform more complex phrases in various styles.

#### PE 1150 Ballroom Dancing

Fall, spring, and summer. Fee charged.

Students and their partners must sign up at course registration.

Includes instruction in the waltz, swing, cha cha, calypso, tango, and others.

#### PE 1155 Belly Dancing I

Fall and spring. Fee charged.

Belly dancing is an exciting Middle Eastern folk art that can help in the development of flexibility, body awareness, and overall body tone. The class begins with warm-ups and continues with basic movements and rhythms, then puts them together in a dance to music of the Middle East.

#### PE 1156 Belly Dancing II

Spring. Fee charged.

Advanced belly dance movements and combinations that include putting basic and advanced movements to the Beledi, Masmouodi, and Karsilma dance rhythms of the Middle East. A drum solo, taqsim (fluid, graceful movements of the arms and hands), floor work (level changes with the dance), and techniques in playing finger cymbals are also a part of this class.

#### PE 1160 Latin Dance

Fall and spring. Fee charged.

Partner sign-in required. This is an introductory course that teaches salsa, mambo, Latin, and meringue. Emphasis on listening, feeling, and expressing Latin rhythms with precise detail and technique.

#### PE 1161 Latin-Israeli Dance

Fall and spring.

Covers some of the hundreds of dances that make up Latin-Israeli dancing and the thousands of dances that make up Israeli dancing, with a clear emphasis on the dances of the past 10 years.

**PE 1170 Introduction to Swing Dance**

Fall and spring. Fee charged.  
No partners are needed. Beginners can expect to develop significant capacity for enjoyment of two forms of swing dance: jitterbug and street boogie. Partners are rotated throughout the course. Effort are made at registration to equalize male and female ratios.

**PE 1171 Swing Dance II**

Fall and spring. Fee charged.  
Those who have taken the introductory course.

**PE 1180 Dance Technique I (also THETR 124[1240])**

Fall and spring.

**First Aid/CPR Courses****PE Emergency Response**

Fall. Fee charged.  
This advanced-level first aid course is the most comprehensive available without NYS certification. Sixty hours of training includes CPR for the Professional Rescuer and oxygen administration, as well as many of the first aid skills taught in a basic EMT class. American Red Cross certification is valid throughout the United States and is accepted by many states as a Certified First Responder equivalent. Certification is valid for three years. This certification would be appropriate for camp medical directors and those who work closely with pre-hospital medical staff.

**PE 1210 NYS Emergency Medical Technician—Basic**

Two-semester course. Fee charged.  
Intensive 130-hour course taught throughout both the fall and spring semesters. Includes training in CPR for the Professional Rescuer, oxygen administration, airway management, fracture management, bleeding control, expanded patient assessment, spinal immobilization, medical anti-shock trousers, and defibrillation. Students qualify for the NYS EMT Certification Exam upon successful completion of this course. Rigid attendance and participation requirements are strictly enforced.

**PE 1211 NYS Emergency Medical Technician—Critical Care**

Two-semester course. Prerequisite: current certification as NYS EMT. Fee charged.  
Intensive 160-hour course taught throughout both fall and spring semesters. Includes training in CPR for the Professional Rescuer, oxygen administration, airway management, fracture management, bleeding control, expanded patient assessment, spinal immobilization, medical anti-shock trousers, manual defibrillation, EKG interpretation, pharmacology, and IV administration. Clinical rotations, in the field and hospital, are also required. Students qualify for the New York State AEMT-CRITICAL CARE certification exam upon successful completion of the course. Attendance and participation requirements are strictly enforced.

**Fishing Courses****PE 1310 Introduction to Freshwater Angling**

Fall. Fee charged.  
Acquaints the student with freshwater spinning, casting, and fly fishing equipment; tackle; and techniques through on-the-water experiences. It also seeks to promote an awareness of the angling opportunities that exist close to Cornell and in the Finger Lakes

region of New York. The course consists of an orientation and outings to various locations around the area such as Cayuga Lake and the Susquehanna River.

**PE 1311 Fly Fishing and Basic Flytying Techniques, Level I**

Fall and spring. Fee charged.  
Learn the art of tying several of your own artificial flies while you learn the art of fly casting. Students must have a valid NYS fishing license and their own wader boots. All other materials provided.

**Fitness Courses****PE 1129 Cardio Combo**

Fall, spring, and summer (six weeks). Fee charged.  
Dance program designed to keep the cardiovascular system in top shape by making the body demand increased amounts of oxygen.

**PE 1130 Cardio Crazy**

Fall and spring. Fee charged.  
Designed to acquaint the student with the various types of indoor aerobic training equipment, rowing machines, tread mills, stair machines, exercycles, and Nordic Tracks, and to teach them to design a personal fitness program incorporating the equipment.

**PE 1231 Aerobic Instructor**

Fall. Fee charged.  
Helps prepare the student to teach aerobics and prepares them for the AFAA Primary Aerobic Instructor or Step Certification. Topics include the theory behind all basic components of a good class, applications, and practical uses in the class settings.

**PE 1233 Bootcamp**

Fall and spring. Fee charged.  
Designed as a modern military-style workout program with an emphasis on both aerobic and anaerobic fitness.

**PE 1234 Athletic Performance Enhancement**

Fall and spring. Fee charged.  
Train like an athlete! Workouts are designed to enhance all aspects of athletic performance: strength, power, speed, balance, force application, dynamic flexibility, anaerobic, and aerobic conditioning.

**PE 1235 8 O'Clock Rock**

Fall and spring. Fee charged.  
Combines the best of the principles of weight training and cardio training.

**PE 1240 Pilates Mat Work**

Fall and spring. Fee charged.  
Conditioning program designed to increase body awareness, improve alignment and breathing, and build endurance, flexibility, coordination, and strength through a highly focused flow of movement.

**PE 1245 Spinning**

Fall and spring. Fee charged.  
Indoor stationary cycling class that combines basic cycling movements with motivational coaching, breathing awareness, and heart rate training.

**PE 1246 Spinning Instructor**

Fall. Fee charged.  
Prepares students for the Johnny G spinning Certification. The course is intended to provide the fundamental theoretical knowledge and the practical skills necessary

to assume the role of a certified spinning program instructor.

**PE 1261 Fitness and Conditioning**

Fall and spring.  
Physical fitness program that embodies features of stretching exercises, weight lifting, and jogging. Students work on their individual training needs.

**PE 1265 Wellness and Fitness**

Fall and spring. Fee charged.  
"Here's to a Healthier You"—a wellness experience for the busy student. This course assesses the student's physical fitness status, blood-cholesterol levels, and overall lifestyle health habits. Each student receives an individual exercise prescription and has access to the Wellness Program fitness room in Helen Newman Hall. Lectures on nutrition and stress management are also presented. This course has been made possible through the generosity of the Bateman family in memory of Ms. Dorothy Bateman, Cornell's first director of women's sports and physical education (1920 to 1962).

**PE 1270 Jogging**

Fall and spring.  
Covers running and stretching techniques. It comprises a conditioning program with the objective to develop the capacity to run 3 miles after 12 weeks of training.

**PE 1271 Jogging Tours—Distance Running**

Fall and spring.  
Designed for the intermediate runner who can run an average of 3 miles in 30 minutes. Most tours are 3-4 miles long and go through campus and nearby countryside.

**PE 1275 Triathlon**

Fall and spring.  
Designed to acquaint students with the components of, and conditioning for, triathlon (running, swimming, and bicycling).

**Equitation Courses****PE 1305 Basic, Intermediate, Advanced**

Fall, spring, and summer (six weeks). Fee charged.  
All riding classes are held at the Cornell Equestrian Center located on Pine Tree Road near East Hill Plaza. Detailed information will be offered by the equitation staff at the registration sign-up table. Basic—never ridden; Intermediate I—completed basic with knowledge of walk/trot/canter; Intermediate II—walk/trot/canter with control over two-foot-high jumping course; Advanced—strong jumping/dressage skills with experience hunting/showing/eventing. Students must fill out a release form to participate in any riding class.

**Golf Courses****PE 1320 Golf, Introduction to**

Fall and spring. Fee charged. Equipment furnished.  
PGA program of instruction geared to all levels of experience and ability. The objective is to give beginners enough skill to play, and to give more advanced players direction in their thinking, practice, and play, through a thorough understanding of fundamentals.

**PE 1321 Golf, Recreational**

Fall and spring. Prerequisite: experienced golfers. Fee covers a semester's membership. Students must provide clubs. Students must play a minimum of 10 rounds of nine holes to receive credit.

**Gymnastics Courses****PE 1290 Introduction to Gymnastics**

Fall and spring. Open to both male and female participants. Deals with a majority of the Olympic events. Focuses on beginner-level skills.

**Ice Skating Courses****PE 1540 Introduction to Skating**

Fall and spring. For beginning to intermediate skaters. Fee charged; students provide skates or rent them at Lynah Rink. Covers forward and backward skating, turns, and stops.

**PE 1546-1547 Figure Skating, Beginning, Intermediate, and Advanced Levels**

Fall and spring. Fee charged; students provide skates or rent them at Lynah Rink. Instruction and practice in basic figure-skating techniques: forward, backward, crossovers, turns, and spirals.

**Martial Arts—Self-Defense Courses****PE 1345-1346 Boxing, Introduction to, Intermediate**

Fall and spring. Fee charged. Covers the basic skills of footwork, defensive, and offensive techniques. Skipping rope, shadow boxing, and heavy bag work are taught as methods for individual aerobic conditioning.

**PE 1350 Chi Gong**

Fall and spring. Chi Gong, or "the art of breathing," is an ancient Taoist exercise system from China. Like Tai Chi, Chi Gong is an internal martial art that links movement, breathing, and visualization to enhance physical strength and mental clarity. In ancient times, this gentle system was used by warriors preparing for battle. They believed it would make their bodies impervious to weapons of the day. The movements used in Chi Gong are generally less complex than those of Tai Chi and can be learned more quickly. Meditation is an important element of the practice.

**PE 1355 Judo, Introduction to**

Fall and spring. Fee charged. Conditions and increases suppleness. Continues to develop skills in the two parts of judo: standing techniques (throws and trips) and mat techniques.

**PE 1356 Judo, Intermediate**

Fall and spring. Fee charged. Conditions and increases suppleness. Continues to develop skills in the two parts of judo: standing techniques (throws and trips) and mat techniques.

**PE 1360 Jun Fan/Jet Kune Do**

Fall and spring. Fee charged. Blended system of martial arts. Developed by the late Bruce Lee and taught to his personal apprentice at the time, Dan Inosanto, Jun Fan Gung Fu is the foundation from which Jeet Kune Do eventually evolved. The system emphasizes footwork and agility, economy of motion, counter ability, and strong practical self-defense. This realistic, modern training

approach cultivates strong physical, mental, and emotional development in the student.

**PE 1365 Karate, Introduction to**

Fall and spring. Fee charged. Beginning course taught by professional black-belt instructors. Involves mastery of basic blocks, kicks, and punches.

**PE 1366 Karate, Advanced**

Fall and spring. Fee charged. Open to those who have taken basic karate or the equivalent.

**PE 1370 Kung Fu**

Fall and spring. Fee charged. Explores conditioning and fitness procedures used in the major martial arts, such as karate or judo. Covers circular movement for generating strong blocks, kicks, and punches.

**PE 1375 Tae Kwon Do, Introduction to**

Fall and spring. Fee charged. Korean martial art distinguished by emphasis on high and powerful kicks. Basic kicking, punching, and blocking emphasized.

**PE 1376 Tae Kwon Do, Intermediate**

Fall and spring. Fee charged. Korean martial art distinguished by its emphasis on high and powerful kicks. Intermediate-level kicking, punching, and blocking are emphasized.

**PE 1377 Tae Kwon Do, Advanced**

Fall and spring. Fee charged. A Korean martial art distinguished by its emphasis on high and powerful kicks. Advanced-level kicking, punching, and blocking are emphasized.

**PE 1380-1381 T'ai Chi Chuan, Introduction to, and Intermediate**

Fall and spring. Fee charged. Introduction to T'ai Chi, a system of graceful exercises that aims at nurturing relaxation, deep breathing, and improved circulation.

**PE 1385 Thai Boxing**

Fall and spring. Fee charged. Martial art system developed from the unique culture of Thailand that is a blend of art, science, and sport.

**PE 1390 Self-Defense and Empowerment for Women**

Fall and spring. Fee charged. Basic methods of physical protection for women.

**PE 1395 Self-Defense and Personal Safety in the Modern World**

Fall and spring. Fee charged. Provides students an opportunity to learn a system of practical, proven self-defense techniques and educates the individual in the strategies of personal safety and awareness.

**PE 1520 Fencing, Introduction to**

Fall and spring. Fee charged. Equipment furnished. Includes warm-up exercises and offensive and defensive moves.

**PE 1521 Fencing, Intermediate**

Spring. Prerequisite: Introduction to Fencing or equivalent. Fee charged. Equipment furnished. Interclass competition is stressed.

**PE 1525 Fencing, Classical**

Fall and spring. Fee charged. Martial art that uses the practice of the sword to cultivate self-mastery.

**PE 1526 Renaissance Fencing**

Fall and spring. Prerequisite: Introduction to Fencing or permission of instructor. Fee charged.

Focuses on the fundamental techniques of 16th- to 17th-century fencing with an emphasis on safety, balance, line, focus, and distance.

**Outdoor Education Program**

For further information, class schedules, or to register at any time, call 255-6183 or visit [www.coe.cornell.edu](http://www.coe.cornell.edu).

**Climbing Courses****OUTED 1640 Basic Rock Climbing**

Fall, spring, and summer. Fee charged. Six indoor climbing sessions at the Lindseth Climbing Wall.

**OUTED 1642 Women's Basic Rock Climbing**

Fall, spring. Fee charged. Six indoor climbing sessions at the Lindseth Climbing Wall taught by and for women.

**OUTED 1643 High Adventure**

Fall, spring. Fee charged. Six sessions combining classes at the Lindseth Climbing Wall and the Hoffman Challenge Course.

**OUTED 1644 Basic Outdoor Rock Climbing**

Fall. Fee charged. Includes fall break trip. Two indoor classes and a four-day climbing trip to the Shawangunks introduce basic safety, techniques, equipment, and methods for outdoor rock climbing.

**OUTED 1645 Basic Rock Climbing for 24 and Over**

Fall. Fee charged. Noncredit course. Four indoor climbing sessions at the Lindseth Climbing Wall for people age 24 and older.

**OUTED 1646 Wellness Rock Climbing**

Fall, spring. Fee charged. Noncredit course. Nine one-hour climbing sessions at the Lindseth Climbing Wall for Wellness Program members only.

**OUTED 1650 Performance Rock Climbing**

Fall, spring. Fee charged. Six indoor sessions at the Lindseth Climbing Wall that introduce and practice more advanced climbing techniques.

**OUTED 1651 Intermediate Outdoor Rock Climbing**

Fall, spring. Fee charged. Two indoor classes and two weekend trips to the Shawangunks introduce intermediate-level climbing techniques and systems for top-rope anchors.

**OUTED 1652 Shawangunks Rock Climbing**

Fall, spring. Fee charged. Includes fall-break or senior-week trip. Two indoor classes and a four-day advanced climbing camp at the Shawangunks introduce advanced climbing techniques and systems for outdoor multi-pitch rock climbing.

**OUTED 1654 Ice Climbing**

Spring. Fee charged. Basic top-rope ice climbing instruction, including a weekend trip.

**OUTED 1655 Gunks Bouldering**

Fall. Fee charged. In recent years bouldering, or climbing near the ground without ropes or harnesses, has

become a sport unto itself. Bouldering is easy to learn, requires very little gear, and is amazingly addictive. Gunks Bouldering will introduce you to the basics of climbing low: locations, spotting, safety, and all those hard-earned climbing tips and tricks that make the impossible possible. We will spend one day at the climbing wall, then head out for a weekend of climbing and camping. Reserve the following weekend in case of rain!

#### **OUTED 1657 Tree Climbing**

Fall. Fee charged. All equipment is included in the course fee. No experience necessary.

Whether you are a rain forest canopy researcher, an arborist, or just a kid at heart, everyone loves to climb trees. Recall the excitement and your sense of adventure when you first crawled into the branches to look inside a bird's nest. Then you swung from limb to limb without a thought of ropes and harnesses. But what about that big tree down the street you always wanted to climb, but couldn't reach the first branch? Cornell Outdoor Education's Tree Climbing course will teach you how to get up into the canopy of any tree, to move around, even to climb from one tree to another without touching the ground.

### **Backpacking Courses**

#### **OUTED 1606 Trail Maintenance**

Fall, spring. Free with 100 percent attendance, otherwise fee charged. Fee charged for personal rental equipment.

Learn basic trail construction and outdoor living skills on local outings and overnights. Projects may include designing and creating new trails, switchback construction, bridge building, water bar construction, and erosion control. Course includes day outings and one weekend trip.

#### **OUTED 1610 Backpacking the Finger Lakes**

Fall, spring. Free with 100 percent attendance, otherwise fee charged.

Escape from campus on day outings and two weekend trips to explore the glens, forests, waterfalls, vistas, and trails in the local area. This fantastic introduction to backpacking skills covers basic outdoor living skills, including hiking, navigation, camping, equipment selection and use, backcountry cooking, and safety. No experience necessary. Fee charged for personal rental equipment.

#### **OUTED 1611 Southwest Backpacking**

Spring. Fee charged. Includes spring break trip.

Spend spring break exploring the wide open spaces of the Southwest. Destination changes year to year. Trip heads to either Utah's stunning and remote Escalante Canyon country or Arizona's Sonoran Desert wilderness of the Superstition Mountains. Visit [www.coe.cornell.edu](http://www.coe.cornell.edu) for trip destination and full details.

#### **OUTED 1619 Adirondack Winter Camping**

Spring. Fee charged. Includes winter break trip. Prerequisite: some backpacking experience; permission of instructor.

Learn the fundamentals of winter travel and camping. Course covers trip planning, equipment selection, snowshoe travel, snow shelter construction, and winter safety. A four-day trip to the Adirondacks at the end of winter break includes a peak ascent attempt.

### **Biking Courses**

#### **OUTED 1664 Mountain Biking**

Fall, spring. Fee charged. Participants provide own mountain bike.

Explore local bike trails and develop off-road riding skills. Course covers essential cycling skills for riding single track, managing steep terrain, and negotiating obstacles, as well as bike repair, riding etiquette, navigation, and outdoor safety.

#### **OUTED 1665 Mountain Biking in Vermont**

Fall. Includes fall break trip. Fee charged. Participants provide own mountain bike and helmet.

Develop and hone skills for riding a variety of trails, ranging from moderate fire roads to technical single track.

### **Canoeing Courses**

#### **OUTED 1670 Adirondack Canoe Camping**

Fall. Fee charged. Includes fall-break trip. Learn basic canoeing and wilderness camping skills. Experience the blazing Adirondack autumn foliage as this fall-break trip explores lakes and rivers of upstate New York.

#### **OUTED 1684 River Canoeing**

Spring. No prerequisites. Fee charged.

Explore local rivers by canoe. Learn skills to safely navigate quick-moving currents and class I to easy class II water. Course covers strokes, braces, eddy turns, peel outs, ferrying, river dynamics, self-rescue, and river safety. Culminates with a weekend river trip.

### **Caving Courses**

#### **OUTED 1630 Caving**

Fall, spring. Fee charged.

Learn about the basic safety, techniques, and equipment for caving, finishing with a weekend caving trip.

### **Hiking Courses**

#### **OUTED 1605 Day Hiking**

Fall, spring. Fee charged.

Hike and explore Ithaca's spectacular gorges, state forests, and extensive trail system. Course covers planning and packing for a hike, dressing for the outdoors, map reading, outdoor safety, navigation, and natural history of the area.

#### **OUTED 1607 Snowshoeing**

Spring. Fee charged.

Outings in the local state forests build skills and confidence in the winter. Learn winter safety; snowshoe history; equipment selection, care, and use; navigation; and natural history—all while enjoying a great workout.

#### **OUTED 1608 Trail Running**

Fall, spring. Fee charged.

Covers stretching, basic trail-running techniques, navigation, injury prevention, training tips, and a scenic tour of local trails. Develop a training routine, learn to stay found, set running goals. Prerequisite: ability to jog two consecutive miles easily.

#### **OUTED 1609 Snowshoeing, for 24 and Over**

Spring. Fee charged. Noncredit course.

Learn basic winter travel and snowshoe skills while exploring some local winter hiking destinations.

#### **OUTED 1612 Wilderness Survival Skills**

Fall. Fee charged.

Hands-on course covers principles of survival, shelter building, navigation, fire starting, and water procurement as well as nature observation skills and local natural history. Evening and weekend outings.

### **Kayaking Courses**

#### **OUTED 1674 Sea Kayak Touring**

Fall, spring. Fee charged.

Learn basic sea kayaking skills and enjoy a weekend trip to the Adirondacks. Course covers equipment, safety, paddling techniques, rescues, trip planning, navigation, considerations for overnight trips, and camping and travel skills.

#### **OUTED 1680 Pool Paddling**

Fall, spring. Free with 100 percent attendance, otherwise fee charged.

Learn a broad range of kayaking skills in the warm comfort and calm waters of the pool. Course introduces whitewater kayaks, canoes, and sea kayaks, while covering strokes, leans, braces, effective boat-handling skills, kayak Eskimo rolls, and rescues. Pool games, slalom gate courses, and video taping are used to hone an understanding of skills and refine techniques.

#### **OUTED 1681 Whitewater Kayaking**

Fall, spring, summer. Prerequisite: ability to swim with comfort in deep water without a flotation aid. Fee charged.

Basic kayaking techniques and equipment use, culminating in a full weekend of whitewater paddling. Pool sessions and local outings develop skills to read water, scout, ferry, brace, power stroke, and execute eddy turns, peel outs, and Eskimo rolls.

#### **OUTED 1682 1,000 Islands Sea Kayaking**

Fall. Fee charged. Includes fall break trip. International travel documentation to Canada required.

Learn fundamental sea kayak touring skills in the Thousand Islands region of the St. Lawrence River. Course covers equipment, safety, paddling techniques, rescues, trip planning, navigation, considerations for overnight trips, camping, cooking, and travel skills.

#### **OUTED 1685 Kayak Rolling Seminar**

Fall, spring. Noncredit course. Fee charged.

Learn kayak rolling techniques in two evening sessions. Classes take place at the Helen Newman pool.

#### **OUTED 1686 Introduction to Sea Kayaking Seminar**

Fall, spring, summer. Fee charged. Noncredit course.

Class covers equipment, basic paddling techniques, deep water rescues, and considerations for day trips.

### **Outdoor Leadership and Teambuilding Courses**

#### **OUTED 1618 Outdoor Leadership**

Spring. Prerequisite: backpacking and camping experience. Fee charged. Includes fall or spring break trip.

Learn and practice the skills of outdoor leadership and education. Focus is on refining wilderness skills, outdoor judgment, group facilitation, decision making, and teaching skills. Course culminates in a fall- or spring-break trip where participants plan and lead portions of the trip.

## First Aid Courses

### OUTED 1620 Wilderness First Aid

Fall, spring, summer. Fee charged.  
Full weekend of wilderness first aid. Includes CPR certification.

### OUTED 1621 Wilderness First Responder

Fall, spring. Offered in Jan., over winter break; offered late May/early June. Fee charged.

Eight days of instruction and practical application of backcountry first aid. Participants earn nationally recognized CPR and Wilderness First Responder certifications. Taught by Wilderness Medical Associates.

## Skiing Courses

### OUTED 1690 Cross-Country Skiing

Spring. Fee charged.  
Four sessions learning basic cross-country skiing skills and exploring trails.

### OUTED 1691 Cross-Country Skiing, for 24 and Over

Spring. Noncredit course.  
Fee charged. Four sessions learning basic cross-country skiing skills and exploring local trails.

### OUTED 1693 Basic Telemark Skiing

Spring. Fee charged.  
Four classes at Song Mountain Ski Area.

### OUTED 1694 Intermediate Telemark Skiing

Spring. Fee charged.  
Four classes at Song Mountain Ski Area.

## Personal Growth Courses

### PE 1400 Body-Mind

Fall and spring.  
Activities are drawn from ancient Eastern practices as well as modern Western psychology, and are designed to give the student first-hand experience of the interaction between their own bodies and minds.

### PE 1401 Mindful Group Movement and Process

Fall and spring. Fee charged.  
Teaches students to use the wisdom of the body, movement, and voice. Each class provides an opportunity to increase mindfulness of the present moment. By cultivating openness and respect, students provide the necessary foundation for working with others. Students practice processing and exploring spontaneous experiences of their own and others with precision, gentleness, and curiosity.

### PE 1405 Living Routines

Fall and spring.  
Provides the opportunity to explore a variety of ancient and modern methods designed to bring one to the state of meditation.

### PE 1410 Introduction to Massage

Fall, spring, and summer. Fee charged.  
Provides an experiential introduction to several types of massage. Included are Swedish, shiatsu, polarity, and sports massage. Class members participate in group exercises and practice on each other during class time. All exercises and techniques can be done while wearing street clothing.

### PE 1411 Shiatsu Massage

Fall and spring. Fee charged.  
Gain an experimental understanding of your body and learn certain shiatsu massage techniques.

### PE 1412 Swedish Massage

Fall, spring, and summer. Fee charged.  
Learn to give a relaxing, stress-reducing Swedish massage. Students master the basic strokes of Swedish massage and learn about their application to the different parts of the body. Students use oils and lotions as a part of their training.

### PE 1413 Swedish Massage II

Fall and spring. Fee charged.  
Students build on skills learned in Swedish massage as they participate in instruction practice sessions every week. Additional massage techniques and applications are added to basic skills. Some techniques from other types of massage are also introduced.

### PE 1414 Thai Massage

Fall and spring. Fee charged.  
Thai massage is a holistic, intuitive style of healing from the East. It encourages the flow of energy through the receiver's body that promotes good health. The person giving Thai massage uses his or her hands and feet supported by body weight to apply pressure along the energy channels that run through the receiver's body.

### PE 1415 Weekend Massage Workshop

Fall and spring. Fee charged.  
This introductory course in massage is taught in an intensive, weekend workshop format. It includes sessions on Friday evening and Saturday and Sunday during the day. Students are introduced to massage skills and techniques and then practice on each other in a structured and supervised format. Basics of touch awareness, palpation skills, and techniques from Swedish and oriental (shiatsu) massage are taught. Students learn to massage the back, shoulders, neck, legs, feet, arms, and hands to reduce stress. Professional massage tables are used.

### PE 1420 Introduction to Meditation

Fall and spring. Fee charged.  
Provides the opportunity to explore a variety of ancient and modern methods designed to bring one to the state of meditation. The methods serve to evoke the deep relaxation from which heightened awareness and creativity arise.

### PE 1421 Relaxation and Stress Management

Fall and spring.  
Introduction to basic relaxation techniques for the reduction of everyday stress. Teaches techniques that can be used in normal everyday living situations.

### PE 1422 Meditation and Relaxation

Fall and spring. Fee charged.  
Designed to assist students in learning to meditate, or to deepen an existing practice. As students learn to practice meditation and relaxation exercises, they find that as little as 15 minutes a day can benefit physical, mental, emotional, and spiritual health.

### PE 1425 The Winning Mindset

Fall and spring. Fee charged.  
Contains a wealth of knowledge and experience to guide athletes of all levels and abilities to achieve outstanding levels of performance. Students learn the principles to help them achieve success, whether it be tapping inner strength or overcoming the obstacles that limit performance.

### PE 1430 Yoga, Introduction to

Fall, spring, and summer (six weeks). Fee charged.  
Fundamentals of hatha yoga. Covers basic postures, breathing techniques, and deep relaxation. Introduces chanting.

## Racquet Sports Courses

### PE 1440 Badminton, Introduction to

Fall and spring. Helen Newman Hall.  
Fundamental shots, scoring, and general play.

### PE 1441 Badminton, Intermediate

Fall and spring. Helen Newman Hall.  
Review of fundamental shots, scoring, and general play.

### PE 1445 Tennis, Introduction to

Fall, spring, and summer. Fee charged.  
Basic skills taught include forehand, backhand, serve, and volley. Scoring methods taught.

### PE 1446 Tennis, Intermediate

Fall, spring, and summer. Fee charged.  
Review basic strokes plus topspin and underspin. Doubles strategy emphasized.

### PE 1447 Tennis, Advanced

Fall, spring. Fee charged.  
Advanced strokes and doubles play emphasized. Recommended for tournament players or those with previous team experience.

### PE 1453 Tennis, Indoor-Recreational

Fall and spring. Fee charged. Prerequisite: high school or college tournament experience or a rating of 3.5 or higher from USTA. NO BLACK-SOLED SHOES ALLOWED ON COURTS!  
Play is conducted at the new Reis Tennis Center. Matches are played in both doubles and singles. Equipment furnished.

### PE 1460 Racquetball, Introduction to

Fall, spring, and summer. Fee charged; equipment furnished. Protective eyewear required.  
Instruction for beginners.

### PE 1465-1466 Squash, Introduction to, Intermediate

Fall, spring, and summer. Fee charged.  
Equipment furnished. Protective eyewear required.  
Classes for appropriate level of play.

## Sailing Courses

### PE 1480 Small-Boat Sailing, Introduction to

Fall, spring, and summer (six weeks). Fee charged.  
Learn basic skills necessary to sail small sailboats and basic keelboats safely.

### PE 1481 Small-Boat Sailing, Competitive

Fall and spring. Fee includes one-year membership in university sailing team program.  
Vanguard 420 sailboat used for the course. USYRA Rules Book used as a text for the course.

### PE 1335 Water Skiing

Fall only. Fee charged.  
Introductory course for beginning water skiers. Classes are conducted from East Shore Marina.

### PE 1482 Introduction to Large-Boat Sailing

Fall. Fee charged.



Students learn how to sail on 24- and 26-foot sailboats. Skills learned include sailing terminology, safety and etiquette, boat handling, sail trimming, use of spinnakers, and heavy wind selection and ship systems.

### **Skiing and Snow Boarding**

#### **PE 1330, 1331 Downhill Skiing and Snowboarding**

Spring. Fee charged.

Transportation, instruction, ski-lift fees, and skiing time are offered in a package deal. Greek Peak and Song Mountain personnel are present at registration to explain the program and accept fees. Bus transportation to Greek Peak is provided six afternoons a week for six weeks.

**Cross-Country Skiing**—See Outdoor Program.

### **Target Shooting Courses**

#### **PE 1500 Archery, Introduction to**

Fall and spring. Fee charged. Two classes a week.

Instruction in the care of equipment; seven basic steps for shooting; scoring; practice shooting at 20, 30, and 40 yards.

#### **PE 1515 Handgun Safety, Introduction to**

Fall, spring, and summer (six weeks). Fee charged.

Instruction in use of pistol in the three modes of 50-foot competitive target shooting—slow fire, timed fire, and rapid fire. Emphasis on safety and responsibility while firing.

#### **PE 1510 Riflery**

Fall and spring. Fee charged.

Instruction and practice in the techniques of target riflery from various shooting positions.

#### **PE 1505 Trap and Skeet**

Fall, spring, and summer (six weeks). Fee charged. Guns and shells furnished.

Includes lectures and shooting at the Tompkins County Rod and Gun Club range.

### **Team Sports Courses**

#### **PE 1550 Ice Hockey, Introduction to**

Fall and spring. Prerequisite: basic skating ability. Fee charged. Students provide own skates and sticks; all other equipment furnished.

Stick handling, passing, and shooting are stressed. Some scrimmaging.

#### **PE 1551 Ice Hockey, Intermediate**

Fall and spring. Fee charged. Prerequisite: beginning hockey or previous participation in organized hockey.

This course is designed for the intermediate hockey player. Advanced techniques taught include positioning, power play, penalty killing, and offensive and defensive attack. Each session emphasizes game situations and scrimmaging. Skates and hockey sticks must be supplied by the participants.

#### **PE 1560 Basketball**

Fall and spring.

Fundamental drills in passing, shooting, and dribbling. Scrimmages each class session.

#### **PE 1565 Soccer**

Fall and spring.

Introduction to the game. Includes basic individual skills (passing, trapping, shooting) and team play and strategy.

#### **PE 1570 Volleyball, Introduction to**

Fall and spring.

Fundamentals of ball handling, serves, defensive blocks, and position play are stressed. Classes scrimmage.

#### **PE 1571 Volleyball, Intermediate**

Fall and spring.

Passing and blocking strategy; scrimmages in class.

#### **PE 1572 Volleyball, Advanced**

Fall and spring.

Offensive and defensive team strategy is emphasized in class scrimmages.

### **Weight Training Courses**

#### **PE 1580 Principles of Weight Training**

Fall and spring. Fee charged.

Introduces the proper use of Olympic weights for improving physical condition and muscular strength. Instruction with focus on the relation between high-rep light weight lifting, low-rep heavy lifting, and the development of bulk, strength, and endurance.

### **Independent Study**

#### **PE 1999 Independent Study**

Fall and spring.

Designed for those who have difficulty fitting any of the regularly scheduled courses into their academic program. Class activities are based on personal fitness programs. A term paper is required. Permission to enter this program must be granted by the program director.

## COLLEGE OF VETERINARY MEDICINE

### ADMINISTRATION

Donald F. Smith, dean

Robert O. Gilbert, associate dean

Alfonso Torres, associate dean for veterinary public policy and director, NYS Animal Health Diagnostic Laboratory

Hollis N. Erb, secretary of the college

Katherine M. Edmondson, assistant dean for learning and instruction

Robert F. Gilmour Jr., associate dean for research and graduate education

Bonita S. Voiland, assistant dean for hospital operations

Gene R. Wheeler, assistant dean for finance and administration

Kevin Mahaney, executive director of alumni affairs and development

Douglas F. Antczak, director, James A. Baker Institute for Animal Health

Carol S. Gary, director of student financial planning

Erla Heyns, director, Flower Sprecher Veterinary Library

Mary Beth Jordan, director of human resources

Douglas D. McGregor, director of leadership and training initiatives

Jennifer A. Mailey, director of admissions

Jai Sweet, director of student services and multicultural affairs

### DEPARTMENT CHAIRS

Biomedical Sciences: M. Kotlikoff

Clinical Sciences: R. Page

Microbiology and Immunology: D. Russell

Molecular Medicine: G. Weiland

Population Medicine and Diagnostic Sciences: Y. Grohn

### THE COLLEGE

The College of Veterinary Medicine offers a professional program that requires four years of full-time academic and clinical study of the normal and abnormal structure and function of the animal body and the diagnosis, treatment, and prevention of animal disease.

Graduates of the college receive the doctor of veterinary medicine (D.V.M.) degree, which is recognized by licensing boards throughout the world. Graduates generally enter private practice or academia, or become engaged in one of an increasing number of biomedical activities.

Admission requires a minimum of three years of college work, including specific prerequisite courses and experience.

Applications must be filed approximately one year before the proposed matriculation date. The competition for admission is keen, since there are many more qualified applicants than can be admitted.

Graduate programs in veterinary research and postdoctoral training in clinical specialties are open to doctors of veterinary medicine and some highly qualified holders of baccalaureate degrees and lead to the degree of master of science or doctor of philosophy.

More detailed information is available at the College of Veterinary Medicine web site, [www.vet.cornell.edu/](http://www.vet.cornell.edu/).

Note: 500- and 600-level courses are open only to veterinary students except by written permission from the instructor.

The College of Veterinary Medicine's professional curriculum comprises courses (designated with the prefix "VTMED") in two categories: foundation courses and distribution courses.

The professional D.V.M. curriculum consists of two types of classes; foundation courses and distribution courses. Courses contributing to the D.V.M. degree begin with VTMED.

### FOUNDATION COURSES

Foundation courses are interdisciplinary and represent approximately 70 percent of the professional curriculum. In Foundation courses I, III, and IV (VTMED 510, 530, 540), students work in small groups under the guidance of a faculty tutor. Case-based exercises are used to facilitate the understanding of basic science concepts within the context of clinical medicine. In some courses, three two-hour tutorial sessions are scheduled each week. These are complemented by lectures, laboratories, and discussion sessions or other organized learning opportunities specific to the individual course. Faculty are available to respond to questions that arise as a result of the case-based exercises.

Tutorial sessions and all other organized learning programs are scheduled primarily during the mornings, thereby reserving time in the afternoon for independent study. By learning in a clinical context, students are better able to integrate material from the basic and clinical sciences and are encouraged to develop an understanding of the clinical reasoning process from the beginning of the curriculum. The tutorial-based educational format creates an atmosphere that requires students to be involved actively in their learning and allows them to develop skills in communication, information retrieval, and analysis.

Note: Courses listed in brackets [ ] are approved courses that are not offered during the 2006–2007 academic year.

#### **VTMED 510(5100) The Animal Body (Foundation Course I)**

Fall. 12 credits. Prerequisite: first-year veterinary students. Letter grades only. A. J. Bezuidenhout and staff.

Designed to enable students to understand the principles of veterinary anatomy at the gross, microscopic, and ultrastructural levels. Emphasizes developmental anatomy to the extent that it reflects determination of adult form and species differences. Radiologic and related imaging techniques are used throughout the course to assist in the understanding of normal structural anatomy. Understanding of the anatomic basis of common surgical procedures is achieved during the various dissection procedures. The course is based on tutorials with significant emphasis on practical laboratories. Lectures and modules complement student learning.

#### **VTMED 517(5701) Animals, Veterinarians, and Society (Part A) (Foundation Course VIIa)**

Fall. 1.5 credits. Prerequisite: first-year veterinary students. Letter grades only. Fee charged for course guide. Live animals used in course instruction. N. L. Irby and staff.

Complements and augments material learned in VTMED 510 (Foundation Course I—The Animal Body). The class is divided into small groups and each group meets for four to five hours each week during the first 11 weeks of the fall semester. Using live dogs, cats, horses, and cows as models for learning how to perform a physical examination, this laboratory course teaches the skills of observation, auscultation, palpation, and percussion as well as related basic diagnostic procedures. The body systems are examined sequentially and follow the order of study in Foundation Course I.

#### **VTMED 520(5200) Cell Biology and Genetics (Foundation Course II)**

Fall and spring. 8 credits. Prerequisite: first-year veterinary students; VTMED 510.

Letter grades only. R. A. Levine and staff. Designed to develop an appreciation of the molecular and cellular basis of animal health and disease. Students gain an understanding of the molecular mechanisms that regulate cell function, the molecular signaling processes that form the basis of integrated function and the response to disease, and the mechanisms underlying inherited traits and genetic disease. Emphasis is placed on defining and characterizing normal cell function and on understanding how mutations in specific genes promote disease. Students become familiar with the common molecular procedures being used to develop new diagnostic and therapeutic tools to maintain health and combat disease. The course is divided into two parts separated by a midterm exam. The first part is made up of three sections: Principles of Cell Biology, Cell Signaling, and Medical Genetics. The second half builds on and expands these principles, using examples from veterinary medicine including wound repair and cancer. In both parts, clinical cases are used to illustrate the concepts presented.

**VTMED 522(5220) Neuroanatomy**

Spring. 1 credit. Prerequisite: first-year veterinary students. Letter grades only. M. FitzMaurice.

Designed to give students the necessary background for the understanding of neurophysiology and clinical neurology. Students will gain a basic understanding of the gross anatomy of the Central Nervous System (CNS), pathways involved in somatosensory and motor systems, as well as some exposure to modern imaging of the CNS (CT and MRI correlates with gross coronal sections of the CNS).

**VTMED 527(5702) Animals, Veterinarians, and Society (Part B: Ethics) (Foundation Course VIIb)**

Last part of fall semester through end of winter session. 1.0 credit (Class of 2010); 1.5 credits (Classes of 2007-2009). Prerequisite: first-year veterinary students; VTMED 517. Letter grades only. Fee charged for course guide. Lecs average two hours each week; lab, 10 hours spread throughout course. Live animals used in course instruction. N. L. Irby and staff.

Consists of both lectures and laboratory sessions. Lectures partially complement materials learned in VTMED 520 (Foundation Course II—Cell Biology and Genetics) but for the most part focus primarily on veterinary medical ethical issues related to animal use, animal welfare, genetics counseling, and clinical day-to-day ethics. The laboratory reviews basic equine and bovine husbandry skills and the small-animal physical examination.

**VTMED 530(5300) Function and Dysfunction: Part I (Foundation Course IIIa)**

Spring. 9 credits. Prerequisite: first-year veterinary students; VTMED 520. Letter grades only. Live animals used on limited basis for demonstration or noninvasive procedures. R. Rawson and staff.

Designed to develop students' understanding of how an animal maintains itself as a functional organism; how the maintenance of function is achieved through the integration of different organ systems; how tissue structure relates to tissue function; how injury alters structure and leads to dysfunction, manifested as clinical signs; how organ function can be assessed; and how organ function can be modulated pharmacologically. The course incorporates aspects of physiology, biochemistry, cell biology, histology, pathology and histopathology, clinical pathology, and pharmacology.

**VTMED 531(5310) Function and Dysfunction: Part II (Foundation Course IIIb)**

Fall. 7 credits. Prerequisite: second-year veterinary students; VTMED 530. Letter grades only. R. Rawson and staff.

Continuation of VTMED 530 Function and Dysfunction: Part I.

**VTMED 537(5703) Animals, Veterinarians, and Society (Part C) (Foundation Course VIIc)**

Spring. 1 credit. Prerequisite: first-year veterinary students; VTMED 527. Letter grades only. Fee charged for course guide. Live animals used in course instruction. N. L. Irby and staff.

Introduces students to medical record keeping and to the communication skills and techniques necessary for effective

communication with clients. In addition, students are introduced to the human-animal bond and its implications for veterinary medicine, animal death, and grief counseling. This course gives students the opportunity to practice interviewing clients while refreshing their physical exam skills. The opportunity to gain an appreciation of the role of animal husbandry in veterinary medicine is provided through a milking experience at the college's dairy barn.

**VTMED 540(5400) Host, Agent, and Defense (Foundation Course IV)**

Fall. 12 credits. Prerequisite: second-year veterinary students; VTMED 531. Letter grades only. D. Bowman (course leader) and staff.

This course seeks to develop an understanding of the interplay between the immunological system of the host and the most significant bacterial and viral agents that cause disease in animals. Lectures focus primarily on adaptive and innate immunity, as well as bacterial and viral pathogens and the diseases they cause. Autoimmunity, epidemiological methods to investigate infectious disease at the herd and single-animal levels, and techniques and tools to control infectious disease are also important components of the course. In the laboratory, animals are used to illustrate some aspects of infectious diseases.

**VTMED 541(5410) Veterinary Parasitology**

Spring. 2.5 credits. Prerequisite: second-year veterinary students. Letter grades only. D. D. Bowman.

Provides a basic introduction to animal parasites of veterinary importance, concentrating mainly on the biology, control, and diagnosis of protozoan and metazoan parasites. Emphasizes parasites representative of significant disease processes or of significant clinical importance to veterinarians. Elaborates on the biology and pathogenesis of these major pathogens with the ultimate goal being to maximize the recognition of the major disease manifestations induced by the different groups of organisms. Laboratories stress certain aspects of some important parasite groups.

**VTMED 547(5704) Animals, Veterinarians, and Society (Part D: Public Health and Preventive Medicine) (Foundation Course VIId)**

Fall. 2.0 credits (Class of 2010); 1.5 credits (Class of 2009); 1.0 credit (Classes of 2007-2008). Prerequisite: second-year veterinary medical students; VTMED 537. Letter grades only. Fee for course guide. Live animals used in course instruction. N. L. Irby, L. D. Warnick, and staff.

Complements and augments material learned in VTMED 540 (Block IV—Host, Agent, and Defense). Emphasizes veterinary public health and preventive medicine. Topics include aggressive animals and animal bites, routes of disease transmission, rabies control programs, zoonotic diseases, emerging infectious diseases, environmental health and preventive health care programs including vaccination protocols in large and small animals. One rotation in the Community Practice service and small group discussions are required of each student.

**VTMED 550(5500) Animal Health and Disease: Part I (Foundation Course V)**

Spring. 10 credits. Prerequisite: second-year veterinary students; VTMED 540. Letter grades only. S. Fubini and D. W. Scott.

Integrates the clinical sciences of medicine, surgery, anesthesiology, radiology, and theriogenology, which are themselves integrated subjects, with systems pathology and relevant aspects of applied pharmacology. The course is presented on a systems basis, moving from clinical signs of alteration in function, to pathophysiology of clinical signs, to strategies for diagnosis and treatment. Specific examples are used to establish a cognitive framework and knowledge of the most important diseases. This course provides a sound foundation for clinical rotations in Foundation Course VI. It builds on the strengths developed in earlier courses by an increased exposure to case examples in a more directed way, taking advantage of the diversity of skills and special knowledge of both faculty and students. A variety of educational techniques are used, including lectures in which interaction is encouraged, laboratories, demonstrations, case discussions, and autotutorials.

**VTMED 551(5510) Animal Health and Disease: Part II (Foundation Course V, continued)**

Fall. 20 credits. Prerequisite: third-year veterinary students; VTMED 550. Letter grades only. S. Fubini and D. W. Scott. Continuation of VTMED 550 Animal Health and Disease: Part I.

**VTMED 557(5705) Animals, Veterinarians, and Society (Part E: Introduction to Clinical Procedures) (Foundation Course VIIe)**

Spring. 0.5 credit (Classes of 2009-2010); 1.0 credit (Classes of 2007-2008). Prerequisite: second-year veterinary students; VTMED 547. Letter grades only. Fee charged for course guide. Live animals used in course instruction. N. L. Irby and staff.

Laboratory course that provides a basic instruction to clinical skills students will need when they start their clinical rotations in the Cornell University Hospital for Animals. Includes a brief review of the physical examination of the dog, horse, and cow. Clinical procedures include but are not limited to ear examination and treatment, IM and SQ injections, fluid administration, naso- and orogastric tube placement, urinary catheterization, and IV catheterization.

**VTMED 558(5706) Animals, Veterinarians, and Society (Part F) (Foundation Course VIIf)**

Fall. 1.5 credits. Prerequisite: third-year veterinary students; VTMED 557. Letter grades only. Fee charged for course guide. Live animals used in course instruction. N. L. Irby and staff.

Complements material learned in VTMED 551 Foundation Course V—Animal Health and Disease. Examines governmental regulation of the veterinary profession, including proper drug usage, extra label drug use (FDA), controlled substances (DEA), professional liability and malpractice insurance, professional and unprofessional conduct, hazardous materials in the workplace (OSHA), and environmental issues (EPA). Also includes sessions relating to the control and prevention of the spread of animal diseases

and the role of USDA and specifically APHIS in these regulatory functions. The laboratory component consists of night treatments in the Equine and Farm Animal Hospital.

**VTMED 560(5600) Ambulatory and Production Medicine**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Students can take more than one week early but a minimum of one week must be completed during Block VI. M. E. White and staff.

Clinical service rotation in which students accompany ambulatory clinicians on farm and stable calls and learn the skills and procedures necessary for operation of a modern veterinary practice offering primary care to large animal clients. Routine herd health visits are conducted for cattle, horses, sheep, goats, and swine. Reproductive evaluations (including pregnancy and fertility examinations), nutritional evaluation, and disease prevention are stressed. Herd health programs also include vaccinations, parasite control, mastitis prevention, and routine procedures. With appropriate herds, analysis of computerized performance data is conducted and discussed with the owner. In addition to assisting with routine scheduled work, students participate in diagnosis and medical or surgical treatment of ill or injured animals. This includes rotating assignments for night and weekend duty.

**VTMED 561(5601) Community Practice Service: Medicine**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. W. E. Hornbuckle and staff.

Structured to provide supervised clinical experience in the practice of companion small-animal medicine. The course is conducted in the Companion Animal Hospital of the Cornell University Hospital for Animals. Students interact directly with clients presenting their pets for primary medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients. After review, students explain their plans to the clients and provide follow-up care and management of these patients.

**VTMED 563(5602) Small-Animal Medicine**

Fall, spring, winter, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. S. C. Barr, S. A. Center, J. F. Randolph, K. W. Simpson, and R. Goldstein.

Structured to provide supervised clinical experience in the practice of companion small-animal medicine. The course is conducted in the Companion Animal Hospital of the Cornell University Hospital for Animals. Students interact directly with clients presenting their pets for primary or referral medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients.

**VTMED 564(5603) Small-Animal Soft Tissue Surgery Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. H. J. Harvey and small-animal surgery faculty.

Clinical service rotation that exposes the student to the practice of surgery under hospital conditions. Students participate in office hours, diagnostic techniques; planning of therapy; and daily care of dogs and cats under the direction of a faculty veterinarian. Students assist experienced surgeons in the operating room. Client communications and the basics of efficient practice are emphasized.

**VTMED 564(6611) Small Animal Orthopedic Surgery Service**

Fall, winter, spring, and summer. 2 credits. Letter grades only. E. Trotter and small animal surgery faculty.

Clinical service rotation that exposes the student to the practice of surgery under hospital conditions. Students participate in office hours, diagnostic techniques; planning of therapy; and daily care of dogs and cats under the direction of a faculty veterinarian. Students assist experienced surgeons in the operating room. Client communications and the basics of efficient practice are emphasized.

**VTMED 566(5604) Large-Animal Medicine Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. D. Ainsworth, T. Divers, G. Perkins, and M. Flaminio.

Students assigned to this service assist the faculty, technicians, and residents of the Large-Animal Medicine Service in the diagnosis and care of patients. The goal of this course is for students working on this service to acquire knowledge and skills in history taking, physical examination, election and completion of appropriate ancillary tests, diagnosis, treatment, and patient care. Daily rounds and discussions are used to monitor patient progress and further educate students. If time allows, sit-down rounds to discuss medical disorders are provided.

**VTMED 567(5605) Large-Animal Soft Tissue Surgery Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. A. J. Nixon and staff.

Clinical rotation structured to provide supervised clinical experience in the practice of large-animal surgery. Under the direction of faculty and house staff, students participate in the diagnosis, surgical treatment, and care of patients presented to the Equine and Farm Animal Hospital. Training through patient care is supplemented by formal rounds and didactic instruction.

**VTMED 567(6612) Large-Animal Orthopedic Surgery Service**

Fall, winter, spring, and summer. 2 credits. Letter grades only. N. Ducharme, A. Nixon, L. Fortier, and staff.

Clinical rotation structured to provide supervised clinical experience in the practice of large animal surgery. Under the direction of faculty and house staff, students participate in the diagnosis, surgical treatment, and care of patients presented to the Equine and Farm Animal Hospital. Training through patient care is supplemented by formal rounds and didactic instruction.

**VTMED 568(5606) Anesthesiology Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. R. D. Gleed, J. W. Ludders, A. A. Smith, and staff.

Designed to provide clinical experience in the use of anesthetics in small companion animals, horses, and some food animals. Students participate in selecting suitable anesthetic techniques for patients in the Cornell University Hospital for Animals and then implement those techniques under the supervision of faculty and residents. The goal is for students to learn the skills and thought processes necessary to perform safe anesthesia in a modern veterinary practice.

**VTMED 569(5607) Dermatology Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. W. H. Miller and D. W. Scott.

During this clinical rotation, students participate in the diagnosis and management of skin disorders in small and large animals. Patients are examined by appointment and through consultation with other hospital services.

**VTMED 570(5608) Ophthalmology Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. R. C. Riis, T. Kern, and N. Irby.

Combines clinical experience with beginning skills in diagnostic ophthalmology. Students learn how to apply the ophthalmic diagnostic tests. A competent ocular examination is the goal of this rotation. Confidence in using direct and indirect ophthalmoscopes, slit lamps, tonometers, gonioscopes, conjunctival cytology, and surgery comes with the practice provided by this rotation. Students are required to review the introductory orientation videotapes in the autotutorial center titled *Ocular Examination I and II* before the start of the rotation. This rotation provides surgical experience and consultations. A high percentage of the consultations are referral cases that usually challenge the service. Adequate routine case material is presented to prepare most students for practice.

**VTMED 571(5609) Pathology Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. S. P. McDonough and staff.

Involves hands-on diagnostic necropsies of mammals, birds, reptiles, and other exotic species that are presented to the Section of Anatomic Pathology necropsy service. Students work in groups of three to five for the two-week rotation. Necropsies are performed under the guidance of pathology faculty and residents. Students prepare written reports of necropsies performed that are reviewed by the faculty. Twice each week, students meet with a clinical pathologist to review current cases of interest.

**VTMED 572(5610) Radiology Service**

Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. N. L. Dykes and staff.

Two-week clinical experience in the imaging section of the Cornell University Hospital for Animals. Students use radiographic,

ultrasonographic, CT, MRI, and nuclear medicine imaging techniques to evaluate animal patients under treatment in the Cornell University Hospital for Animals. Students obtain and interpret radiographic studies with guidance from radiology faculty and technical staff. Autotutorial teaching films are used to familiarize students with radiographic examples of common diseases of large- and small-animal species. Small-group discussions are scheduled to present and discuss the teaching files and current cases. The safe use of X-ray-producing equipment and radioisotopes is discussed.

#### **VTMED 573(5612) Fourth-Year Seminar**

Fall and spring, 1 credit. Required component of Clinical Rotations (Foundation Course VI). First-, second-, and third-year students and all staff members also invited and encouraged to attend. S-U grades only. F. H. Fox, chair of Senior Seminar Committee.

Gives the student the responsibility and opportunity of selecting and studying disease entity on the basis of a case or series of cases, or to conduct a short-term, clinically oriented research project under the direction of a faculty member. In either case, an oral report is presented at a weekly seminar. A written report is also submitted at the time of the seminar. All participants are encouraged to foster an atmosphere in which discussion, exchange of ideas, and the airing of controversial opinions might flourish.

## **DISTRIBUTION COURSES**

Distribution courses comprise 30 percent of the curriculum and are usually scheduled during the first half of each spring semester. During the first two years, many of the distribution courses are oriented to the basic sciences. During years three and four, students have additional distribution course offerings from which to choose. Some emphasize clinical specialties, whereas others integrate basic science disciplines with clinical medicine and are co-taught by faculty representing both areas. Students from different classes have the opportunity to take many of these courses together.

Grading options for distribution courses are either letter or S-U.

#### **VTMED 601(6100) Anatomy of the Carnivore**

Spring, 3 credits. Prerequisite: VTMED 510 or permission of instructor; first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades only. P. S. Maza.

Students study carnivore anatomy by detailed systematic and regional dissection of the cat, with comparison to the dog. Student dissection is supplemented with prosections, radiographs, palpation of live cats, and exercises focusing on surgical approaches. There are opportunities to dissect other carnivores, such as the ferret and the fox, depending on availability of specimens. The lectures augment the laboratory dissection and introduce the student to clinical anatomy of the cat and functional morphological comparative features in the Order Carnivora. Students do an independent project on the carnivore species of their choice and give an oral presentation on this to the class.

#### **VTMED 602(6101) Anatomy of the Horse**

Spring, 3 credits. Prerequisite: VTMED 510; first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades only. A. J. Bezuidenhout.

Organized as a traditional anatomy course that relies primarily on students learning the anatomy of horses through hands-on dissection laboratories augmented by lectures and highlighted by clinical correlations. An understanding of anatomy that provides the foundation for surgery and is directly relevant to clinical practice is emphasized in the regional approach to dissection. Most lectures emphasize structural-functional correlations that are unique or important in the horse. Microscopic anatomy is integrated into the course in selected areas to lay a foundation for the later study of pathology or when it reinforces concepts of structure and function that are difficult to understand by a study of the gross anatomy alone (i.e., hoof). Student dissection cadavers are supplemented by skeletal materials, radiographs, models, preserved predissected specimens, and fresh specimens when available. A live horse will be available for palpation.

#### **VTMED 603(6102) Anatomy of the Ruminant**

Spring, 3 credits. Prerequisite: VTMED 510 or permission of instructor; first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades only. L. A. Mizer.

Covers the regional anatomy of several ruminant species using dissection laboratories and lectures. Emphasizes the functional consequences of structural modifications and anatomical features relevant to clinical practice. Correlates microscopic anatomy with gross anatomy when appropriate to relate structure to function and to provide a foundation for later study in pathology. Student dissection material is supplemented by skeletal materials, radiographs, models, predissected specimens, and postmortem specimens. Students are required to complete an independent study project on a relevant subject of their choice. Assessment includes written and practical exam.

#### **VTMED 605(6103) Comparative Anatomy: Pattern and Function**

Spring, 3 credits. Prerequisite: VTMED 510; first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades only. J. Hermanson.

The goal of this course is to study anatomical variability among amniote (mammals, birds, and reptiles) and anamniote (amphibian and fish) species. This is accomplished by relating the anatomy of major organ systems in each species to a common basic pattern and considering the differences in a functional perspective. Five major systems are explored (integumentary, locomotory, cardiorespiratory, digestive, and urogenital) in a variety of species as available.

#### **VTMED 607(6720) The Literature and Subject Matter of Natural History**

Spring, 1 credit. Minimum enrollment 10; maximum 30. Prerequisite: third- and fourth-year veterinary students. S-U grades only. H. E. Evans.

Introduces natural history literature. Shows and discusses materials relating to the earth sciences and the biology of plants and animals from around the world. Students are

required to show and discuss a book that concerns natural history in a country of their choice and submit a one-page book report for duplication. (A recommended reference text is *The Cambridge Illustrated Dictionary of Natural History* by R. J. Lincoln and G. A. Boxshall, 1990.) Golden Guides for mammals, birds, reptiles, fishes, insects, and plants may be given to participants.

#### **VTMED 609(6120) Anatomy and Histology of Fish**

Spring, 2 credits. Minimum enrollment 4; maximum 6. Prerequisite: first-, second-, third-, and fourth-year veterinary students or written permission of instructor. S-U grades optional. P. R. Bowser.

Provides an overview of the diversity of anatomy and histology of fish. Students participate in lecture, discussion, and laboratory exercises to review the major organ systems. Extensive use of library resources for assigned readings is expected. Each student prepares a term project and makes one oral presentation.

#### **VTMED 610(6721) Veterinary Aspects of Avian Biology**

Spring, 1.5 credits. Minimum enrollment 10; maximum 60. Prerequisite: first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades only. G. V. Kollias and A. J. Bezuidenhout.

Introduction to avian biology for veterinary students. Includes lectures and laboratories involving avian anatomy, physiology, and natural history. One laboratory involves live birds to demonstrate physical examination. The course emphasizes the development of a strong foundation in avian biology that is applied in VTMED 616 Diseases of Birds and VTMED 652 Avian Medicine and Surgery.

#### **VTMED 613(6722) AQUAVET I: Introduction to Aquatic Veterinary Medicine**

Four weeks of full-time instruction at Woods Hole, Mass., immediately after spring semester. 4 credits. Maximum enrollment 24 students from Cornell U., the U. of Pennsylvania, and other U.S. colleges and schools of veterinary medicine. Available, by competitive application process, to veterinary and graduate students. S-U grades only. Fee charged. P. R. Bowser.

Sponsored by Cornell U., the U. of Pennsylvania, and three marine-science institutions at Woods Hole: the Marine Biological Laboratory, Woods Hole Oceanographic Institution, and Northeast Center of the National Marine Fisheries Service. Introduces veterinary students to aquatic-animal medicine. The marine environment is described and visited on field trips in the Woods Hole area. Specific aspects of the comparative anatomy, physiology, nutrition, microbiology, pathology, and medicine of a variety of marine and freshwater species are discussed. Some emphasis is placed on systems of aquaculture. The specific diseases of a few selected species are presented as examples. The course is taught by an invited faculty of 35 individuals who are leaders in their respective fields of aquatic-animal medicine. Students present seminars on appropriate topics.



**VTMED 614(6521) AQUAVET II:  
Comparative Pathology of Aquatic  
Animals**

Two weeks of full-time instruction at Woods Hole, Mass., immediately after spring semester. 2 credits. Maximum enrollment 18. Prerequisites: formal course work in diseases of aquatic animals or appropriate experience and permission of instructor. S-U grades optional. Fee charged. Available, by competitive application process, to veterinary and graduate students. P. R. Bowser.

Advanced course (sponsored by Cornell U., the U. of Pennsylvania, and three marine-science institutes at Woods Hole: the Marine Biological Laboratory, Woods Hole Oceanographic Institution, and Northeast Center of the National Marine Fisheries Service) covering the comparative pathology of aquatic invertebrates and vertebrates commonly used as laboratory animals. The material presented consists of discussions of the diseases of aquatic animals as well as extensive use of the microscope to examine the histopathology associated with these diseases. The course is taught by an invited faculty of 12 individuals who are leaders in their respective fields of aquatic-animal medicine.

**[VTMED 615(6723) Veterinary Medicine in  
Developing Nations**

Spring. 2 credits. Maximum enrollment 20. Prerequisite: first-, second-, third-, and fourth-year veterinary students or permission of instructor. S-U grades only. Offered even-numbered years; not offered 2006–2007; next offered 2007–2008. K. A. Schat.

This seminar course provides interested veterinary students with information on and insight into the complex issues facing U.S. veterinarians working in developing nations.]

**VTMED 616(6522) Diseases of Birds**

Spring. 2 credits. Minimum enrollment 10; maximum 80. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. G. V. Kollias and staff.

Designed to introduce second-, third-, and fourth-year veterinary students to a basic and practical knowledge of the most common infectious and noninfectious diseases affecting a variety of avian species. Emphasizes the latest diagnostic and control approaches. The course format is a combination of didactic lectures and discussions.

**[VTMED 617(6523) Basic Nutrition for  
Veterinary Students**

Fall. 1 credit. Prerequisite: Foundation Course III (VTMED 531). S-U grades only. Not offered 2006–2007. F. A. Kallfelz, J. J. Wakshlag, and K. J. Hurley.

Introduction to nutrition, including basic concepts of the need for and metabolism of energy, protein, minerals, and vitamins in domestic animals.]

**VTMED 622(6420) Foreign Infectious  
Diseases of Animals**

Spring. 1 credit. Minimum enrollment 20. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. A. Torres, R. Gilbert, and D. Schlafer.

Describes the etiology, pathogenesis, clinical signs, gross pathology, differential diagnosis, methods of spread, reservoir hosts, and control of the most important foreign and emerging animal diseases that present serious economic threats to the United States. Several

foreign and emerging animal diseases are also important zoonoses affecting public health. The recent spread and impact of foot-and-mouth disease, avian influenza virus, bovine spongiform encephalopathy, and chronic wasting disease are good examples of the need to emphasize the importance to practicing veterinarians so they in turn could educate producers, consumers, and the public in general.

**VTMED 624(6524) Feline Infectious  
Diseases**

Spring. 1 credit, two 50-min. lec each week for eight weeks. Minimum enrollment 10; maximum 80. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. S. C. Barr.

Emphasizes the clinical aspects of feline infectious diseases common to cats in North America and complements knowledge acquired in Foundation Courses IV and V. The overall objective is to provide details about specific infectious diseases a future small-animal practitioner may need to know to effectively diagnose and treat diseases. Etiology, epidemiology (prevalence and transmission), pathogenesis, clinical findings, diagnosis, pathologic findings, therapy prevention, and public health considerations are emphasized. Most lectures are presented from a clinician's point of view, and therefore the material is oriented toward practical skills in managing clinical cases. Grades are based entirely on the result of a written exam (usually multiple-choice format) given in the final period.

**VTMED 625(6525) Osteoarthritis**

Spring. 1 credit. Minimum enrollment 8; maximum 24. Prerequisite: graduate and second-, third-, and fourth-year veterinary students. Letter grades only. G. Lust.

Provides a basis at the molecular, cellular, and tissue levels for understanding the function of mammalian diarthrodial joints. Includes a description of a diarthrodial joint and the composition and metabolism of articular cartilage, subchondral bone, ligaments, meniscus, capsule, and synovium. Considers the interrelationships of synovium, synovial fluid, articular cartilage, joint lubrication, biomechanical considerations, and innervation are considered. Canine hip dysplasia is a focus during the early class sessions. The osteoarthritis associated with canine hip dysplasia serves as a basis for discussion of the etiopathogenesis of the disease. Canine osteoarthritis is emphasized, but the disease in animal models such as mice, guinea pigs, rabbits, and sheep is mentioned. Therapies such as nonsteroidal anti-inflammatory drugs, glucocorticoids, and others may be discussed.

**VTMED 626(6421) Epidemiology of  
Infectious Diseases**

Spring. 1 credit. Maximum enrollment 8. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. H. Mohammed and staff.

Introduces the epidemiologic methods used in infectious disease investigations. Also discusses the importance of surveillance systems in detecting modern epidemics and in the development of effective disease prevention and control strategies. Emphasizes understanding the relationships between the host, the agent, and the environment as they relate to disease causation. Explores contemporary epidemiologic methods applicable to old diseases that remain real

or potential problems, newly emerging infectious diseases, and nosocomial infections. Selected diseases are discussed to clarify the role of epidemiology in understanding the pathogenesis of infectious processes in individuals and groups of animals. Students have the opportunity to apply the methods learned to actual disease problems and write an epidemiologic report that might lead to a publication in a peer-reviewed scientific journal.

**VTMED 628(6320) Clinical Pathology**

Spring. 2 credits. Minimum enrollment 25; maximum 81. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. T. Stokol and T. W. French.

Addresses a range of issues related to laboratory medicine and interpretation of laboratory results. General topic areas include hematology, clinical chemistry and immunology, and urinalysis. The primary mode of instruction is student-driven small-group (untutored) exploration of case materials followed by faculty-moderated large-group discussions. Selected lectures and laboratory sessions supplement and expand on issues generated by the case discussions. This course builds on concepts previously addressed in Foundation Courses III and IV and provides additional experiences in practical clinical pathology procedures and microscopy.

**VTMED 630(6422) Clinical Biostatistics  
for Journal Readers**

Spring. 1 credit. Minimum enrollment 3; maximum 12. Prerequisite: first-, second-, third-, and fourth-year veterinary students or permission of instructor. Letter grades. H. N. Erb.

Students become familiar with the statistical methods commonly used in veterinary clinical articles, learn to recognize obvious misuse of those methods, and become able to interpret the statistical results.

**VTMED 631(6423) Clinical Diagnostic  
Parasitology**

Fall and spring. 0.5 credits for attending eight one-hour parasitology sessions; student usually can easily obtain 2 hours on each of the five participating rotations (Ambulatory, Community Practice Service, Dermatology, Pathology, and Wildlife). Prerequisite: VTMED 551; third- and fourth-year veterinary students. S-U grades only. M. K. Frongillo and D. D. Bowman.

Gives students experience in diagnosing parasitic infections. Students perform appropriate parasitological testing methods on clinical samples from patients on their rotation. They also evaluate the test results in terms of treatment or management of the infections. If clinical specimens are not available, appropriate materials are provided for study and evaluation. Ambulatory students typically do qualitative and quantitative floatations on samples from large animal cases they have encountered that week. In CPS, one hour is spent testing samples from current dog and cat patients, while a second hour is devoted to a discussion of the treatment of common endo- and ecto-parasites. Pathology students typically examine and identify intact parasites they retrieved from various organs at necropsy. This course is considered to be a logical extension to Foundation Course IV, Host, Agent, and Defense, and is expected to build on the didactic material presented in Large and Small Animal Parasitology.

**VTMED 632(6724) Senior Seminar**

Fall and spring. 1 credit. Does *not* fulfill 1-credit Set VII minimum. Prerequisite: first-, second-, and third-year veterinary students. Must be completed in two consecutive semesters (either fall to spring or spring to fall). S-U grades only. R. O. Gilbert.

Attendance at 14 of the senior seminar sessions presented during the academic year constitutes acceptable completion of this course.

**VTMED 635(6726) Introduction to the Professional Literature**

Spring. 1 credit. Minimum enrollment 6; maximum 20. Prerequisite: first-, second-, third-, and fourth-year veterinary students. Letter grades only. S. Whitaker.

Introduces veterinary students to the professional and biomedical literature, including development of critical reading skills. Students become familiar with the broad range of professional and biomedical literature and are encouraged to develop a rigorous approach to journal and scientific article review. Secondary emphasis is on developing skills in library and bibliographic search techniques and strategies for personal information management, as well as exploring the use of veterinary-related online information.

**VTMED 637(6727) Introduction to Community Practice Service**

Fall, winter, spring, and summer. 1 credit. Prerequisite: first- and second-year veterinary students, permission of instructor. S-U grades optional. W. E. Hornbuckle.

Introduces veterinary students to primary care small-animal clinical practice through direct exposure to the Community Practice Service of the Cornell University Hospital for Animals. Students observe and assist with restraint, examination, and routine treatment of pets and communication with clients. Successful completion requires satisfactory participation during 10 half-days of clinical service.

**VTMED 638(6526) Veterinary Nutrition**

Spring. 2 credits. Minimum enrollment 10; maximum 90. Prerequisite: second- and third-year veterinary students or permission of instructor. Recommended for second- and third-year veterinary students. Letter grades only. F. A. Kallfelz.

The first half of this course provides information on the requirements for and metabolic uses of the essential nutrients of large and small animals as well as on formulation and evaluation of practical rations for species of veterinary interest. These concepts are applied in discussion of life stage nutritional needs, including growth, adult maintenance, gestation, lactation, aging, performance, and production. The second half covers clinically relevant diseases of nutritional deficiency and excess, including obesity, as well as the role of nutrition in the management of diseases of the various organ systems—e.g., renal, lower urinary tract, cardiac, G-I, hepatic, and musculoskeletal system disease. Other topics include the role of nutrition in managing cancer and hypersensitivity disorders and in critical care, including enteral and parenteral nutrition. The course also includes an introduction to nutrition for exotic and zoo animals.

**VTMED 639(6560) Small Animal Veterinary Dentistry**

Spring. 0.5 credits. Prerequisite: second-, third-, and fourth-year veterinary students who have completed Block III. S-U grades only. J. Rawlinson.

This is an introductory-level course in small animal dentistry. Students will complete an online auto-tutorial course that covers the basics of oral examination, dental radiography, oral pathology, and treatment options in the disciplines of oral surgery, periodontology, endodontics, orthodontics, restorative dentistry, and prosthodontics. This will be complimented by eight non-mandatory, 1-hour question and answer sessions and two mandatory 3-hour laboratories covering oral examination, dental radiography, basic periodontology, and simple and advanced extractions.

**VTMED 640(6527) Veterinary Aspects of Captive Wildlife Management**

Spring. 2 credits. Minimum enrollment 10; maximum 40. Prerequisite: first-, second-, third-, and fourth-year veterinary students. Letter grades only. G. V. Kollias.

Concentrates on principles of captive wildlife management, both clinical and nonclinical. Students are challenged to learn and integrate a variety of disciplines that are essential to managing wildlife successfully in a captive or semi-free-ranging environment. These disciplines include but are not limited to species-specific (1) behavior and behavioral requirements, (2) nutritional requirements and problems, (3) natural history, (4) zoonotic and toxicological problems, (5) manual restraint and anesthesia, (6) preventive medicine, and (7) medical and legal ethics. In even-numbered years the course emphasizes non-North American wildlife species (e.g., African, Asian, Australian, and Central and South American species), and in odd-numbered years it focuses more on the North American (native) wildlife species.

**VTMED 641(6424) Approaches to Problems in Canine Infectious Diseases**

Spring. 1 credit. Minimum enrollment 10; maximum 80. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. S. C. Barr.

Emphasizes the clinical aspects of the more common canine infectious diseases. The overall objective is to provide details about specific infectious diseases a future small-animal practitioner may need to know to effectively diagnose and treat these diseases. Clinical signs, presentation, clinicopathologic data, diagnostic choices, treatment plans, and prevention are emphasized. Most lectures are presented by clinical faculty and therefore the material is oriented toward practical skills in managing clinical cases. Grading is based entirely on the result of a written exam (usually multiple-choice format) given in the final period.

**VTMED 642(6321) Management of Fluid and Electrolyte Disorders**

Spring. 2 credits. Minimum enrollment 20; maximum 80. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. R. Rawson.

Students focus on clinical manifestations and the pathophysiologic mechanisms associated with fluid, electrolyte, and metabolic acid-base disturbances in domestic animals. The course is divided into segments dealing with salt and

water imbalances, potassium abnormalities, metabolic acidosis, metabolic alkalosis, and mixed acid-base disturbances.

**VTMED 644(6528) Equine Surgical and Anesthetic Techniques**

Winter, one-week period over winter intersession. 1 credit. Minimum enrollment 3; maximum 21. Enrollment by lottery. Prerequisite: VTMED 602; preference given to students who have indicated career interest in equine medicine and surgery; third- and fourth-year veterinary students. S-U grades only. S. Fubini (coordinator) and other large-animal surgeons.

Consists of five laboratories performing surgical procedures on ponies and cadaver specimens. It is the intent of this course not to make the students proficient in these procedures but to familiarize them with some specialized surgical techniques and to make them more enlightened referring practitioners. The course, therefore, is intended for students anticipating equine practice after graduation.

**VTMED 645(6529) Food-Animal Surgical and Anesthetic Techniques**

Winter, one-week period over winter intersession. 1 credit. Minimum enrollment 6; maximum 21. Enrollment by lottery. Prerequisite: VTMED 603; preference given to students who have indicated career interest in farm animals; third- and fourth-year veterinary students. S-U grades only. S. Fubini and other large-animal surgeons.

Consists of five laboratories performing surgical procedures on sheep, calves, cadaver specimens, and adult cattle. It is the intent of this course not to make the students proficient in these procedures but to familiarize them with surgical techniques and to make them more enlightened referring practitioners. The course, therefore, is intended for students anticipating food-animal practice after graduation.

**VTMED 646(6530) Llama Tutorial**

Fall, spring, summer. 1 credit. Prerequisite: VTMED 540; second-semester second-, third-, and fourth-year veterinary students. S-U grades only. Independent study. M. C. Smith.

Autotutorial or group tutorial course covering common problems of llamas and alpacas. Participants are provided with study guides consisting of brief case descriptions and sample study questions. Reference is made to textbooks, journal articles, videotapes, and (if available) a teaching llama or alpaca to assist students in finding the answers to the questions efficiently. Grading is based on an oral exam.

**VTMED 647(6531) Poisonous Plants**

Fall. 1 credit. Prerequisite: first-, second-, third-, and fourth-year veterinary students or permission of instructor. S-U grades only. M. C. Smith.

Field trips demonstrate toxic plants growing in natural or cultivated settings. Lectures address economically important poisonous plants native to the United States. Information presented includes plant identification, natural habitat, toxic principles, clinical signs of toxicity, and treatment and prevention of poisoning in animals. Some of the major toxic principles found in plants and considered in detail in the course are nitrates, cyanide, oxalates, photodynamic agents, alkaloids, and mycotoxins.

**VTMED 648(6728) Clinical Management of Native Wildlife**

Fall, spring, summer (credit given in fall). 1 credit. Maximum enrollment 30 students per semester. Prerequisite: first-, second-, third-, and fourth-year veterinary students. Letter grades only. G. V. Kollias and staff.

Introduces veterinary students to primary care for native wildlife and to wildlife issues that practicing veterinarians face on a daily basis. Students are responsible for the assessment, physical examination, and medical care of native wildlife presented to the Cornell University Hospital for Animals by the public and local wildlife rehabilitators. Student activities are directly supervised and assessed by faculty and residents on a daily basis. Successful completion of the course requires 40 hours of satisfactory supervised participation per semester in the clinic. Clinic times are appropriately scheduled throughout the semester. Students are required to submit two case summaries, or alternatives approved by the course leader, before the end of the semester and a log of their clinical hours.

**VTMED 649(6729) Introduction to Equine Practice**

Spring. 0.5 credit. Maximum enrollment 30. Prerequisite: first- and second-year veterinary students. Intended for students with little or no experience working with horses. Letter grades only. R. Hackett and C. Collyer.

Introductory course in equine husbandry. Lecture topics include horse breeds and colors, housing facilities and fencing, and overview discussions of the racing, showing, and breeding industries. Laboratories emphasize basic equine handling and restraint as well as feeds and bedding.

**VTMED 652(6532) Avian Medicine and Surgery**

Spring. 2 credits. Minimum enrollment 20; maximum 40. Prerequisite: third- and fourth-year veterinary students. Letter grades only. Live birds used in some laboratories. G. V. Kollias and staff.

Designed to introduce third- and fourth-year veterinary students to the principles and practice of clinical avian medicine and surgery. The course is taught in a basic didactic lecture and discussion format with laboratories that reinforce concepts presented in the lectures.

**VTMED 653(6533) Advanced Equine Lameness**

Spring. 1.5 credits. Minimum enrollment 7; maximum 21. Enrollment by lottery. Prerequisite: third- and fourth-year veterinary students. Letter grades. Live animals used for learning. N. Ducharme, A. Nixon, A. Yeager, D. Dykes, L. Fortier, C. Allen, and staff.

Designed to teach students the methodology of equine lameness diagnosis. Places a strong emphasis on a hands-on approach to learning and is primarily laboratory-based. During laboratories, students work in small groups on live horses to diagnose the cause of their lameness. To this end, students learn both the practical skills, such as perineural and intra-articular blocks, as well as the methodology necessary to systematically work up a lameness case. Laboratories also provide students with the opportunity to practice field radiography and gain ultrasound skills as they pertain to equine lameness. Additionally, students have the opportunity

to practice basic farrier skills. Lecture topics are intended to round out the students' understanding of lameness by providing them with a knowledge base of the common causes of lameness, organized by response to local anesthesia. Imaging interpretation is emphasized through case discussions. The course is recommended for students anticipating entry into equine practice. Students seeking hands-on experience with horses are also welcome.

**VTMED 654(6534 lec, 6535 lab) Equine Theriogenology**

Spring. Lec, 1 credit; lab, 0.5 credit. Minimum lab enrollment 12; maximum 24. Lab enrollment by lottery. Prerequisite: third- and fourth-year veterinary students. Lab corequisite: enrollment in lec. Letter grades only. C. Schweizer.

Covers advanced aspects of equine reproductive physiology. Discusses reproductive management of mares and stallions using natural and artificial breeding strategies. Stresses diagnosis, treatment, and prevention of common reproductive disorders. The laboratory component builds on skills acquired during foundation courses and provides experience in techniques important in equine theriogenology.

**VTMED 655(6536 lec, 6537 lab) Advanced Dairy Reproduction**

Spring. Lec, 1 credit; lab, 1 credit. Minimum lab enrollment 12; maximum 24. Lab enrollment by lottery. Prerequisite: third- and fourth-year veterinary students. Lab corequisite: enrollment in lec. Letter grades only. R. Gilbert.

Offers lectures and labs that provide both theoretical and practical training in current approaches to the veterinary aspects of dairy-cow reproductive care and management. The aim is to empower the student with entry-level, current knowledge and skills for the reproductive aspects of any modern dairy practice.

**VTMED 656(6538) Special Problems in Equine Medicine**

Spring. 1.5 credits. Minimum enrollment 10; maximum 30. Enrollment by lottery. Prerequisite: third- and fourth-year veterinary students. S-U grades only. T. Divers and staff.

Intended for students anticipating equine practice. In-depth study of important diseases, review of recent literature, health management, and hands-on procedures or demonstrations are the core of this course.

**VTMED 657(6539) Disorders of Large-Animal Neonates**

Spring. 1 credit. Minimum enrollment 10; maximum 100. Prerequisite: first-, second-, third-, and fourth-year veterinary students. Letter grades only. G. Perkins.

Introductory neonatology course. The emphasis is on the medical and surgical problems of foals in the early neonatal period with some information presented about calves, small ruminants, and camelid neonates. Students also spend several hours in the neonatal intensive care unit providing medical care of hospitalized patients under staff supervision.

**VTMED 659(6540) Equine Soft-Tissue Surgery**

Spring. 1 credit. Minimum enrollment 6; maximum 24. Enrollment by lottery. Prerequisite: third- and fourth-year veterinary students. Letter grades only. R. Hackett and staff.

Intended for students anticipating equine practice after graduation. Builds on material presented in the foundation courses to provide supplemental instruction in surgical disorders of the horse. Lectures are case based and emphasize disorders likely to be encountered in equine practice (colic, traumatic injuries, upper respiratory tract disorders, prepurchase examination). Laboratories emphasize diagnostic and therapeutic procedures in which an entry-level equine practitioner should be competent.

**VTMED 661(6541) Surgical Pathology**

Spring, summer, fall. 1-2 credits, variable; one or two weeks, approx. eight hours per day for 1 credit per week. Prerequisite: second-, third-, and fourth-year veterinary students by permission of instructor. Letter grades only. S. McDonough.

Provides hands-on experience in the Surgical Pathology Service of the Department of Biomedical Sciences. Working with the attending pathologist, students examine tissue specimens histologically, propose diagnoses, and discuss their interpretations. Students may enroll in this course only through the Office of Student Records *within the official add/drop period*. All requests to enroll must be accompanied by the Supplemental Enrollment Form indicating Dr. McDonough's approval of the enrollment and the amount of credit to be awarded. *Second-year students* should not enroll for any term other than summer *unless* they have actually reserved a January or spring-break slot through Dr. McDonough.

**VTMED 665(6542) Medical and Surgical Problems of Dairy Cattle: Emphasis on the Individual Animal**

Spring. 1.5 credits. Minimum enrollment 6; maximum 28. Prerequisite: third- and fourth-year veterinary students. Letter grades only. S. Fubini and staff.

Provides students who have a special interest in dairy practice the opportunity for in-depth discussions of special problems in bovine medicine and surgery. Emphasizes case discussions, physical examination techniques, and ethical and practical matters. Emphasizes individual cow treatment.

**VTMED 666(6500) Veterinary Clinical Oncology**

Spring. 1 credit. Prerequisite: third- and fourth-year veterinary students. Letter grades only. K. M. Rassnick.

This course presents the common cancers affecting companion animals. Emphasis is placed on etiology, biological behavior, and patient management. Surgery, chemotherapy, and radiation therapy as important methods to treat cancers in veterinary patients are discussed. Course format includes lectures. Attendance is required.

**VTMED 667(6543) Special Problems in Small-Animal Medicine**

Spring. 1 credit. Minimum enrollment 10; maximum 40. Prerequisite: third- and fourth-year veterinary students. S-U grades only. K. Simpson (coordinator) and staff. Students work through selected problems in small-animal medicine in two-hour weekly seminars. The focus is on the medical

problems associated with cases using historic, clinical, clinical pathologic, and pathologic findings to elucidate basic pathophysiologic principles of disease. The overall objective is to give future small-animal practitioners skills in the approach to clinical problems with specific emphasis placed on history taking, clinical signs and examination skills, assessment of clinical pathology data and diagnostic materials (radiographs, ultrasounds), treatment plans, and prevention. The course expands knowledge gained in Foundation Course V and, under the instruction of a clinical faculty member, is aimed at facilitating the use of that knowledge into the practical skills of managing clinical cases.

#### **VTMED 668(6544) Practice Management**

Spring. 2 credits. Prerequisite: second-, third-, and fourth-year veterinary students. S-U grades only. M. Kraus, J. Ludders, J. Morrissey, and K. Cummings.

Professional practice and financial managers teach veterinary medical students the essential elements of a successful practice, concentrating on management and organizational skills. Topics include basic practice organization, leadership styles, career planning, communication skills, facility management, human resource management, marketing, building and maintaining clients, practice growth, personal finances, money management, insurance, animals and the law, malpractice, medical records, inventory and pharmacy management, and contracts.

#### **VTMED 669(6545 lec, 6546 lab) Sheep and Goat Medicine**

Spring. Lec, 1 credit; lab, 0.5 credit. Prerequisite: third- and fourth-year veterinary students. Lab corequisite: Sheep and Goat Medicine lec. S-U grades only. M. C. Smith.

Discusses diagnosis, treatment, and prevention of medical and surgical problems of individual small ruminants and of sheep and goat herds. Basic information on breeds, behavior, nutritional requirements, and management systems is supplied. Economically important contagious or metabolic diseases are discussed in depth. The diagnostic evaluation and differential diagnoses for common clinical presentations such as skin disease, neurologic disease, lameness, and mastitis are considered. Herd monitoring of economically important parameters and necropsy diagnosis of abortions and neonatal losses are addressed. Breeding systems, pregnancy diagnosis methods, correction of dystocias, and common surgical procedures are discussed and demonstrated in laboratory sessions.

#### **VTMED 672(6324) Antimicrobial Drug Therapy in Veterinary Medicine**

Spring. 1 credit. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. W. S. Schwark.

Familiarizes students with antimicrobial drugs used in veterinary practice. Builds on fundamental pharmacological and microbiological principles covered in Foundation Courses III and IV and considers antibacterial, antifungal, antiparasitic, and anticancer drugs from the point of view of unique pharmacokinetic properties, indications for clinical use, and potential toxicities as the basis for rational use.

#### **VTMED 676(6547) Clinical Ophthalmology**

Spring. 0.5 credit. Prerequisite: third- and fourth-year veterinary students. S-U grades only. R. Riis, N. Irby, and T. Kern.

The principles and practice of entry-level veterinary ophthalmology introduced in Foundation Course V, Introduction to Veterinary Ophthalmology, are supplemented by lectures and discussions that emphasize species differences, basic surgical decision-making, and recognition of ocular conditions appropriate for referral. One of the four class periods is devoted to ocular surgical techniques performed on cadaver tissues.

#### **VTMED 677(6548) Dairy Production Medicine**

Fall. 2 credits. Minimum enrollment 6; maximum 14. Prerequisite: third- and fourth-year veterinary students. S-U grades only. C. Guard.

Intermediate course in techniques and procedures used by veterinarians in modern dairy practice. Many of these activities fall outside the traditional boundaries of medicine, surgery, and theriogenology and might include housing, facilities, manure management, and employee education. Data analysis, disease and productivity monitoring, and evaluation of deviations from targeted performance are used to plan cost-effective interventions or corrections, followed by continued surveillance to monitor their effect. Students are introduced to the dominant software currently used in dairy management. Local dairy herds serve as additional laboratories for class projects.

#### **VTMED 678(6549) Small-Animal Theriogenology**

Spring. 1 credit. Minimum enrollment 6; maximum 100. Prerequisite: third- and fourth-year veterinary students. Letter grades only. Therio faculty.

Distribution course in a lecture-based format designed to complement the knowledge gained in the theriogenology component of Foundation Course V, Animal Health and Disease. Content includes discussion of breeding management, infectious and noninfectious causes of infertility, and pathology of the male and female reproductive tracts, their diagnosis, and management. The course emphasizes conditions affecting dogs and cats.

#### **VTMED 679(6550) Clinical Pharmacology**

Spring. 0.5 credit. Prerequisite: third- and fourth-year veterinary students. S-U grades only. W. S. Schwark.

Offered after Foundation Courses I-V and formal exposure to pharmacology course work is completed. The course is designed to familiarize students with drug use in the clinical setting and uses ongoing cases in the Cornell University Hospital for Animals as a teaching tool. Pharmacological concepts are emphasized, with a focus on the rationale for drug choice, alternative drug choices available, pharmacokinetic considerations, and potential drug interactions/toxicities. This course is offered at the time students are about to embark on their clinical rotations. It is designed to emphasize practical aspects of pharmacology in the clinical setting, using basic concepts obtained during formal course work. The onus is placed on the student to explain/rationalize drugs employed in clinical cases in the teaching hospital.

#### **VTMED 680(6730) Behavior Problems of Horses**

Spring. 1 credit. Prerequisite: one semester of veterinary curriculum; first-, second-, third-, and fourth-year veterinary students. S-U grades only. K. A. Houpt.

The goal of this course is to give veterinary students the ability to treat the behavior problems of horses. History-taking, counseling, diagnostic tests, follow-up, the importance of cooperation with the referring veterinarian, prevention of behavior problems, training techniques of value to the practitioner, and socialization of foals are presented.

#### **VTMED 681(6731) Behavior Problems of Small Animals**

Spring. 1 credit. Minimum enrollment 10. Prerequisite: one semester of veterinary curriculum; first-, second-, third-, and fourth-year veterinary students. S-U grades only. K. A. Houpt.

The goal of this course is to give veterinary students the ability to treat the behavior problems of cats and dogs. History-taking, counseling, and follow-up methods are presented. Each student has the opportunity to participate in three cases. Behavioral and pharmacological treatments for behavior problems are presented.

#### **[VTMED 692(6327) Current Concepts in Reproductive Biology (also BIOAP 757(7570))]**

Fall. 3 credits. Minimum enrollment 6. Prerequisite: first-, second-, and third-year veterinary students and appropriate undergraduate/graduate training. Letter grades only. Offered odd-numbered years; not offered 2006-2007; next offered 2007-2008. J. Fortune, W. R. Butler, and staff.

Team-taught survey course in reproductive physiology/endocrinology. Lectures by reproductive biologists on various aspects of reproductive function. Student participation through discussions and/or presentations.]

#### **VTMED 696(6552) Fundamental Principles and Techniques of Small-Animal Anesthesia: Dogs, Cats, and Birds**

Spring. 1 credit. Minimum enrollment 15. Prerequisite: third- and fourth-year veterinary medical students. J. W. Ludders and R. D. Gleed.

Designed for the veterinary student interested in small-animal practice. Consists of lectures, case discussions, and development of anesthetic protocols for routine and complicated cases. Subjects include anesthetic management for elective and emergency surgery, management of the high-risk patient, fluid therapy, drug interactions, pain management, and the management of anesthesia-related complications, cardiopulmonary resuscitation, and post-anesthetic management. While fundamental concepts and recent advances in anesthesia are discussed, the practical application of anesthetic principles and techniques are a major objective of the course.

#### **VTMED 697(6553) Fundamental Principles of Large-Animal Anesthesia: Equine and Mixed Animal Practice**

Spring. 1 credit. Minimum enrollment 15. Prerequisite: third- and fourth-year veterinary medical students. R. D. Gleed and J. W. Ludders.

Designed for the veterinary student interested in equine or mixed-animal practice. Consists



of lectures, case discussions, and development of anesthetic protocols for routine and complicated cases. Subjects include anesthetic management for elective surgery, field anesthesia, management of the high-risk patient, fluid therapy, drug interactions, pain management, and the management of anesthesia-related complications, cardiopulmonary resuscitation, and post-anesthetic management. While fundamental concepts and recent advances in anesthesia are discussed, the practical application of anesthetic principles and techniques is a major objective of the course.

#### **VTMED 698(6798) Special Projects in Veterinary Medicine**

Fall, winter, spring, summer. 1-4 credits, variable. S-U grades optional. TBA with College of Veterinary Medicine tenure-track faculty member.

Provides students the opportunity to work individually with a faculty member to pursue an area of particular interest and, typically, not part of the established curriculum. Specific course objectives and course content are flexible and reflect the scope and academic expertise of the faculty.

#### **VTMED 699(6199, 6299, 6399, 6499, 6599) Research Opportunities in Veterinary Medicine**

Fall, winter, spring, summer. 1-4 credits, variable. S-U grades optional. TBA with College of Veterinary Medicine tenure-track faculty member.

Provides students the opportunity to work in the research environment of faculty involved in veterinary or biomedical research. Specific course objectives and course content are flexible and reflect the specific research environment. Research projects may be arranged to accumulate credit toward requirements in Distribution Sets I, II, III, IV, and V.

#### **VTMED 700(6600) Theriogenology Service**

Spring. 2 or 4 credits. Maximum enrollment 5 per rotation. Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. C. Schweizer and staff.

Exposure to clinical procedures in theriogenology as provided by Cornell University Hospital for Animals patient load and augmented by teaching herd animals.

#### **VTMED 701(6601) Cardiology Service**

Fall and spring. 2 credits. Minimum enrollment 1 per rotation; maximum 2. Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. S. Moise and staff.

Provides students with the opportunity to put into practice what they have learned in the foundation years. The management of the most common cardiac diseases is emphasized, including congestive heart failure, arrhythmias, and secondary cardiac diseases. All species are examined, large and small, although the majority are small animals. Diagnostics, including cardiovascular physical examination, electrocardiography, radiography, and echocardiography, are taught. The rotation includes clinical work, didactic teaching, and self-initiated digging for information.

#### **VTMED 702(6602) Laboratory-Animal Medicine**

Fall and spring. 2 credits. Maximum enrollment 2 per rotation. Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. M. Bailey and staff.

The practice of laboratory animal medicine requires a combination of preventive programs, clinical skills, knowledge of various species' biologies, familiarity with research methodology, and acquaintance with state and federal regulations. This course is an introduction to that specialty. Students accompany laboratory-animal veterinarians on clinical rounds of Cornell's research-animal housing and participate in laboratory diagnostic work. Review sessions are conducted on the biology, medicine, pathology, and husbandry of rodents, rabbits, and primates and on current legislation regulating the care and use of research animals. The course may include field trips to other institutions.

#### **VTMED 703(6603) Clinical Wildlife-, Exotic-, and Zoo-Animal Medicine**

Fall, winter, spring, summer. 2 credits. Maximum enrollment 3 per rotation (plus one intern or extern). Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. G. V. Kollias and staff.

Introduces students to primary medical care of nontraditional pet species, zoo animals, and native wildlife. Students, directly supervised by the attending clinician, are responsible for the assessment, physical examination, and medical management of exotic animal species presented to the Cornell University Hospital for Animals. Other opportunities available to assist in the development of clinical skills in wildlife-, zoo-, and exotic-animal medicine include the wildlife clinic cases, ongoing wildlife research and service projects, and trips to the Rosamond Gifford Zoo. Successful completion of the course requires satisfactory performance during this 14-day clinical rotation.

#### **VTMED 704(6604) Quality Milk**

Fall. 2 credits. Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. R. Gonzalez and QMPS staff.

Covers the causes, diagnosis, treatment, and prevention of bovine mastitis. Stresses the role of management practices. Includes lectures, readings, discussions, laboratory exercises, and farm visits as part of the Quality Milk Production Services. Participants are expected to complete a case study on a dairy farm with udder-health problems and present their findings to the producer and farm personnel. Grading is on performance during the course and a final exam.

#### **VTMED 705(6605) Special Opportunities in Clinical Veterinary Medicine**

Fall, spring, and summer. Prerequisite: VTMED 551; third- and fourth-year veterinary students. S-U grades only. W. Miller and N. Ducharme.

Provides opportunities for students finished with Foundation Course V to explore professional areas not available through the regular curriculum. Blocks of two to four weeks are usually spent at other teaching hospitals, research laboratories, or zoological facilities. Student proposals are submitted to the assistant dean for learning and instruction for review and approval. On-site supervisors

of the block are required to evaluate each student formally.

#### **VTMED 707(6607) Poultry Medicine and Production Rotation**

Fall, two-week rotation that takes place at University of St. Hyacinthe or University of Guelph in alternating years. 2 credits.

Prerequisite: VTMED 551; third- and fourth-year veterinary students.

Recommended: VTMED 616. K. A. Schat.

Provides an introduction in practical poultry medicine by a combination of lectures, discussions, and laboratory sessions including postmortem examinations. Students also visit hatcheries, broiler, layer, and turkey farms.

#### **VTMED 708(6608) Clinical Oncology**

Fall and spring. 2 credits. Maximum enrollment 4 per rotation. Prerequisite: VTMED 551; third- and fourth-year veterinary students. Letter grades only. K. M. Rassnick and staff.

Management and prevention of cancer in companion animals represents a significant component of the practice of veterinary medicine. The focus of this clinical rotation is the development of a comprehensive set of skills necessary for a veterinarian to become an advocate for the client/patient with cancer. These skills include appropriate initial evaluation of animals with cancer; sensitive and effective client and referring-veterinarian communication; ability to access relevant information from numerous sources related to cancer management; and ability to understand and apply principles of surgical, medical, and radiation oncology as well as techniques specifically related to minimize pain and treatment-related effects in cancer patients.

#### **VTMED 709 (5611) Small-Animal Clinical Emergency and Critical Care Medicine**

Fall, winter, spring, and summer. 2 credits. Prerequisite: third- and fourth-year veterinary students. S-U grades only.

N. Dhupa and staff.

Management of both emergent and critical cases represents a significant component of the practice of veterinary medicine. The focus of this clinical rotation is the development of a knowledge base and a comprehensive set of skills necessary for a veterinarian to perform adequately in these areas, within a structured format. These skills include the appropriate evaluate (triage) and stabilization of emergency patients, the management of post-operative and other critical patients, and sensitive and effective client communication. Participants access relevant information from various sources related to emergency and critical care medicine and understand and apply these principles to clinical cases. Participants have patient care responsibilities in the Intensive Care and intermediate Care units and work closely with technicians and clinicians to develop familiarity with technical and nursing procedures. Students also participate in the management of incoming emergency cases. The clinical emergency and critical care medicine rotation are primarily an overnight rotation.

#### **VTMED 710(6609) Animal Behavior Clinic**

Fall, winter, spring, and summer. 2 credits. Maximum enrollment 2 per rotation. Prerequisite: VTMED 681; third- and fourth-year veterinary students. S-U grades only. K. A. Houpt and staff.

Students participate fully in the Animal Behavior Clinic: answering telephone, mail,



and e-mail inquiries, observing and taking charge of behavior cases. To answer inquiries, the student is expected to consult several behavioral textbooks or other sources. Taking charge of the cases includes reading the entire behavioral history, interviewing the owner, forming a diagnosis, conferring with Dr. Houpt or a behavioral resident as to the proper behavioral and pharmacological treatment, demonstrating behavior-modification techniques and writing a letter to the client. Follow-up calls to earlier cases may be made.

**VTMED 711(6610) Herd Health and Biosecurity Risk Evaluation Using the NYS Cattle Health Assurance Program (NYSCHAP) Model**

Summer, fall. 2 credits. Minimum enrollment 5. Prerequisites: VTMED 540 and 743; third- and fourth-year veterinary students or permission of instructor. Letter grades only. K. Kaufman, F. L. Welcome, D. V. Nydam, and Diagnostic Lab faculty. Introduces students to the identification of disease risk and the evaluation of cattle operations, focusing on animal health, food safety, and the environment. The course combines information on risk assessment, creation of herd plans, biosecurity, Johne's disease, standard operating procedures, global trade, and environmental issues. Additionally, two local farms are visited to give students the opportunity to implement knowledge gained in lectures.

**VTMED 712(6613) Equine Specialty Rotation**

Fall. 2 credits. Minimum enrollment 5; maximum 10. Prerequisite: VTMED 551. Priority given to fourth-year veterinary students in equine pathway. Letter grades only. Live animals used for learning. N. G. Ducharme, G. Perkins, and S. Fubini. The objective of the rotation is to teach students basic diagnostic recognition and clinical skills for those interested in equine practice. These skills prepare students to respond on equine-related calls on their first day of work. The Cornell horse population is used to teach these practical skills. The emphasis of this elective is hands-on with discussion, rounds and lectures. The rotation includes lectures and corresponding discussion groups to cover the scientific basis, controversies, industry specific state of the art and clinical indications, contraindications, and potential complications of the various modalities.

**VTMED 713(6614) Large-Animal Clinical Emergency and Critical Care**

Summer and spring. 2 credits. Prerequisite: third- and fourth-year veterinary students. S-U grades only. R. Radcliffe and staff. The evaluation and management of critical patients and other emergency problems represents a significant component of the practice of large animal veterinary medicine. As emergency cases are frequently presented to these practitioners, it is imperative such veterinarians are well prepared. The focus of this clinical rotation is for students to acquire the knowledge, skills, and thought processes necessary to triage large animal emergencies and manage critical patients. These skills include the appropriate evaluation, stabilization, and treatment of emergency patients and the management of post-operative cases and other critical patients. Participants access relevant information from various sources related to emergency and

critical care medicine and surgery in an effort to understand and apply these principles to clinical cases. Participants primarily have patient care responsibilities in the Large Animal Intensive Care Unit of the Cornell University Hospital for Animals and work closely with technicians and clinicians to develop familiarity with technical and nursing procedures. In addition, students will learn common veterinary skills and techniques using teaching animals when time permits. The large animal emergency and critical care rotation is primarily an after-hours rotation.

**VTMED 714(6616) Veterinary Dentistry Service**

Fall, winter, spring, summer. 2 credits. Prerequisite: third- and fourth-year veterinary students who have completed Foundation Course V. Letter grades only. J. Rawlinson. This rotation is designed to introduce students to clinical veterinary dentistry with an emphasis on small animals. The goal of this rotation is for students to become proficient in completing thorough oral examinations, identifying oral pathology, interpreting dental radiographs, discussing appropriate dental therapeutic options, and performing dental prophylaxis, basic periodontal procedures, and basic and advanced extractions.

**VTMED 720(6425) Shelter Medicine I**

Spring. 1 credit. Minimum enrollment 5; maximum 40. Prerequisite: VTMED 540; third- and fourth-year veterinary students. Letter grades only. J. M. Scarlett and staff from American Society for Prevention of Cruelty to Animals. Shelter medicine is a new and exciting discipline in veterinary medicine. Caring for animals in animal shelters requires a "herd health" as well as an individual animal perspective. This course addresses the role of veterinarians working with and for animal shelters, the principles of preventive medicine and population health in companion animals; behavioral enrichment, temperament testing, and diagnosis and treatment of behavior problems in shelter animals; design and implementation of high volume spay/neuter programs for shelters; design and implementation of trap/neuter/release programs by shelters; and the medical management of common infectious diseases in shelter cats and approved methods of euthanasia for companion animals. This is the second course in a three-course sequence.

**VTMED 721(6426) Timely Topics in Veterinary Parasitology: Large-Animal**

Spring. 0.5 credit. Minimum enrollment 2. Prerequisite: third- and fourth-year veterinary students. S-U grades only. D. D. Bowman. In-depth look at one or a few parasites of special interest relative to large-animal medicine. Presents details of taxonomy, biology, epidemiology, clinical presentation, and preventive and curative treatment. Efforts are made to discuss those aspects of the disease as it relates to the practical control of these and in-depth coverage of primary literature relating to the parasite being discussed. Topics vary annually. The course is presented in a lecture/discussion format.

**VTMED 722(6427) Timely Topics in Veterinary Parasitology: Small-Animal**

Spring. 0.5 credit. Minimum enrollment 2. Prerequisite: third- and fourth-year veterinary students. S-U grades only. D. D. Bowman. In-depth look at one or a few parasites of special interest relative to small-animal medicine. Presents details of taxonomy, biology, epidemiology, clinical presentation, and preventive and curative treatment. Efforts are made to discuss those aspects of the disease as it relates to the practical control of these and in-depth coverage of primary literature relating to the parasite being discussed. Topics vary annually. The course is presented in a lecture/discussion format.

**VTMED 726(6554) Reptile and Amphibian Medicine and Surgery**

Spring. 1.5 credits. Minimum enrollment 10; maximum 40. Prerequisite: third- and fourth-year veterinary students or graduate students. Letter grades only. G. V. Kollias. Designed to introduce veterinary students to the basic principles and practice of reptile and amphibian husbandry, management, diseases and medicine and surgery.

**VTMED 730(6428) Vaccines: Theory and Practice**

Spring. 1 credit. Minimum enrollment 10; maximum 40. Prerequisite: introductory immunology course or VTMED 540 or VETMI 315; second-, third-, and fourth-year veterinary students and graduate students or others by permission of instructor. Letter grades only. Offered odd-numbered years. T. Clark. Provides an overview of vaccines used in clinical practice as well as an in-depth look at vaccine development. Emphasizes the most recent advances in vaccine design and delivery, including the use of recombinant DNA techniques for targeting specific immunological responses. Lectures touch on vaccines commonly used in veterinary practice and address in detail the use of carriers, adjuvants, and immunostimulants; attenuated pathogens; recombinant subunit vaccines; viral and bacterial vectors for vaccine delivery; synthetic antibodies; and genetic immunization with "naked" DNA. Grades based on final exam and one term report.

**VTMED 732(6438) Veterinary Clinical Toxicology**

Spring. 2 credits. Prerequisite: second-, third-, and fourth-year veterinary students. S-U grades optional. K. Bischoff. Provides veterinary students with a solid introduction to concepts and principles of toxicology and how they are applied in the clinical setting. Students learn about specific common toxicants, clinical signs in affected animals, and treatment protocols for the toxicants in question. Students also gain an understanding of the clinical approach to suspected or unknown toxicoses, sample collection and handling, and resources available for clinical toxicologic problems. The course is conducted with three one-hour lectures per week and one hour-long large-group discussion per week. Grades are based on weekly homework assignments, a midterm, and a final exam.

**VTMED 733(6429) Infectious Diseases and Management of Swine**

Spring. 2 credits. Minimum enrollment 6; maximum 80. Prerequisite: second-, third-, and fourth-year veterinary students. S-U grades optional. K. Earnest-Koons.

Provides veterinary students with a solid introduction to concepts and principles of swine infectious diseases and how they are treated in the clinical setting. Students learn about specific infectious diseases, clinical signs in affected animals, and treatment protocols for the diseases in question. Students also gain an understanding of the clinical approach to suspected or unknown infectious agents, sample collection and handling, and resources available for infectious disease diagnosis. Good management practices for swine farmers are also reviewed and their relationship to disease is discussed. The course is conducted with three one-hour lectures per week and one hourlong large group discussion per week. Meets two days per week for one hour and one day per week for two hours. Grades are based on weekly quizzes, a final exam, a short paper, and attendance/participation.

**VTMED 735(6614) Special Topics in Ambulatory and Production-Animal Medicine**

Fall, winter, spring, and summer. 1-2 credits, variable. Prerequisite: second-, third-, and fourth-year veterinary students; VTMED 560 and permission of instructor. Letter grades only. M. E. White and staff.

Provides specialized experiences in the Ambulatory and Production Medicine Service. Consists of participation in scheduled and emergency farm calls and completion of projects designed to provide experience in herd problem solving, records analysis, and implementing herd-health programs. Clinical service assignments are planned to meet individual student goals. Examples of focus areas available include livestock production medicine, dairy reproductive examinations, and small-ruminant medicine.

**VTMED 736(6501) Veterinary Diagnostic Imaging**

Spring. 1.5 credits. Minimum enrollment 20; maximum 80. Prerequisite: VTMED 540; third- and fourth-year veterinary students. Letter grades only. P. Scrivani.

Designed to emphasize the relevance of a solid foundation in veterinary anatomy as it is clinically applied to diagnostic imaging. Additionally, the course is designed to provide students with an understanding of the strengths and limitation of diagnostic imaging by discussing interpretation principles, pitfalls and interpretations, and measurements obtained through lectures, laboratory exercises, weekly quizzes, and reading assignments. Integration of these objectives culminate in weekly laboratory exercises where students must make or evaluate decisions regarding patient management based on evaluation of clinical signs and imaging examinations. The "Roentgen-Sign" approach to diagnostic imaging interpretation is used as a model.

**VTMED 737(6239) Principles of Pathology**

Spring. 1.5 credits. Minimum enrollment 6; maximum 40. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. S. McDonough.

Intended for students who wish to strengthen and broaden their knowledge of the

pathologic basis of disease. Fundamental biologic processes as revealed by gross and microscopic pathologic changes are emphasized. Molecular mechanisms are integrated into the discussion where appropriate. General pathologic processes are organized into a logical and uniform system to facilitate comprehension and learning with particular attention paid to definition and proper usage of terminology. The course includes two lectures per week and a one-hour large-group discussion. The large-group discussion allows students to apply general knowledge gained in lecture to a specific problem.

**VTMED 740(6430) Veterinary Perspectives on Pathogen Control in Animal Manure (also BEE 740(6430), BIOMI 740(6430))**

Spring. 2 credits. Prerequisite: third- and fourth-year veterinary students. Letter grades only. D. D. Bowman.

In-depth look at the management of pathogens in animal manures. Reviews the pathogens involved, the role of governing agencies, the survival of pathogens in the field, and methods of pathogen destruction. Discusses commercial methods of manure processing for the control of these pathogens for the protection of other animals and the human population. Concludes with class discussions with major stakeholders representing the dairy, beef, pork, and poultry industries and their understanding of the problem as it relates to veterinary students.

**VTMED 741(6431) Microbial Safety of Animal-Based Foods**

Spring. 1 credit. Minimum enrollment 10; maximum 20. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. B. L. Njaa and M. Wiedmann.

In the first two weeks, the instructor provides an overview of food-safety issues relevant to the veterinary profession. The following four weeks are dedicated to student presentations on selected food-borne pathogens and food-safety issues. In the final two weeks, lectures and discussion led by the instructors focus on emerging new issues in food safety and on farm-to-table technologies and approaches that can be used to assure the safety of animal-based foods.

**VTMED 742(6555) Dairy Business Management and Health Economics**

Spring. 2 credits. Minimum enrollment 5; maximum 15. Prerequisite: second-, third-, and fourth-year veterinary students. Letter grades only. L. Warnick and C. Guard.

Helps veterinary students understand basic principles of dairy economics and business management and develop specific skills used by veterinarians in health economic decision making. Covers three main topic areas: (1) overview of dairy economics from regional, national, and global perspectives; (2) the terminology and concepts used in dairy business financial analyses and economic decision making; (3) dairy health economics, including the application of economic tools to decisions related to disease treatment, health maintenance, and productivity.

**VTMED 743(6732) Interaction with the Animal Health Diagnostic Laboratory for Investigating Herd Problems**

Spring. 1 credit. Minimum enrollment 5. Prerequisite: third- and fourth-year veterinary students or permission of instructor. Letter grades only. D. V. Nydam and others.

This seminar course uses an interactive format and multiple experts from their fields to introduce future veterinarians how best to use the services of a diagnostic laboratory when investigating herd problems. The course combines logistical and factual matters such as appropriate sample submission, tests available for various pathogens, and relative test interpretation with practical case-based discussion of the various diagnostic modalities. Topics include virology (e.g., BVD), bacteriology (e.g., *Salmonella*), parasitology (e.g., *Cryptosporidium*), serology (e.g., *Johnes Disease*), molecular techniques (e.g., *E. coli*), herd-level test interpretation, and outbreak investigation.

**VTMED 744(6733) Veterinarians and Food-Animal Production Systems: An Introduction**

Spring. 1 credit. Minimum enrollment 5. Prerequisite: first- and second-year veterinary students or permission of instructor. Letter grades only. D. V. Nydam and invited speakers.

This seminar course uses an interactive format and multiple experts from their fields to introduce future veterinarians to various food-animal production systems, how veterinarians interact with them, and the synergy between these systems and veterinarians in society. Each week the production structure of the dairy, beef, swine, poultry, or aquaculture industry, veterinarians' role in them, and career opportunities and expectations are discussed. The offering is intended for first- or second-year students so that they can plan appropriately to take additions courses or set up externships in the following years.

**VTMED 745(6556) Dynamics of Dairy Herd Health and Management**

Spring. 1 credit. Prerequisite: third- and fourth-year veterinary students. Letter grades only. L. D. Warnick, D. V. Nydam, and Y. T. Grohn.

Veterinarians are increasingly asked to advise dairy producers on productivity and management decision making. This course addresses the relationships of dairy cattle diseases with herd-performance parameters. Through a combination of lectures and laboratory exercises, students learn analytic techniques and computer software skills to evaluate dairy herd disease and production problems. Topics include: (1) how often production diseases occur and when, (2) how they are interrelated, (3) the impact of disease on milk production, reproductive performances, and risk of culling, and (4) how to use this information in production medicine.

**VTMED 746(6432) Fish Health Management**

Spring. 1.5 credit. Minimum enrollment 8; maximum 16. Prerequisite: first-, second-, third-, and fourth-year veterinary students or written permission of instructor. S-U grades optional. P. R. Bowser.

Lecture and laboratory course providing an overview of the aquatic environment and the important infectious and noninfectious

diseases of fish. Covers important diseases encountered in commercial aquaculture, aquarium systems, and natural waters. The laboratory is designed to provide students with a knowledge base and hands-on diagnostic experience in diseases of fish. Students also maintain and manage aquarium systems during the course to gain an appreciation for the science behind the operation of those systems. The laboratory requires time outside the normal scheduled class sessions (to be scheduled by the students) for management of the aquarium systems. Each student also makes a presentation on a topic in aquatic animal health during the course.

**VTMED 747(6557) Exotic Small Mammals as Pets**

Spring. 1.5 credits. Maximum enrollment 80. Prerequisite: third- and fourth-year veterinary students and graduate students. Students enrolled in VTMED 703 encouraged to enroll. Letter grades only. J. K. Morrissey.

Concentrates on the husbandry, clinical presentation, diagnosis, and treatment of common diseases of nontraditional small mammals that are kept as pets. These species include ferrets, rabbits, guinea pigs, chinchillas, rats, mice, hamsters, gerbils, hedgehogs, sugar gliders, and other animals. Grading is based on a midterm and final exam. Information regarding these species in the laboratory setting will also be discussed.

**VTMED 748(6222) Canine and Feline Medical Genetics**

Spring. 2 credits. Minimum enrollment 10; maximum 40. Prerequisites: VTMED 520, 530, and 531. S-U grades optional. V. N. Meyers-Wallen.

Covers the genetic and pathophysiologic mechanisms underlying inherited diseases in dogs and cats that may be encountered in small animal practice. Specific disorders of clinical importance are presented in a lecture format to illustrate the distribution, diagnosis, and control of inherited diseases in individuals and populations. Ethical considerations regarding treatment, prevention, and control measures are discussed.

**VTMED 749(6433) Anaerobic Infections of Animals**

Spring. 1 credit. Minimum enrollment 10; maximum 80. Prerequisite: VTMED 540. S-U grades only. P. L. McDonough and staff.

Presents anaerobic infections in clinical context as an adjunct to the material covered in Foundation Course IV. Students gain an understanding of the diversity and biology of anaerobic bacteria and the niches that they occupy in the animal and avian body. A basic, clinically oriented taxonomy is presented, and students learn about the virulence and pathogenesis of the major anaerobes that they will encounter in clinical practice. The clinical signs of anaerobic infections, laboratory identification and susceptibility testing, and the use of specimen transport media are also covered. Treatment of common infections, including wound care, is covered and vaccines currently available are discussed in detail. In the second four weeks of the course, students learn about the major clinical syndromes caused by anaerobes. Course format consists of two one-hour lectures per week for eight weeks.

**VTMED 750(6434) Shelter Medicine II**

Spring. 1 credit. Minimum enrollment 3; maximum 20. Prerequisite: third- and fourth-year veterinary students. Highly recommended: VTMED 720. Letter grades only. J. M. Scarlett.

Intended as a sequel to the Issues and Preventive Medicine in Animal Shelters course offered in the C Distribution block. In light of the time constraints in the Issues course, the principles of prevention and control to specific diseases (e.g., ringworm, kennel cough) commonly encountered in small animal populations are not discussed. This course encourages students to apply principles of infectious disease, epidemiology, and preventive medicine to infectious disease problems in small animal populations, with a particular emphasis on disease problems in shelters. Mention of modification to fit other small animal populations (e.g., catteries, kennels) is made.

**VTMED 751(6558) Applied Dairy Nutrition for Practitioners**

Spring. 2 credits. Minimum enrollment 5; maximum 25. Prerequisite: veterinary students or permission of instructor. S-U grades only. T. Overton, D. Nydam, and others.

Provides a foundation in the principles of dairy cattle nutrition for veterinary students interested in dairy production medicine. Emphasizes integration of the principles of dairy cattle nutrition with practical rational formulation with troubleshooting on dairy farms, both preventive and curative.

**VTMED 752(6558) Advanced Small Animal Clinical Oncology**

Spring. 1 credit. Minimum enrollment 10. Prerequisite: VTMED 666. Letter grades only. K. M. Rassnick.

Elective course designed to complement the required course VTMED 666 Veterinary Clinical Oncology. Cancer is among the leading causes of death in dogs and cats and remains the number one concern of pet owners. Management and prevention of cancer in companion animals represents a significant component of the practice of small animal veterinary medicine. This advanced course emphasizes the biologic behavior and patient management of cancers in dogs and cats more thoroughly than addressed in VTMED 666. Additionally, molecular and cytogenetic methodologies that are likely to affect cancer diagnosis and management in the future are discussed. Finally, students are provided with the skills necessary to critically read and evaluate clinically based publications in the professional literature.

**VTMED 753(6734) Companion Animal Welfare Issues**

Spring. 1 credit. Minimum enrollment 3; maximum 50. Letter grades only.

J. M. Scarlett, L. Appel, and L. Miller. Companion animal welfare issues have become a major concern for many American communities. Precipitated by the changing status of companion animals, the proliferation of free-roaming cats, and human safety issues, communities are considering (or have passed) breed-specific bans, restrictions on declawing, and solutions for "free-roaming" cats. This course will address these and other issues such as pet surplus – animals entering shelters and those euthanized in shelters; the "no-kill" movement, reasons for relinquishment to shelters; recognition and documentation of

animal abuse; the use of pediatric neutering in population control—studies relating to safety and potential adverse effects; dogs and cock fighting and the role of the veterinarian in the recognition and reporting of these activities. The objective of the course is to provide information for veterinary students such that they can assume leadership with regards to these issues in their future communities.

**VTMED 754(6735) Conservation Medicine**

Spring. 1.5 credits. Maximum enrollment 80. Prerequisite: veterinary students, graduate students at CVM, others by written permission of instructor. Letter grades only. G. V. Kollias, A. J. Travis, and N. Abou-Madi.

Conservation Medicine will introduce students to the basic concepts of free-ranging and captive wildlife conservation and will engage veterinary students in issues of sustainable development relating to wildlife. The course will present information not included in other courses within the curriculum that is fundamental for veterinarians contemplating a career in conservation medicine, wildlife health, or zoological medicine. This course will complement existing courses in the curriculum including, but not limited to, Introduction to Avian Biomedicine, Avian Diseases, Veterinary Aspects of Captive Wildlife, Veterinary Medicine in Developing Nations, The Literature and Subject Matter of Natural History, Comparative Anatomy, Foreign Animal Diseases, Epidemiology of Infectious Diseases, Anatomy and Histology of Fishes, and Fish Health Management. Students will learn how wildlife populations are regulated by their environment and how such populations are managed and assessed. Various habitat preservation strategies will be presented and discussed. Conversely, for critical endangered species, the focus will be on *ex situ* recovery programs.

## UNDERGRADUATE AND GRADUATE COURSES

These courses are taught by the faculty in the College of Veterinary Medicine but do not contribute to the D.V.M. degree requirements.

## Biomedical Sciences

**VTBMS 346(3460) Introductory Animal Physiology (also BIOAP 311[3110]) (Undergraduate)**

Fall. 3 credits. Prerequisites: BIO G 105, 106, or 101, 102, 103, 104, 107, 108; CHEM 207, 208, or 206, or 215, 216; MATH 106, 111 or 191 or AP credit for any of the above; or one year college-level biology, chemistry, and math. S-U grades optional. E. R. Loew.

General course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure-function relationships are stressed along with underlying physical-chemical mechanisms.

**VTBMS 400(4000) A Genomic Approach to Studying Life**

Fall. 3 credits. Prerequisites: one year introductory biology or equivalent plus BIOGD 281 or BIOBM 330 or 333 or 331/332 or permission of instructor. Letter grades only. J. Schimenti.

Introduction to principles underlying the organization of genomes and the methods of studying them, emphasizing genome-wide approaches to research. Covers the application of genomics methodologies for addressing issues including evolution, complex systems, genetic and gene:phenotype relationships. Includes periodic, in-depth discussions of landmark or timely genomic papers.

#### **VTBMS 401(4010) Genomic Analysis**

Spring. 3 credits. Prerequisites: upper-level undergraduates and graduate students; BIOGD/VTBMS 400 or equivalent by permission of instructor. Letter grades only. T. O'Brien.

Overview of approaches and tools used in genomic research. Covers experimental and computational technologies as well as theoretical concepts important for the study of genomes and their function. Topics include high-throughput DNA sequencing and genotyping, genetic mapping of simple and complex traits, RNA expression profiling, proteomics, genome modification and transgenesis, and computational genomics.

#### **VTBMS 600(6000) Special Projects in Anatomy**

Fall, spring. 1 credit per 2.5-hour period. Prerequisite: permission of instructor. S-U grades only. Biomedical science staff.

#### **VTBMS 610(6100) Genomes as Chromosomes**

Fall. 1 credit. Prerequisites: upper-level undergraduates and graduate students; others by permission of instructor or BIOGD 281 and BIOBM 332. Letter grades only. T. O'Brien and P. Cohen.

The eukaryotic genome is partitioned into discrete structural units, the chromosomes. This course examines how chromosomes organization is related to chromatin structure, gene expression, DNA replication, repair and stability. Special emphasis is placed on how the linear arrangement of sequence features along the chromosome, such as genes and regulatory modules, relate to the functional organization of the genome in the nucleus. Experimental and computational approaches used to address chromosome structure and function are studied.

#### **VTBMS 611(6110) Genomes Maintenance Mechanisms**

Fall. 1 credit. Prerequisites: upper-level undergraduates and graduate students. BIOGD 281, BIOBM 330, or 333, or 331/332 or equivalents. S-U grades optional. R. Weiss.

Focuses on the molecular mechanisms used by eukaryotic cells to preserve genomic integrity. Topics include endogenous and exogenous sources of mutation, DNA repair pathways, and cell cycle checkpoint mechanisms. Also addresses how genome maintenance impacts genome plasticity and evolution, as well as the relationship between genomic instability and disease, including cancer.

#### **VTBMS 612(6120) Overview of Model Genetic Organisms**

Spring. 1 credit. Prerequisites: upper-level undergraduates and graduate students; BIOGD 281, or BIOGD/VTBMS 400 or permission of instructor. S-U grades optional. J. Schimenti.

Presents the features of various model organisms and their relative merits for conducting various types of genomics/genetics research. Model systems discussed are:

*Arabidopsis*, yeast, *Drosophila*, *C. Elegans*, zebrafish, and mice.

#### **VTBMS 620(6200) Research Fellowship in Biomedical Sciences**

Fall, spring. 1–12 credits. Cannot be used to fulfill formal course requirements for DVM curriculum. Prerequisite: permission of instructor. S-U grades only.

Offered by individual faculty members in the Department of Biomedical Sciences for DVM students undertaking research in research fellowship.

#### **VTBMS 628(6280) Graduate Research in Animal Physiology (also BIOAP 719[7190]; Graduate)**

Fall, spring. 1–3 credits. Prerequisite: written permission of department chairperson and faculty mentor who will supervise work and assign grade. S-U grades optional.

Similar to BIO G 499 but intended for graduate students who are working with faculty members on an individual basis.

#### **VTBMS 700(7000) Predictions of Form or Phylogeny**

Fall. 1 credit. Prerequisite: permission of instructor. S-U grades optional. J. W. Hermanson.

Form and function are often discussed as a correlated entity in biology. This seminar group starts with the question, Does form really predict function? This is addressed initially with respect to the analysis of paleobiology but then encompasses examples of experimental functional morphology. In particular, there is a growing body of experimental data demonstrating that diverse functions can be achieved with nearly identical morphologies, and that the functional diversity may better be explained by behavior or environmental factors. Might these observations refute current theories about the origin of flight in extinct organisms (i.e., the cursorial or ground-up theory of flight versus the arboreal gliding theory of flight evolution)? Specific topics pursued are selected by participants in this course. Participation is open to interested graduate students, advanced undergraduate students, and veterinary students.

#### **VTBMS 701(7010) Mouse Pathology and Transgenesis (also TOX 701[7010])**

Spring. 1 credit. Maximum enrollment 12 students. Priority given to graduate students, pathology residents, interns, and post-docs; third and fourth-year veterinary students may attend if space permits. Prerequisite: permission of instructor. Highly recommended: basic histology course (BIOAP 413) or equivalent. Letter grades only. A. Nikitin and staff.

Introductory course on contemporary mouse pathology explains principles and methods of pathology and transgenesis. In addition to covering development, anatomy, histology and pathology of organs and systems, the course focuses on systematic evaluation of new genetically modified mice, with particular attention to such topics as experimental design, validation of mouse models, and identification of novel phenotypes. This course includes supervised mouse necropsy.

#### **VTBMS 702(7020) The Practice of Laboratory Animal Medicine**

Fall, spring. 1 credit. Prerequisite: upper-level undergraduate or graduate standing; basic knowledge of anatomy and pathology in comparative animal species. S-U grades optional. M. E. Martin.

A laboratory animal veterinarian must be trained in the regulatory aspects of research and teaching utilizing animals; in addition, they must understand the principles of facility management and design. Also, to work with researchers, a lab animal veterinarian must have knowledge of basic research methodologies and animal welfare issues. This course may also be of interest to other veterinarians, veterinary students, and researchers who wish to understand the workings of the specialized field that oversees and enables the use of animals in research and teaching. The topics covered include: Laboratory Animal Medicine: Historical Perspectives; Laws, Regulations, and Policies; Design and Management of Animal Facilities; Anesthesia, Analgesia, and Euthanasia; Techniques of Experimentation; Control of Biohazards Used in Animal Research; Selected Zoonoses/Zenozoonoses; Genetic Monitoring; Transgenic and Knockout Mice; Factors Influencing Animal Research; Animal Models in Biomedical Research; Research in Lab Animal and Comparative Medicine; Lab Animal Behavior.

#### **VTBMS 703(7030) The Biology and Diseases of Laboratory Animals**

Fall, spring. 2 credits. Prerequisite: upper-level undergraduate or graduate standing; basic knowledge of anatomy and pathology in comparative animal species. S-U grades optional. M. E. Martin.

Intended for veterinarians entering the field of laboratory animal medicine. It may also be of interest to other veterinarians, veterinary students, and researchers with a basic knowledge of anatomy and pathology who use animals in research or teaching. This course will cover the main laboratory animal species (rodents, rabbits, non-human primates, ruminants, swine, dogs, cats, ferrets, reptiles, amphibians, and fish). The biology, husbandry, diseases, pathology, and main research uses of these species will be covered. The course will meet for 2 hours weekly and will extend over the course of two years.

#### **[VTBMS 713(7130) Cell Cycle Analysis**

Spring. 1 credit. Minimum enrollment 5 students. S-U grades only. Offered even-numbered years; not offered 2006–2007; next offered 2007–2008. A. Yen.

Presents a brief historical review of the cell cycle; a summary of cell cycle regulatory processes; and practical methods for cell cycle analysis, including mathematical representations.]

#### **VTBMS 720(7200) Special Problems in Physiology (Graduate)**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor. S-U grades optional.

Laboratory work, conferences, collateral readings, and reports. Adapted to the needs of students.



**VTBMS 788(7880) Seminar in Surgical Pathology**

Fall, spring. 1 credit. Intended for residents in anatomic pathology; third- and fourth-year veterinary students may attend. Letter grades only. D. H. Schlafer and faculty of the Section of Anatomic Pathology and visiting pathologists.

The major objective of this discussion and seminar course is to introduce the residents to the discipline of surgical pathology. Selected material from the Surgical Pathology Service is prepared in advance for independent review by the residents. The material is presented in a slide-seminar format by the residents under the review of the faculty. Emphasis is placed on pathogenesis, etiology, and pathologic descriptions of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs.

**Clinical Sciences****[VETCS 299(2990) Research Opportunities in Clinical Sciences]**

Summer, six-week session. 6 credits; minimum 120 hours lab time expected per 3 credits. Prerequisites: one year basic biology (scores of 5 on Biology Advanced Placement Examination of College Entrance Examination Board or BIO G 100 level). Letter grades only. Clinical science faculty.

Mentored research apprenticeship program designed to give laboratory experience to qualified unmatriculated high school students (participating in Cornell Summer College).]

**VETCS 618(6180) Principles of Medical Imaging (also BME 618(6180))**

Fall. 3 credits. Prerequisite: graduate D.V.M.s or equivalent in residency or graduate training programs. Letter grades only. Y. Wang and N. Dykes.

For description, see BME 618.

**VETCS 700(7000) Pathophysiology of Gastrointestinal Surgery**

Fall. 1.5 credits. S-U grades only. Offered every third year. S. L. Fubini.

Initially presents normal anatomy and physiology of the gastrointestinal system in carnivores, herbivores, and ruminants. This is followed by in-depth discussion of the pathophysiological mechanisms and sequelae of gastrointestinal obstructions including reperfusion injury, peritonitis, adhesions, and short bowel syndrome. This course emphasizes development of an advanced understanding of surgically relevant gastrointestinal problems leading to appropriate decision making.

**[VETCS 701(7010) Pathophysiology of Orthopedic Surgery (Graduate)]**

Spring. 1.5 credits. Prerequisites: D.V.M., M.D., or equivalents or permission of instructor. S-U grades only. Offered every third year; next offered 2007-2008. A. J. Nixon.

Provides specialized training in the anatomic, physiologic, and pathologic process of musculoskeletal diseases in animals and humans, with special emphasis on surgical diseases of tendons, bones, and joints.]

**VETCS 702(7020) Pathophysiology of Cardiopulmonary Surgery (Graduate)**

Fall. 1.5 credits. Prerequisite: D.V.M. or equivalent. S-U grades only. Offered every third year. R. P. Hackett, S. L. Fubini, and N. G. Ducharme.

Using lectures and group discussions, the objective of this course is to explain the pathophysiology of various cardiovascular diseases (cardiac arrest, cardiac arrhythmia under anesthesia) and airway disease (thoracic and upper-airway disease). As a basis for these abnormalities, cardiopulmonary hemodynamics and biomechanical aspects of ventilation are reviewed. The emphasis is placed on understanding these mechanisms and outlining the surgeon's response to them.

**[VETCS 703(7030) Surgical Principles and Surgery of the Integumentary System (Graduate)]**

Spring. 1.5 credits. Prerequisite: graduate D.V.M.s or equivalent in residency or graduate training programs. S-U grades only. Offered every third year; next offered 2008-2009. S. L. Fubini.

Designed for surgery residents and graduate students. It is largely discussion format and examines surgical principles and surgery of the integumentary system.]

**VETCS 704(7040) Pathophysiology of Urogenital Surgery (Graduate)**

Fall. 1.5 credits. Prerequisite: graduate D.V.M.s or equivalent in residency or graduate training programs. S-U grades only. Offered every third year. S. L. Fubini.

Designed to review and discuss urogenital surgical procedures in animals and the rational basis for them. Pathophysiology is stressed. Some classes consist of reprints with discussion.

**VETCS 705(7050) Animal Pain and Its Control**

Spring. 2 credits. Prerequisite: permission of instructor. Open to third- and fourth-year veterinary medical students, interns, residents, graduate students, and postdoctoral associates interested in fundamental and applied concepts of pain in animals. S-U grades optional. Offered odd-numbered years. R. D. Gleed, J. W. Ludders, and P. F. Moon.

Emphasizes the physiologic and pathophysiologic mechanisms involved in pain perception by animals, their responses (physiological and behavioral) to pain, and the pharmacologic mechanisms underlying analgesic therapy. The subject material is presented through lectures, group discussions, group readings, and group evaluation of analgesic protocols.

**VETCS 706(7060) Pathophysiology of Neurologic Surgery (Graduate)**

Spring. 1.5 credits. Prerequisite: D.V.M.s, M.D.s, or equivalent or permission of instructor. S-U grades only. Offered every third year. A. J. Nixon.

Provides specialized training in neurosurgical techniques and application and discusses pathophysiologic implications of neurosurgical and neurologic diseases.

**VETCS 710(7100) Advanced Veterinary Anesthesiology I**

Fall. 1 credit. Prerequisite: VTMED 568 or permission of instructor; third- and fourth-year veterinary students, graduate students, interns, and residents. S-U grades only. R. D. Gleed and J. W. Ludders.

Designed to prepare students for the American College of Veterinary Anesthesiology examinations. Also suitable for interns and for residency training in other areas such as surgery and internal medicine. Speakers are from both inside and outside the college. Topics cover the basic sciences as they apply to anesthesiology such as physics and engineering, applied pharmacology, physiology, and pathology. Clinically oriented lectures are also given concerning specific anesthetic techniques and species-specific differences in response to anesthetic drugs.

**VETCS 711(7110) Advanced Veterinary Anesthesiology II**

Spring. 1 credit. Prerequisite: VTMED 568 or permission of instructor; third- and fourth-year veterinary students, graduate students, interns, and residents. S-U grades only. R. D. Gleed and J. W. Ludders.

Designed to prepare students for the American College of Veterinary Anesthesiology examinations. Also suitable for interns and for residency training in other areas such as surgery and internal medicine. Speakers are from both inside and outside the college. Topics cover the basic sciences as they apply to anesthesiology such as physics and engineering, applied pharmacology, physiology, and pathology. Clinically oriented lectures are also given concerning specific anesthetic techniques and species-specific differences in response to anesthetic drugs.

**Microbiology and Immunology****[VETMI 299(2990) Research Opportunities in Microbiology and Immunology]**

Summer, six-week session. 6 credits; minimum 120 hours lab time expected per 3 credits. Prerequisites: one year of basic biology (scores of 5 on Biology Advanced Placement Examination of College Entrance Examination Board or BIO G 100 level). Letter grades only. Microbiology and Immunology faculty.

Mentored research apprenticeship program designed to give laboratory experience to qualified unmatriculated high school students (participating in Cornell Summer College).]

**VETMI 315(3150) Basic Immunology (also BIO G 305[3050]; Undergraduate)**

Fall. 3 credits. Highly recommended: basic courses in microbiology, genetics, and biochemistry. S-U grades optional. J. A. Marsh.

Survey of immunology, with emphasis on the cellular and molecular bases of the immune response. More information is available at the BIO G 305 courseinfo web site.

**VETMI 331(3310) General Parasitology (also BIOMI 331[3310]; Undergraduate)**

Spring. 2 credits. Prerequisites: zoology or biology course; any of the following: BIOMI 261, 264, 267, 274, 275, 278; BIO G 101, 102, 103, 104, 106, 107, 108, 109, 110, 170, 202, 207; BIOMI 192, 290, or equivalent courses. Letter grades only. D. D. Bowman.

Introduction to the basic animal parasites, stressing systematics, taxonomy, general biology, ecological interactions, and behavior of non-medically important groups. Also introduces the major animal parasites, protozoan, nematode, platyhelminth, acanthocephalan, annelid, and arthropod.



**[VETMI 404(4040) Pathogenic Bacteriology and Mycology (also BIOMI 404(4040))]**

Spring. 2 or 3 credits; 3 credits with lec. and sem. Seminar required for graduate students. Maximum enrollment for seminar portion 15. Prerequisites: BIOMI 290 and 291; undergraduates by permission of instructor. Not offered 2006–2007; next offered 2007–2008. Letter grades only. D. P. Debbie.

Course in medical microbiology, presenting the major groups of bacterial and mycotic pathogens important to human and veterinary medicine. Emphasizes infection and disease pathogenesis.]

**VETMI 409(4090) Principles of Virology**

Fall. 3 credits. Prerequisites: BIOMI 290 and 291 or permission of instructor. Recommended: BIOMI 408, BIOMI 330–332, 432. G. Whittaker and S. Lazarowitz.

Covers the principles of virology, focusing mainly on animal viruses but also including plant viruses and bacteriophage. Topics include the classification of viruses, virus entry, genome replication and assembly, and virus pathogenesis. Particular emphasis is placed on virus-host cell interactions and common features between different viral families.

**VETMI 431(4310) Medical Parasitology (also BIOMI 431(4310); Undergraduate)**

Fall. 2 credits. Prerequisites: zoology or biology course; any of the following: BIOEE 261, 263, 264, 267, 274, 275, 278; BIO G 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 170, 202, 207; BIOMI 192, 290, 398, or equivalent course. Letter grades only. D. D. Bowman.

Systematic study of arthropod, protozoan, and helminth parasites of public health importance, with emphasis on epidemiologic, clinical, and zoonotic aspects of these parasitisms.

**VETMI 605(6050) Special Projects in Microbiology (Undergraduate)**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor; good background in microbiology or immunology. Recommended: background in pathogenic microbiology and immunology. S-U grades only. Microbiology staff.

Normally provides an opportunity for the student to work in a research laboratory or carry out a special project under supervision.

**VETMI 620(6200) Research Fellowship in Microbiology and Immunology**

Fall, spring. 1–12 credits. Cannot be used to fulfill formal course requirements for DVM curriculum. Prerequisite: permission of instructor. S-U grades only. Faculty TBA. Offered by individual faculty members in the Department of Microbiology and Immunology for DVM students undertaking research in Research Fellowship.

**VETMI 700(7000) The Biology of Animal and Plant Viruses (Graduate and Upper-level Undergraduate)**

Fall. 2 credits. Letter grades only. Offered odd-numbered years; next offered 2007–2008. C. R. Parrish and virology faculty. Examines current topics in studies of animal and plant viruses. Topics examined in depth include the structures of viruses and their interactions with host cells.

**[VETMI 705(7050) Advanced Immunology (also BIO G 705(7050); Graduate)**

Spring. 3 credits. Prerequisite: VETMI 315 or permission of instructor. Letter grades only. Offered even-numbered years; next offered 2007–2008. J. Marsh and staff. Coverage at an advanced level of molecular and cellular immunology.]

**VETMI 707(7070) Advanced Work in Bacteriology, Virology, and Immunology (Graduate)**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor. S-U grades optional. Microbiology staff.

Designed primarily for graduate students with a good background in pathogenic microbiology and immunology. May be elected by veterinary students who are properly prepared.

**VETMI 712(7120) Seminars in Infection and Immunity**

Fall, spring. 1 credit. Requirement for graduate students in Department of Microbiology and Immunology and field of immunology. S-U grades only. D. G. Russell.

Invited speakers in immunology and infection biology acquaint students with current advances in the field.

**VETMI 713(7130) Biological and Biomedical Sciences Program—Teaching Experience**

Fall, spring. 1 credit. Requirement for first-year graduate students. S-U grades only. D. G. Russell.

All graduate students who are a part of the Biological and Biomedical Sciences Program must complete this 1-credit teaching experience. The goal is for each graduate student to increase his or her knowledge in a biology area and simultaneously increase confidence in his or her teaching abilities. Specific teaching assignments are administered through the CVM's Office of Graduate Education. A faculty mentor provides ongoing feedback throughout the experience.

**VETMI 719(7190) Immunology of Infectious Diseases (also BIO G 706(7060); Graduate)**

Spring. 2 credits. Prerequisite: VETMI 315 or permission of instructor. S-U grades optional. Offered odd-numbered years. E. Y. Denkers and staff.

Focuses on molecular and cellular mechanisms underlying the immunity to infectious diseases caused by viral, bacterial, protozoan, and helminth pathogens. How the host immune system responds to infection and how pathogens manipulate immunity are considered. Specific topics include immune response initiation; antigen presentation pathways; T cell subsets in protection and pathology; mechanisms of cytolysis; manipulation of signaling in the immune system; vaccines. Lectures are based on recent advances in the field and are accompanied by relevant readings from the current literature.

**VETMI 723(7230) Current Topics in Immunology**

Fall, spring. 1 credit. Registration each semester required of field of immunology graduate students. Prerequisite: graduate standing. S-U grades only. Immunology faculty.

Immunology discussion group in which students present research papers from the contemporary scientific literature.

**VETMI 725(7250) Mechanisms of Microbial Pathogenesis (also BIOMI 725(7250))**

Spring. 3 credits. Prerequisites: BIOMI 404, 409, 417 or equivalent course; written permission of instructor for undergraduates. Letter grades only. D. Debbie, M. Hesse, H. Marquis, J. Parker, M. Scidmore, and G. Whittaker.

Covers the mechanisms of pathogenesis of bacteria, fungi, parasites, and viruses. Addresses the need for a course covering the breadth of microbial pathogenesis. Emphasizes, at the molecular and cellular levels, the methods microbial pathogens use to enter, survive, and cause damage to their hosts. By studying the molecular mechanisms of all the major microbial groups together, students will be able to appreciate the commonality of pathogenic mechanisms as well as see the unique properties of each group of organisms. The contribution of the host response to the pathogenesis process will be covered, but in less detail as this information is addressed in VETMI 719 Immunology of Infectious Diseases.

**VETMI 737(7370) Advanced Work in Animal Parasitology (Graduate)**

Fall, spring. 1–3 credits. Prerequisite: advanced undergraduate, graduate, and veterinary students. Letter grades only. D. D. Bowman and other faculty.

Intended for advanced undergraduate, graduate and veterinary students with interests in parasitology research.

**[VETMI 770(7700) Advanced Work in Avian Diseases (Graduate)]**

Fall, spring. 1–3 credits. Letter grades only. K. A. Schat.]

**VETMI 772(7720) Advanced Work in Aquatic Animal Diseases (Graduate)**

Fall, spring. 1–3 credits. S-U grades only. P. R. Bowser.

**[VETMI 773(7730) Advanced Work in Avian Immunology]**

Fall, spring. Variable credit. Letter grades only. K. A. Schat.]

**VETMI 783(7830) Seminars in Parasitology (Graduate)**

Fall, spring. 1 credit. Prerequisite: veterinary or graduate students or permission of instructor. S-U grades only. D. D. Bowman.

Seminar series designed to acquaint students with current research in the field of parasitology. The range of topics is determined, in part, by the interests of those participating and may include such topics as the ecology of parasitism, parasite systematics, wildlife parasitology, and parasitic diseases of plants and animals, including humans.

**Molecular Medicine****[VETMM 299(2990) Undergraduate Research in Pharmacology]**

Summer, six-week session. 3 to 6 credits; minimum 120 hours of lab time expected per 3 credits. Prerequisites: one year basic biology (score of 5 on Biology Advanced Placement Examination of College Entrance Examination Board or BIO G 100 level). Letter grades only. R. A. Cerione. Mentored research apprenticeship program designed to give laboratory experience to qualified unmatriculated high school students (participating in Cornell Summer College) or Cornell underclassmen.]

**VETMM 470(4700) Biophysical Methods (also A&EP/BIONB 470[4700])**

Fall. 3 credits. Prerequisite: permission of instructor. Prerequisite: basic knowledge of physics and mathematics. Recommended: some knowledge of physical chemistry, molecular and cell biology, or neurobiology. Letter grades only. M. Lindau.  
For description, see A&EP 470.

**VETMM 571(5710) Biophysics Methods Advanced Laboratory (also A&EP 571[5710])**

Spring, taught daily during first three weeks of Jan. 3 credits. Prerequisites: VETMM 470. S-U grades optional. M. Lindau.  
For description, see A&EP 571.

**VETMM 610(6100) Cellular and Molecular Pharmacology**

Fall. 2 credits. Prerequisite: permission of instructors. S-U grades optional. Offered even-numbered years. C. M. S. Fewtrell and field of pharmacology faculty.  
Graduate-level course surveying the molecular and cellular aspects of receptor mechanisms, signaling pathways, and effector systems. Topics include drug-receptor interactions; ligand- and voltage-gated ion channels; G protein pathways; growth factor signaling; calcium; nutrient and nitric oxide signaling; mechanisms of receptor-mediated effects on neural excitability, electrical pacemakers, muscle contraction, gene expression; and chemotherapy, including antimicrobial agents and cancer chemotherapy.

**[VETMM 611(6110) Systems Pharmacology]**

Spring. 2 credits. Prerequisite: permission of instructors. S-U grades optional. Offered even-numbered years; not offered 2006-2007; next offered 2007-2008. C. M. S. Fewtrell and field of pharmacology faculty.  
Graduate-level course surveying system- and organ-related aspects of pharmacology.

**[VETMM 700(7000) Calcium as a Second Messenger in Cell Activation]**

Spring. 2 credits. Prerequisite: permission of instructor. Lec-disc. S-U grades only. Offered even-numbered years; not offered 2006-2007; next offered 2007-2008. C. M. S. Fewtrell.

Focuses on regulation of intracellular calcium and techniques for studying calcium movements and distribution in cells.]

**VETMM 701(7010) Organ-System Toxicology (also TOX 611[6110])**

Fall. 1 credit. Prerequisite: graduate students in environmental toxicology. S-U grades only. Offered even-numbered years. W. S. Schwark.

Minicourse on molecular mechanisms involved in chemical toxicity. Considers specific examples of toxicity in organ systems such as the nervous system, kidney, liver, respiratory tract, and cardiovascular system.

**[VETMM 703(7030) Receptor-Ligand Interactions]**

Fall. 2 credits. Prerequisite: permission of instructors. S-U grades optional. Offered odd-numbered years; not offered 2006-2007; next offered 2007-2008. G. A. Weiland and R. E. Oswald.

Covers both the practical and theoretical tools for the study of ligand-receptor interactions, emphasizing the quantitative and physical chemical aspects of receptor theory.]

**[VETMM 704(7040) CNS Synaptic Transmission]**

Fall. 2 credits. Limited to 20 students. Prerequisite: senior or graduate standing; permission of instructor. S-U grades optional. Offered odd-numbered years; not offered 2006-2007; next offered 2007-2008. L. M. Nowak.

Survey course in vertebrate central nervous system physiology and pharmacology, that focuses on mechanisms of neuro-transmitter action at the membrane and cellular levels.]

**VETMM 705(7050) Chemistry of Signal Transduction**

Fall. 2 credits. S-U grades optional. Offered even-numbered years. R. A. Cerione.  
Focuses on the mechanisms of action of GTP binding proteins. Examines several receptor-coupled signaling systems, including adenylyl cyclase, vertebrate vision, phosphatidylinositol lipid turnover, receptor systems regulating various ion channels, and receptors involved in cell growth regulation.

**VETMM 706(7060) Growth Factor-Coupled Signaling (also BIOBM 734[7340])**

Fall. 0.5 credit. Prerequisite: permission of instructor. S-U grades optional. Offered even-numbered years. R. A. Cerione.  
The general theme of this course is mitogenic signaling pathways. Receptor tyrosine kinases, src, ras, and ras-regulatory proteins are covered.

**[VETMM 707(7070) Protein NMR Spectroscopy (also BIOBM 730[7300])]**

Spring. 2 credits. Prerequisites: CHEM 389 and 390 or 287 and 288 or permission of instructor. S-U grades optional. Offered even-numbered years. R. E. Oswald and K. L. Nicholson.

The student acquires the tools necessary for in-depth understanding of multidimensional, multinuclear NMR experiments.]

**[VETMM 709(7090) Topics in Cancer Cell Biology]**

Fall and spring, certain years. 0.5-1.0 credit per sec. Prerequisite: graduate standing. Letter grades only. Students may select modules (sections) of interest. Not offered 2006-2007. Coordinator: B. U. Pauli.

Sec 1—Cell Adhesion Molecules, Signaling, and Cancer. 1 credit. J. Guan.

Sec 2—Cell Cycle Analysis (also TOX 713 and TOX 698). 1 credit. A. Yen.

Sec 3—Principles of Metastasis. 1 credit. B. U. Pauli.

Sec 4—Angiogenesis in Normal Development, Cancer, and Other Diseases. 1 credit. B. U. Pauli.

Sec 5—Current Topics in Oncogenic Viruses. J. Casey.

Sec 6—Growth Factor-Coupled Signaling. 0.5 credit. R. Cerione.]

**VETMM 720(7200) Patch-Clamp Techniques in Biology**

Spring, daily during second and third weeks of Jan. 2 credits. S-U grades only. L. M. Nowak.

Students learn theoretical background for patch-clamp studies in morning lectures. The experimental techniques of conventional and permeabilized patch whole-cell recording and single-channel recordings in cell-attached and -excised membrane patches are discussed.

Lab training sessions are arranged individually throughout the spring semester.

**VETMM 730(7300) Graduate Research in Pharmacology or Molecular Medicine**

Fall, spring, and summer. 1-12 credits. May not be used to fulfill formal course requirements for field of pharmacology. Prerequisite: permission of instructor. S-U grades only.

Offered by individual faculty members in the Department of Molecular Medicine and the graduate field of pharmacology for graduate students undertaking research toward M.S. or Ph.D. degrees.

**VETMM 740(7400) Special Projects and Research in Pharmacology**

Fall, spring, and summer. 1-3 credits each topic. May not be used to fulfill formal course requirements for field of pharmacology. Letter or S-U grades. Field of pharmacology faculty.

Enables students to undertake research in an area related to the research interests of a faculty member in the graduate field of pharmacology. Topics include but are not limited to Mechanisms of Growth-Factor Action—R. A. Cerione; The Role of Calcium in Stimulus-Secretion Coupling—C. M. S. Fewtrell; Mechanisms of Neurotransmitter Release—M. Lindau; Central Nervous System Neurotransmitters—L. M. Nowak; Structure-Function of the Nicotinic Acetylcholine Receptor—R. E. Oswald.

**VETMM 760(7600) Directed Readings in Pharmacology**

Fall, spring, and summer. 1-3 credits each topic. Letter or S-U grades. Reading and disc. Field of pharmacology faculty.

Individual members of the graduate field of pharmacology offer directed readings and discussions on pharmacological topics to small groups or to individual students. Topics include but are not limited to Receptor Mechanisms—G. A. Weiland; Biochemical Neuropharmacology—G. A. Weiland; Amino Acid Neurotransmitters—L. M. Nowak; Stimulus-Secretion Coupling—C. M. S. Fewtrell; Cell Calcium—C. M. S. Fewtrell.

**Population Medicine and Diagnostic Sciences****VTPMD 299(2990) Undergraduate Research in Epidemiology**

Fall, spring, and summer. 3 credits; minimum 120 hours of lab time expected per 3 credits. Prerequisite: undergraduate standing; one year of basic biology (score of 5 on Biology Advanced Placement Examination of College Entrance Examination Board or BIO G 100 level) or permission of instructor. J. Scarlett, H. Erb, Y. Grohn, L. Warnick, H. Mohammed, and Y. Schukken.

Mentored research apprenticeship program designed to give laboratory experience in applied epidemiology to qualified unmatriculated high school students (participating in Cornell Summer College) or Cornell underclassmen. Students are placed in a research laboratory with a designed project under the direct supervision of a research associate (upper-level graduate student, post-doc, or faculty member). Students are graded on preparation participation in laboratory academic life and appropriate acquisition of techniques. At the end of the six-week session, they are expected to give a brief (15- to 20-minute) oral presentation on their

work and submit a manuscript in a form suitable for publication. The faculty director of the laboratory has ultimate responsibility for evaluating each student's work and assigning the grade.

**VTPMD 664(6640) Introduction to Epidemiology (Graduate)**

Fall, 3 credits. Corequisite: BTRY 601 (College of Agriculture and Life Sciences) or permission of instructor. S-U grades optional. H. N. Erb.

Lectures and discussion deal with the fundamentals of epidemiology. Topics include outbreak investigation, causal association, data quality, the design and ethical constraints of clinical trials, and infectious-disease epidemiology.

**VTPMD 665(6650) Study Designs (Graduate)**

Spring, 2 credits. Prerequisites: VTPMD/VETCS 664 and BTRY 601 (College of Agriculture and Life Sciences). S-U grades optional. H. O. Mohammed.

Design and interpretation of cross-sectional, case-control, and cohort studies (including controlled clinical trial). Design issues include sample size, bias, and relative advantages and disadvantages. Course objectives are (1) to know the difference between different epidemiologic study designs and relative advantages and disadvantages of each; (2) given a problem (usually a field situation), be able to design an appropriate epidemiologic study; (3) be able to effectively analyze and criticize published epidemiologic studies. Consists of lectures on the principles of epidemiologic study design and related issues (sample size calculations, validity and precision, and identification and minimizing of bias); basic analysis of epidemiologic data; and discussion of published epidemiologic studies. These studies include observational cohort studies (prospective and retrospective), cross-sectional studies, case-control studies, and hybrid studies (ambidirectional and other hybrid designs).

**VTPMD 666(6660) Advanced Methods in Epidemiology (Graduate)**

Fall, 3 credits. Prerequisites: VTPMD/VETCS 665 and BTRY 602 (College of Agriculture and Life Sciences). S-U grades optional. Y. T. Grohn.

Concepts introduced in VTPMD 664 and 665 are developed further, with emphasis on statistical methods. Topics include interaction, effect modification, stratified analysis, matching and multivariate (logistic regression) methods, survival analysis, and strategies for the analysis of epidemiologic data.

**VTPMD 700(7000) Special Projects in Diagnostic Endocrinology**

Fall, spring, 1-3 credits. Prerequisite: permission of instructor. Recommended: AN SC 427. Letter grades only. N. J. Place.

Independent study course. Students have the opportunity to research a particular topic in diagnostic/clinical endocrinology of animals.

**VTPMD 701(7010) Special Projects in Infectious Diseases**

Fall, spring, 1-3 credits. Prerequisite: permission of instructor. S-U grades optional. Diagnostic laboratory faculty.

Provides laboratory experience with attention to specific aspects of infectious disease problems.

**VTPMD 702(7020) Special Topics in Infectious Diseases**

Fall, spring, 1-3 credits. Prerequisite: permission of instructor. S-U grades optional. Diagnostic laboratory faculty.

Offers a broad exposure to various aspects of infectious diseases.

**VTPMD 704(7040) Master's-Level Thesis Research (Graduate)**

Fall, spring, 1-3 credits. Prerequisite: permission of instructor. S-U grades only. Diagnostic Laboratory faculty.

Research leading to an M.S. degree.

**VTPMD 707(7070) Clinical Biostatistics (Graduate)**

Spring, 2 credits. Minimum enrollment 2; maximum 15. Prerequisite: veterinary residents and graduate students. Letter grades only. Offered odd-numbered years. J. M. Scarlett, H. N. Erb and H. O. Mohammed.

Explains the theory behind and interpretation of parametric and nonparametric statistical techniques commonly used in research/clinical medicine. Students analyze small data sets using a commercial statistical-software package.

**VTPMD 708(7080) Epidemiology Seminar Series (Graduate)**

Fall, spring, 1 credit. S-U grades only. Epidemiology faculty.

Discusses advanced theoretical and analytical epidemiologic concepts and techniques.

**VTPMD 766(7660) Graduate Research (Graduate)**

Fall, spring, summer. Credit TBA. Prerequisite: master's and Ph.D. students; permission of graduate faculty member concerned. S-U grades only. Epidemiology faculty.

Enables students outside the section of epidemiology to receive graduate research credits for projects with epidemiological components.

**VTPMD 769(7690) Doctoral-Level Thesis Research**

Fall, spring, and summer. Credit TBA. Prerequisite: master's and Ph.D. students in epidemiology. S-U grades only. Epidemiology faculty.

Enables students in the section of epidemiology to receive graduate research credits for their doctoral research.

**VTPMD 799(7990) Independent Studies in Epidemiology**

Fall, spring, 1-3 credits. H. N. Erb, Y. T. Grohn, H. O. Mohammed, and J. M. Scarlett.

The purpose of this course is to investigate an epidemiologic topic with one of the instructors. It provides experience in problem definition, research design, and the analysis of epidemiologic data.

## FACULTY ROSTER

Abou-Madi, Noha, D.V.M., U. of Montreal (Canada). Lec., Clinical Sciences  
Ainsworth, Dorothy M., Ph.D., U. of Wisconsin, Madison. Prof., Clinical Sciences  
Alcaraz, Ana, D.V.M., U. Autonoma Natl. de Mexico. Lec., Biomedical Sciences  
Allen, Louise Clare V., D.V.M., U. of Cambridge (England). Instr., Clinical Sciences

Antczak, Douglas F., Ph.D., U. of Cambridge (England). Dorothy Havemeyer McConville Professor of Equine Medicine, Microbiology, and Immunology

Appel, Max J., Ph.D., Cornell U. Prof. Emeritus, Microbiology and Immunology  
Appleton, Judith A., Ph.D., U. of Georgia.

Alfred H. Caspary Professor, Microbiology and Immunology

Baines, Joel, Ph.D., Cornell U. Prof., Microbiology and Immunology

Balkman, Cheryl, D.V.M., Cornell U. Lec., Clinical Sciences

Barr, Stephen C., Ph.D., Louisiana State U. Prof., Clinical Sciences

Bedford-Guaus, Sylvia J., Ph.D., U. of Massachusetts, Amherst. Asst. Prof., Clinical Sciences

Beyenbach, Klaus, Ph.D., Washington State U. Prof., Biomedical Sciences

Bezuidenhout, Abraham J., D.V.M., U. of Pretoria (South Africa). Sr. Lec., Biomedical Sciences

Bischoff, Karyn L., D.V.M., U. of Illinois. Prof., Population Medicine and Diagnostic Sciences

Bloom, Stephen E., Ph.D., Pennsylvania State U. Prof., Microbiology and Immunology

Bowman, Dwight D., Ph.D., Tulane U. Prof., Microbiology and Immunology

Bowser, Paul R., Ph.D., Auburn U. Prof., Microbiology and Immunology

Buckles, Elizabeth L., D.V.M., U. of California, Davis. Asst. Prof., Biomedical Sciences

Bynoe, Margaret S., Ph.D., Einstein College of Medicine. Asst. Prof., Microbiology and Immunology

Casey, James W., Ph.D., U. of Chicago. Assoc. Prof., Microbiology and Immunology

Center, Sharon A., D.V.M., U. of California, Davis. Prof., Clinical Sciences

Cerione, Richard A., Ph.D., Rutgers U. Prof., Molecular Medicine

Chang, Yung Fu, Ph.D., Texas A&M U. Prof., Population Medicine and Diagnostic Sciences

Clark, Theodore G., Ph.D., SUNY Stony Brook. Assoc. Prof., Microbiology and Immunology

Cohen, Paula, Ph.D., U. of London (England). Asst. Prof., Biomedical Sciences

Collins, Ruth N., Ph.D., Imperial Cancer Research Center (England). Asst. Prof., Molecular Medicine

Cooper, Barry J., Ph.D., U. of Sydney (Australia). Prof. Emeritus, Biomedical Sciences/Administration

Cummings, Kevin J., D.V.M., Cornell U. Instr., Clinical Sciences

Davisson, Robin, Ph.D., U. of Iowa. Prof., Biomedical Sciences

Debbie, Dorothy P., Ph.D., Stanford U. Lec., Microbiology and Immunology

Denkers, Eric Y., Ph.D., U. of Wisconsin, Madison. Assoc. Prof., Microbiology and Immunology

Dhupa, Nishi, B.V.M. (Bachelors of Veterinary Medicine), U. of Nairobi (Kenya). Veterinarian, Clinical Sciences

Dietert, Rodney R., Ph.D., U. of Texas, Austin. Prof., Microbiology and Immunology

Divers, Thomas J., D.V.M., U. of Georgia. Prof., Clinical Sciences

Dobson, Alan, Ph.D., Cambridge U. (England). Prof. Emeritus, Biomedical Sciences

Dubovi, Edward J., Ph.D., U. of Pittsburgh. Assoc. Prof., Population Medicine and Diagnostic Sciences  
Ducharme, Normand G., D.V.M., U. of Montreal (Canada). James Law Professor of Surgery, Clinical Sciences

- Dykes, Nathan L., D.V.M., Cornell U. Lec., Clinical Sciences
- Earnest-Koons, Kathy, M.S., Pennsylvania State U. Lec., Microbiology and Immunology
- Erb, Hollis N., Ph.D., U. of Guelph (Canada). Prof., Population Medicine and Diagnostic Sciences
- Evans, Howard E., Ph.D., Cornell U. Prof. Emeritus, Veterinary and Comparative Anatomy, Biomedical Sciences
- Farnum, Cornelia, Ph.D., U. of Wisconsin, Madison. Prof., Biomedical Sciences
- Fewtrell, Clare, D.Phil., Oxford U. (England). Assoc. Prof., Molecular Medicine
- FitzMaurice, Marnie C., Ph.D., U. of Pennsylvania. Instr., Biomedical Sciences
- Flaminio, Maria Julia, Ph.D., Cornell U. Asst. Prof., Clinical Sciences
- Flanders, James A., D.V.M., U. of California, Davis. Assoc. Prof., Clinical Sciences
- Fortier, Lisa A., D.V.M., Colorado State U. Asst. Prof., Clinical Sciences
- Fortune, Joanne E., Ph.D., Cornell U. James Law Professor of Physiology, Biomedical Sciences
- Fox, Francis H., D.V.M., Cornell U. Prof. Emeritus, Clinical Sciences
- French, Tracy W., D.V.M., Purdue U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Fubini, Susan L., D.V.M., U. of Georgia. Prof., Clinical Sciences
- Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof. Emeritus, Biomedical Sciences
- Gelzer, Anna, D.V.M., U. of Bern (Switzerland). Lec., Clinical Sciences
- Gilbert, Robert O., B.V.Sc., U. of Pretoria (South Africa). Prof. and Assoc. Dean, Clinical Sciences and Administration
- Gilmour, Robert F., Jr., Ph.D., SUNY Upstate Medical Center. Prof. and Assoc. Dean, Biomedical Sciences and Administration
- Gleed, Robin D., B.V.Sc., U. of Liverpool (England). Prof., Clinical Sciences
- Goldstein, Richard E., D.V.M., Hebrew U. (Israel). Asst. Prof. Clinical Sciences
- Grohn, Yrjo T., Ph.D., Coll. of Veterinary Medicine, Helsinki (Finland). Prof., Population Medicine and Diagnostic Sciences
- Guan, Jun-Lin, Ph.D., U. of California, San Diego. Prof., Molecular Medicine
- Guard, Charles L. III, Ph.D., Case Western Reserve U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Gunn, Theresa M., Ph.D., U. of British Columbia (Canada). Asst. Prof., Biomedical Sciences
- Habel, Robert E., D.V.M., M.Sc., M.V.D., Cornell U. Prof. Emeritus, Anatomy
- Hackett, Richard P., Jr., D.V.M., Ohio State U. Prof., Clinical Sciences
- Hansel, William, Ph.D., Cornell U. Liberty Hyde Bailey Prof. Emeritus, Biomedical Sciences
- Harvey, H. Jay, D.V.M., Kansas State U. Assoc. Prof., Clinical Sciences
- Henion, John D., Ph.D., SUNY Albany. Prof. Emeritus, Analytical Toxicology, Population Medicine and Diagnostic Sciences
- Hermanson, John W., Ph.D., U. of Florida. Assoc. Prof., Biomedical Sciences
- Hesse, Matthias, Ph.D., DRFZ Rheumatic Research Center (Germany). Asst. Prof., Microbiology and Immunology
- Hornbuckle, William E., D.V.M., Oklahoma State U. Prof., Clinical Sciences
- Haupt, Katherine A., Ph.D., U. of Pennsylvania. James Law Professor of Animal Behavior, Biomedical Sciences
- Irby, Nita L., D.V.M., U. of Georgia. Lec., Clinical Sciences
- Kallfelz, Francis A., Ph.D., Cornell U. James Law Prof. of Medicine, Clinical Sciences
- Kern, Thomas J., D.V.M., U. of Missouri. Assoc. Prof., Clinical Sciences
- King, John M., Ph.D., Cornell U. Prof. Emeritus, Biomedical Sciences
- Kollias, George V., Ph.D., U. of California, Davis. Jay D. Hyman Prof. of Wildlife Medicine, Clinical Sciences
- Korich, Jodi A., D.V.M., Cornell U. Instr., Clinical Sciences
- Kotlikoff, Michael I., V.M.D., Ph.D., U. of California, Davis. Prof., Biomedical Sciences
- Kraus, Marc, D.V.M., U. of Georgia. Lec., Clinical Sciences
- Krook, Lennart P., Ph.D., Royal Veterinary Coll., Stockholm (Sweden). Emeritus Prof., Pathology
- Krotscheck, Ursula, D.V.M., Texas A&M U. Lec., Clinical Sciences
- Leifer, Cynthia A., Ph.D., Cornell U. Asst. Prof., Microbiology and Immunology
- Lengemann, Fredrick W., Ph.D., U. of Wisconsin. Prof. Emeritus, Biomedical Sciences
- Levine, Roy A., Ph.D., Indiana U. Assoc. Prof., Molecular Medicine
- Lewis, Robert M., D.V.M., Washington State U. Prof. Emeritus, Biomedical Sciences
- Lin, David M., Ph.D., U. of California, Berkeley. Asst. Prof., Biomedical Sciences
- Loew, Ellis R., Ph.D., U. of California, Los Angeles. Prof., Biomedical Sciences
- Lorr, Nancy, Ph.D., U. of Oregon. Lec., Biomedical Sciences
- Ludders, John W., D.V.M., Washington State U. Prof., Clinical Sciences
- Lust, George, Ph.D., Cornell U. Prof., Microbiology and Immunology
- Marquis, Helene, Ph.D., Texas A&M U. Asst. Prof., Microbiology and Immunology
- Marsh, James A., Ph.D., Northwestern U. Prof., Microbiology and Immunology
- Maylin, George A., Ph.D., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Maza, Paul S., D.V.M., Ross U. Lec., Biomedical Sciences
- McDonough, Patrick, Ph.D., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- McDonough, Sean P., Ph.D., U. of California. Assoc. Prof., Biomedical Sciences
- McEntee, Kenneth, D.V.M., Cornell U. Prof. Emeritus, Biomedical Sciences
- McEntee, Margaret C., D.V.M., Cornell U. Assoc. Prof., Clinical Sciences
- McGregor, Douglas D., D.Phil., Oxford U. (England). Prof., Microbiology and Immunology
- Mendez, Susana, Ph.D., U. of Comp de Madrid (Spain). Asst. Prof., James A. Baker Institute of Animal Health
- Menne, Stephan, Ph.D., U. of Essen (Germany). Asst. Prof., Clinical Sciences
- Messick, Joanne B., Ph.D., Ohio State U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Meyers-Wallen, Vicki N., Ph.D., U. of Pennsylvania. Assoc. Prof., Biomedical Sciences
- Miller, William H., Jr., V.M.D., U. of Pennsylvania. Prof., Clinical Sciences
- Minor, Ronald R., Ph.D., U. of Pennsylvania. Prof., Biomedical Sciences
- Mizer, Linda, Ph.D., Ohio State U. Sr. Lec., Biomedical Sciences
- Mohammed, Hussni, O., Ph.D., U. of California, Davis. Prof., Population Medicine and Diagnostic Sciences
- Moise, N. Sydney, D.V.M., Texas A&M U. Prof., Clinical Sciences
- Morrisey, James K., D.V.M., Cornell U. Lec., Clinical Sciences
- Naqi, Syed A., Ph.D., Texas A&M U. Prof. Emeritus, Microbiology and Immunology
- Nikitin, Alexander, Ph.D., Acad. Pavlov First Medical Inst. (Russia). Asst. Prof., Biomedical Sciences
- Nixon, Alan J., B.V.Sc., U. of Sydney (Australia). Prof., Clinical Sciences
- Njaa, Bradley, D.V.M., U. of Saskatchewan (Canada). Asst. Prof., Biomedical Sciences
- Noden, Drew M., Ph.D., Washington U. Prof., Biomedical Sciences
- Noronha, Fernando M., D.V.M., U. of Lisbon (Portugal). Prof. Emeritus, Microbiology and Immunology
- Nowak, Linda M., Ph.D., U. of Michigan. Assoc. Prof., Molecular Medicine
- O'Brien, Timothy P., Ph.D., U. of Illinois Coll. of Vet Med. Assoc. Prof., Biomedical Sciences
- Osterrieder, Nikolaus, D.V.M., U. of Ludwig-Maximilians (Germany). Assoc. Prof., Microbiology and Immunology
- Oswald, Robert E., Ph.D., Vanderbilt U. Prof., Molecular Medicine
- Page, Rodney L., D.V.M., Colorado State U. Prof., Clinical Sciences
- Parker, John, Ph.D., U. of Glasgow (Scotland). Asst. Prof., James Baker Institute
- Parrish, Colin R., Ph.D., Cornell U. James M. Olin Professor of Virology, Microbiology and Immunology
- Pauli, Bendicht U., D.V.M., Ph.D., U. of Bern (Switzerland). Prof., Molecular Medicine
- Perkins, Gillian, D.V.M., U. of Prince Edward Island (Canada). Lec., Clinical Sciences
- Peters, Rachel M., D.V.M., Cornell U. Instr., Biomedical Sciences
- Phemister, Robert D., Ph.D., Colorado State U. Dean Emeritus, Biomedical Sciences
- Place, Ned J., Ph.D., U. of Washington. Asst. Prof., Population Medicine and Diagnostic Sciences
- Quaroni, Andrea, Ph.D., U. of Pavia (Italy). Prof. Emeritus, Biomedical Sciences
- Radcliffe, Rolfe M., D.V.M., U. of Minnesota. Instr., Clinical Sciences
- Randolph, John F., D.V.M., Cornell U. Prof., Clinical Sciences
- Rassnick, Kenneth M., D.V.M., Cornell U. Asst. Prof., Clinical Sciences
- Rawlinson, Jennifer E., D.V.M., Cornell U. Lec., Clinical Sciences
- Rawson, Richard E., Ph.D., Kansas State U. Sr. Lec., Biomedical Sciences
- Reimers, Thomas J., Ph.D., U. of Illinois. Prof. Emeritus, Population Medicine and Diagnostic Sciences
- Riis, Ronald C., D.V.M., U. of Minnesota. Assoc. Prof., Clinical Sciences
- Roberson, Mark S., Ph.D., U. of Nebraska, Lincoln. Assoc. Prof., Biomedical Sciences
- Russell, David G., Ph.D., Imperial Coll., London U. (England). Prof., Microbiology and Immunology
- Sacco, Tyson, Ph.D., U. of California. Lec., Biomedical Sciences
- Sack, Wolfgang O., D.V.M., Ph.D., U. of Edinburgh (Scotland). Prof. Emeritus, Biomedical Sciences
- Scarlett, Janet M., Ph.D., U. of Minnesota. Assoc. Prof., Population Medicine and Diagnostic Sciences

- Schat, Karel A., Ph.D., Cornell U. Prof., Microbiology and Immunology
- Schimenti, John C., Ph.D., U. of Cincinnati. Prof., Biomedical Sciences
- Schlafer, Donald H., Ph.D., U. of Georgia. Prof., Biomedical Sciences
- Schoeffler, Gretchen L., D.V.M., Texas A&M U. Instr., Clinical Sciences
- Schukken, Ynte H., Ph.D., U. of Utrecht (The Netherlands). Prof., Population Medicine and Diagnostic Sciences
- Schwark, Wayne S., Ph.D., U. of Ottawa (Canada). Prof., Molecular Medicine
- Schweizer, Christine M., D.V.M., Cornell U. Lec., Clinical Sciences
- Scidmore, Marci, Ph.D., Princeton U. Asst. Prof., Microbiology and Immunology
- Scott, Danny W., D.V.M., U. of California, Davis. Prof., Clinical Sciences
- Scott, Fredric W., Ph.D., Cornell U. Emeritus Prof., Microbiology and Immunology
- Scrivani, Peter V., D.V.M., Cornell U. Lec., Clinical Sciences
- Sellers, Alvin F., V.M.D., Ph.D., U. of Minnesota. Prof. Emeritus, Biomedical Sciences
- Sharp, Geoffrey W. G., D.Sc., U. of London (England). Prof., Molecular Medicine
- Shin, Sang J., D.V.M., Seoul National U. (Korea). Prof. Emeritus, Population Medicine and Diagnostic Sciences
- Short, Charles E., Ph.D., U. of Turku (Finland). Prof. Emeritus, Clinical Sciences
- Simpson, Kenneth W., Ph.D., U. of Leicester (England). Assoc. Prof., Clinical Sciences
- Smith, Donald F., D.V.M., U. of Guelph (Canada). Dean and Prof., Clinical Sciences
- Smith, Mary C., D.V.M., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Sondermann, Holger, Ph.D., Max-Planck Institute (Germany). Asst. Prof., Molecular Medicine
- Stanhope, Michael J., Ph.D., Simon Fraser U. (Canada). Prof., Population Medicine and Diagnostic Sciences
- Steffey, Michele, D.V.M., U. of California. Lec., Clinical Sciences
- Stokol, Tracy, Ph.D., U. of Melbourne (Australia). Asst. Prof., Population Medicine and Diagnostic Sciences
- Suarez, Susan S., Ph.D., U. of Virginia. Prof., Biomedical Sciences
- Summers, Brian A., Ph.D., Cornell U. Prof., Biomedical Sciences
- Tapper, Daniel N., V.M.D., U. of Pennsylvania, Ph.D., Cornell U. Emeritus Prof., Biomedical Sciences
- Tennant, Bud C., D.V.M., U. of California, Davis. James Law Professor of Comparative Medicine, Clinical Sciences
- Todhunter, Rory J., Ph.D., Cornell U. Assoc. Prof., Clinical Sciences
- Torres, Alfonso, Ph.D., U. of Nebraska. Prof., Population Medicine and Diagnostic Sciences
- Travis, Alexander, Ph.D., U. of Pennsylvania. Asst. Prof., Biomedical Sciences
- Trotter, Eric J., D.V.M., U. of Illinois. Assoc. Prof., Clinical Sciences
- Wagner, Bettina, D.V.M., Hannover Veterinary (Germany). Asst. Prof., Population Medicine and Diagnostic Sciences
- Warnick, Lorin D., Ph.D., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
- Wasserman, Robert H., Ph.D., Cornell U. James Law Prof. Emeritus Physiology/Biomedical Sciences
- Weiland, Gregory A., Ph.D., U. of California, San Diego. Assoc. Prof., Molecular Medicine
- Weiss, Robert, Ph.D., Baylor Coll. of Medicine. Asst. Prof., Biomedical Sciences
- White, Maurice E., D.V.M., Cornell U. Prof., Population Medicine and Diagnostic Sciences
- Whittaker, Gary R., Ph.D., U. of Leeds (England). Asst. Prof., Microbiology and Immunology
- Winand, Nena J., D.V.M., Iowa State U., Ph.D., Cornell U. Sr. Res. Assoc., Molecular Medicine
- Wootton, John F., Ph.D., Cornell U. Prof., Biomedical Sciences
- Xin, Hong-Bo, Ph.D., Beijing Met U. (China). Asst. Prof., Biomedical Sciences
- Yen, Andrew, Ph.D., Cornell U. Prof., Biomedical Sciences



## COLLEGE OF ARTS AND SCIENCES

### ADMINISTRATION

G. Peter Lepage, dean—255-4146

Nelson G. Hairston, senior associate dean—255-4147

Harry E. Shaw, senior associate dean—255-4147

David DeVries, associate dean of undergraduate admissions and education—255-3386

Paul Sawyer, associate dean and director of writing programs—255-4061

Jane V. Pedersen, associate dean of administration—255-7507

Nicolas van de Walle, associate dean for international studies—255-1097

### PROGRAM OF STUDY

#### Introduction

The College of Arts and Sciences is a community of about 4,300 undergraduates and 525 faculty members. It is also a graduate school and research center. Altogether it attracts faculty members whose research and scholarly and creative work require first-rate academic facilities and who bring to all their students the profound questioning and exciting ideas of current scholarship. Finally, the college exists within a university of other colleges at Cornell—about 19,500 undergraduate and graduate students and 1,578 faculty members. This wider community provides depth and diversity of applied and professional studies beyond what a college of the liberal arts and sciences alone can offer. Students studying the liberal arts and sciences may draw upon the knowledge and facilities of the other colleges at Cornell to complement their studies. Abundant variety and outstanding quality in many fields, including interdisciplinary fields, and emphasis on individual academic freedom and responsibility give the college and the university their distinctive character.

The richness of the college's undergraduate curriculum is extraordinary; there is no course that all students must take, and there are nearly 2,000 from which they may choose. By choosing courses each semester, students design their own education. They develop known interests and explore new subjects. An education in the liberal arts and sciences means honing one's critical and imaginative capacities, learning about oneself in nature and culture, and gaining experience with views of the world radically unlike one's own. All this is highly individual, and the college relies on each student and faculty advisor to design a sensible, challenging, and appropriate course of study.

Yet the college faculty believes that each student's education should have certain common qualities. These include familiarity with several different ways of knowing that are reflected in the various disciplines and fields of study. In addition to these general

areas of knowledge, students acquire effective writing and quantitative skills, study foreign languages, achieve cultural breadth, and concentrate on one particular field through which they deepen their imaginative and critical thinking as fully as possible. To accomplish these objectives, the college has certain requirements for graduation.

### The College of Arts and Sciences awards one undergraduate degree, the Bachelor of Arts degree.

#### Summary of Requirements

1. First-year writing seminars: two courses. (See "John S. Knight Institute for Writing in the Disciplines," p. 576.)
2. Completion of one course at the nonintroductory level or above (Option 1) or at least 11 credits in one language (Option 2); one to three courses.
3. Distribution: nine courses (may overlap with courses counting toward a major).
4. Breadth: two courses (may overlap with courses for distribution, major, or electives).
5. Major (see individual department listings for major requirements).
6. Electives: four or five courses (at least 15 credits) not used to fulfill other requirements (other than the breadth requirements) and not in the major field.
7. Residence: eight full-time semesters, unless a student can successfully complete all other requirements in fewer than eight semesters and meet the additional criteria to accelerate graduation. (See "Acceleration" below.)
8. 34 courses: a 3- or 4-credit course counts as one course. A 2-credit course counts as half a course; a 1-credit course does not normally count toward the requirement; a 6-credit language course counts as one and one-half courses. (See "Courses and Credits" for some 1-credit courses in music, dance, and theatre performance that can be cumulated to count as one-half course.)
9. Credits: a total of 120 academic credits, of which 100 must be taken in the College of Arts and Sciences at Cornell. (See "Noncredit Courses" below for courses that do not count as academic credits or courses.)
10. Physical education: completion of the university requirement (passing a swim test and two 1-credit nonacademic courses). Note: Physical education credit does not count toward graduation or toward the 12-credit minimum required for good academic standing each semester.
11. Application to graduate. (See "Graduation.")

### Explanation of Requirements

#### Foreign Language Requirement

The faculty considers competence in a foreign language essential for an educated person. Studying a language other than one's own helps students understand the problematics of language, our fundamental intellectual tool, and enables students to understand another culture. The sooner a student acquires competence, the sooner it will be useful. Hence, work toward the foreign language requirement should be undertaken in the first two years. Courses in foreign languages and/or literature are taught in the College of Arts and Sciences by the following departments: Africana Studies and Research Center, Asian Studies, Classics, German Studies, Linguistics, Near Eastern Studies, Romance Studies, and Russian Literature.

The language requirement may be satisfied in one of the following ways:

**Option 1:** Passing (a) a nonintroductory foreign language course of 3 or more credits at Cornell at the 200 level or above or (b) any other nonintroductory course conducted in a foreign language at Cornell. **OR**

**Option 2:** Passing at least 11 credits of study in a single foreign language at Cornell.

Any exceptions to these rules will be noted elsewhere in individual department descriptions.

Students whose speaking, reading, and writing competence in a language other than English is at the same level we would expect our entering freshmen to have in English (as shown by completing high school in that language or by special examination during their first year here at Cornell) are exempt from the college's language requirement.

#### Placement

Entering students who have had two or more years of high school study in a language, who have been awarded credit for language work at another college or university, or who are native speakers, bilingual, or have spoken the language at home, may enroll in a course in the same language only after being placed by examination. The placement exam may have been taken in high school (SAT II, taken after the last course, or AP, if the score was 4 or 5) or at Cornell (LP test). Students may, but need not, retake a language test if a year or more has passed since last taking it. Being placed by examination into the first course at a nonintroductory level does not earn credit toward the degree. Degree credit is earned only for demonstrated mastery of work equivalent to the first course at an intermediate level at Cornell and placement into the second intermediate course. Students should seek to satisfy the language requirement in their first years at Cornell. Those with test scores one or more years old may be required to take a Cornell placement test if the instructor deems the student is not adequately prepared for the level in which he or she has enrolled.

**French**

<b>Placement Tests LPF</b>	<b>SAT II</b>	<b>Language Courses</b>	<b>Literature Courses</b>
below 37 .....	below 410 .....	121	
37-44 .....	410-480 .....	122	
45-55 .....	490-590 .....	123	
56-64 .....	600-680 .....	206 209	
65 and above .....	690 and above .....		CASE required for placement in language.
AP 4 or 5 in language, 3 credits .....			CASE required for placement in language.
AP 4 or 5 in literature, 3 credits and proficiency .....			CASE required for placement in language.

**German**

<b>Placement Tests LPG</b>	<b>SAT II</b>	<b>Language Courses</b>	<b>Literature Courses</b>
below 37 .....	below 370 .....	121	
37-44 .....	370-450 .....	122	
45-55 .....	460-580 .....	123	
56-64 .....	590-680 .....	200	200
65 and above .....	690 and above .....		CASE required for placement
AP 4 or 5, 3 credits .....			CASE required for placement

**Italian**

<b>Placement Tests LPI</b>	<b>SAT II</b>	<b>Language Courses</b>	<b>Literature Courses</b>
below 37 .....	below 370 .....	121	
37-44 .....	370-450 .....	122	
45-55 .....	460-580 .....	123	
56-64 .....	590-680 .....	209	
65 and above .....	690 and above .....		CASE required for placement
AP 4 or 5 in language, 3 credits .....			CASE required for placement
AP 4 or 5 in literature, 3 credits and proficiency .....			CASE required for placement

**Spanish**

<b>Placement Tests LPS</b>	<b>SAT II</b>	<b>Language Courses</b>	<b>Literature Courses</b>
below 37 .....	below 370 .....	121	
37-44 .....	370-450 .....	112 122	
45-55 .....	460-580 .....	123	
56-64 .....	590-680 .....	200 209 207	
65 and above .....	690 and above .....		CASE required for placement
AP 4 or 5 in language, 3 credits .....			CASE required for placement
AP 4 or 5 in literature, 3 credits and proficiency .....			CASE required for placement

**Placement Tests and Advanced Placement Credit**

1. The following language placement and advanced standing tests are scheduled at the beginning of each semester:

- Chinese (Cantonese and Mandarin), Hindi, Japanese, and Korean (schedule available from Department of Asian Studies, 350 Rockefeller Hall);
- German (schedule available from Department of German Studies, 183 Goldwin Smith Hall);
- French, Italian, and Spanish (schedule available from Department of Romance Studies, 303 Morrill Hall);
- Russian (schedule available from Department of Russian, 226 Morrill Hall).

The advanced standing examination in French, German, Italian, Russian, and Spanish, is called the CASE (Cornell Advanced Standing Examination). Eligibility for the CASE may be determined from the placement tables. *In Russian only, all students seeking placement take the CASE.*

Native speakers of Spanish who have completed their secondary education in a Spanish-speaking country do not take the CASE. For these students, the Spanish program offers a walk-in service, the Native Language Accreditation for Spanish, in the third week of September and the first week of February. Students interested in this service should contact Eleanor Dozier in 414 Morrill Hall. Speakers of Spanish who completed their secondary education in a non-Spanish-speaking country are required to present either SAT II or AP or LPS scores for placement, or for eligibility to take the CASE exam.

2. Arabic: departmental examination, Department of Near Eastern Studies, 409 White Hall.
3. Greek, ancient: departmental examination, Department of Classics, 120 Goldwin Smith Hall.
4. Hebrew: departmental examination, Department of Near Eastern Studies, 409 White Hall.
5. Latin: departmental examination, Department of Classics, 120 Goldwin Smith Hall.
6. Persian: departmental examination, Department of Near Eastern Studies, 409 White Hall.
7. Turkish: departmental examination, Department of Near Eastern Studies, 409 White Hall.

**Substitutions to the Language Requirement**

Outright waivers of the requirement are never granted. However, rarely and as appropriate, alternatives to language acquisition are approved. Legitimate requests for substitutions require strong, convincing evidence of inability to learn foreign languages in a classroom setting. A poor grade in a Cornell introductory language course or taking the

LP exam repeatedly and unsuccessfully is not adequate evidence of disability.

Students who wish to request a substitution for this requirement should meet with Dean Peggy Walbridge, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall. If Dean Walbridge determines that the request has merit, the student meets with the Language Substitution Review Committee. This committee makes the final decision for or against a substitution. If a substitution is allowed, the committee works with the student to select appropriate substitute courses.

### Distribution Requirements

In satisfying the distribution requirements, students become acquainted with a broad range of subject matter and points of view among disciplines in the college and explore areas that may be entirely new to them. Or, to look at it the other way, as first-year students explore subjects that interest them, they begin to satisfy distribution requirements. Consequently, first-year students should take courses to prepare for possible majors and to explore subjects new to them and take no course only in order to satisfy a distribution requirement. Although students may complete distribution requirements over eight semesters, they can take advanced courses in subjects they (perhaps unexpectedly) find intriguing only if they have completed the introductory prerequisites. Consequently, students should not postpone satisfying distribution requirements until the last semesters. Once sure of a major, students should consider which distribution requirements are yet unfulfilled and how to fulfill them with courses that complement their overall program. Courses in the major may be applied to the distribution requirements (unless prohibited by one of the restrictions noted under restrictions on applying AP credit, transfer credit, and Cornell courses to distribution requirements).

Students must complete four courses in science and quantitative reasoning, identified below under the categories Physical and Biological Sciences (PBS) and Mathematics and Quantitative Reasoning (MQR). In addition, they must complete five courses of 3 or more credits each from five categories of courses in the humanities and social sciences; they must include at least one course from four different categories and no more than three in the same department. The five categories of courses fulfilling the distribution requirements in humanities and social sciences are: Cultural Analysis (CA), Historical Analysis (HA), Knowledge Cognition and Moral Reasoning (KCM), Literature and the Arts (LA), and Social and Behavioral Analysis (SBA). How an individual course is categorized is indicated with the appropriate abbreviation in its description under its department.

#### • Cultural Analysis (CA)

Courses in this area study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion), expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community),

power and politics (states, colonialism, inequality).

#### • Historical Analysis (HA)

Courses in this group interpret continuities and changes—political, social, economic, diplomatic, religious, intellectual, artistic, scientific—through time. The focus may be on groups of people, dominant or subordinate, a specific country or region, an event, a process, or a time period.

#### • Knowledge, Cognition, and Moral Reasoning (KCM)

Offerings in this area investigate the bases of human knowledge in its broadest sense, ranging from cognitive faculties shared by humans and animals such as perception, to abstract reasoning, to the ability to form and justify moral judgments. Courses investigating the sources, structure, and limits of cognition may use the methodologies of science, cognitive psychology, linguistics, or philosophy. Courses focusing on moral reasoning explore ways of reflecting on ethical questions that concern the nature of justice, the good life, or human values in general.

#### • Literature and the Arts (LA)

Offerings in this area explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge, and creative imagination.

#### • Social and Behavioral Analysis (SBA)

Courses in this area examine human life in its social context through the use of social scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g., in friendship, love, conflict) to larger social organizations (e.g., the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g., discrimination, inequality, prejudice, stigmas, conflict resolution).

#### • Physical and Biological Sciences (PBS)

*In fulfilling the four courses in science and quantitative reasoning, students must take at least two science courses. At least one of these must be from the primary list of courses in science departments in the College of Arts and Sciences.*

#### Primary list:

(The courses listed individually are all cross-listed in an A&S science department.)

#### Animal Science

427 Fundamentals of Endocrinology

#### Anthropology

208 Anthropology of Human Mating  
275 Human Biology and Evolution  
371 Human Paleontology  
474 Lab and Field Methods in Human Biology

#### Applied and Engineering Physics

217 Physics II: Electricity and Magnetism  
363 Electronic Circuits  
450 Introduction to Solid-State Physics  
470 Biophysical Methods

#### Astronomy: all 3- or 4-credit courses

*Biological Sciences:* all 3- or 4-credit courses (including any combination of two courses from BIO 101–104) *except* BIO G 209, 299, 498; BIOEE 362; BIOMI 172; BIOBM 321; BIONB 423 and BIOSM 204. BIO G 200 and 499 require permission from the Office of Undergraduate Biology.

#### Biological and Environmental Engineering

456 Biomechanics of Plants

#### Biology and Society

214 Biological Basis of Sex Differences  
447 Seminar in the History of Biology  
461 Environmental Policy

#### Biomedical Engineering

441 Computer in Neurobiology

#### Chemistry and Chemical Biology

all 3- or 4-credit courses

#### Cognitive Studies

111 Brain, Mind, and Behavior  
330 Introduction to Computational Neuroscience

#### Crop Science

398 Environmental Microbiology

#### Earth and Atmospheric Sciences

all courses *except* 150, 250, 435

#### Engineering

122 Earthquake!

#### Entomology

325 Insect Behavior  
400 Insect Development  
452 Herbivores and Plants  
453 Historical Biogeography  
455 Insect Ecology  
456 Stream Ecology

#### Feminist, Gender, & Sexuality Studies

214 Biological Basis of Sex Differences

#### Food

394 Applied and Food Microbiology

#### Human Development

220 The Human Brain and Mind

#### History

287 Evolution  
415 Seminar in the History of Biology

#### Horticulture

243 Taxonomy of Cultivated Plants

#### Music

204 Physics of Musical Sound

#### Natural Resources

321 Introduction to Biogeochemistry  
456 Stream Ecology

#### Nutritional Science

275 Human Biology and Evolution  
475 Mammalian Developmental Defects

#### Physics

all 3- or 4-credit courses *except* 209

*Psychology*

- 111 Brain, Mind, and Behavior
- 322 Hormones and Behavior
- 324 Biopsychology Laboratory
- 330 Introduction to Computational

*Neuroscience*

- 332 Biopsychology of Learning and Memory
- 396 Introduction to Sensory Systems
- 424 Neuroethology
- 429 Olfaction and Taste: Structure and Function
- 431 Effects of Aging on Sensory and Perception Systems
- 460 Human Neuroanatomy
- 492 Sensory Function

*Science and Technology Studies*

- 287 Evolution
- 447 Seminar in the History of Biology

*Visual Studies*

- 492 Sensory Function

Students may select additional science courses from the following **supplementary list**:

*Animal Science*

- 100 Domestic Animal Biology I
- 150 Domestic Animal Biology II
- 212 Animal Nutrition

*Anthropology*

- 101 Human Evolution: Genes, Behavior, and the Fossil Record
- 370 Environmental Archaeology
- 375 Evolutionary Theory and Human Behavior
- 390 Primate Behavior and Ecology
- 463 Zooarchaeological Method
- 464 Zooarchaeological Interpretation

*Applied and Engineering Physics*

- 110 Lasers and Photonics

*Archaeology*

- 370 Environmental Archaeology
- 463 Zooarchaeological Method
- 464 Zooarchaeological Interpretation

*Cognitive Studies*

- 220 The Human Brain and Mind

*Dance*

- 312 The Moving Body: Form and Function

*Electrical Engineering*

- 430 Lasers and Optical Electronics

*Engineering*

- 110 Lasers and Photonics

*Entomology*

- 201 Alien Empire: Bizarre Biology of Bugs (3 cr.)
- 210 Plagues and People (3 cr.)
- 212 Insect Biology
- 277 Natural Enemies: An Intro to Biological Control (3 cr.)
- 315 Spider Biology

*Food*

- 200 Introductory Food Science

*Human Development*

- 220 The Human Brain and Mind

*Materials Science and Engineering*

- 281 The Substance of Civilization

*Natural Resources*

- 201 Environmental Conservation
- 210 Introductory Field Biology
- 420 Forest Ecology

*Nutritional Science*

- 115 Nutrition and Health
- 361 Biology of Normal and Abnormal Behavior

*Psychology*

- 223 Introduction to Biopsychology
- 326 Evolution of Human Behavior
- 361 Biology of Normal and Abnormal Behavior

- **Mathematics and quantitative reasoning (MQR)**

In completing four courses in science and quantitative reasoning, students must take at least one of the following courses (note that EDUC 115 Introductory College Mathematics, counts neither toward the college degree nor toward distribution):

*Applied Economics and Management*

- 210 Introductory Statistics

*Biochemistry, Molecular and Cell Biology*

- 321 Numerical Methods in Computational Molecular Biology

*Biometry*

- 301 (formerly 261) Statistical Methods

*City and Regional Planning*

- 321 Introduction to Quantitative Methods
- 328 Quantitative Methods in Policy Planning

*Cognitive Studies*

- 172 Computation, Information, and Intelligence
- 424 Computational Linguistics
- 476 Decision Theory
- 477 Decision Theory II

*Computer Science*

- 100 Introduction to Computer Programming
- 172 Computation, Information, and Intelligence
- 211 Computers and Programming
- 280 Discrete Structures
- 312 Data Structures and Functional Programming
- 321 Numerical Methods in Computational Molecular Biology
- 324 Computational Linguistics
- 486 Applied Logic

*Ecology and Evolutionary Biology*

- 362 Dynamic Models in Biology

*Earth and Atmospheric Science*

- 435 Statistical Methods in Meteorology and Climatology

*Economics*

- 319 Introduction to Statistics and Probability
- 320 Introduction to Econometrics
- 321 Applied Econometrics
- 325 Cross Section and Panel Econometrics
- 327 Time Series Econometrics
- 368 Game Theory
- 405 Auction Seminar
- 431 Monetary Economics
- 476/477 Decision Theory I and II

*Engineering*

- 115 Engineering Applications of OR&IE
- 172 Computation, Information, and Intelligence
- 211 Computers and Programming
- 321 Numerical Methods in Computational Molecular Biology

*Industrial and Labor Relations*

- 212 Statistical Reasoning

*Linguistics*

- 424 Computational Linguistics
- 483 Intensional Logic
- 485 Topics in Computational Linguistics

*Mathematics*

- all 3- or 4-credit courses except 101 and 109

*Philosophy*

- 231 Introduction to Deductive Logic
- 330 Foundations of Mathematics
- 331 Deductive Logic
- 383 Choice, Chance, and Reason
- 431 Mathematical Logic
- 432 Topics in Logic
- 436 Intensional Logic

*Physics*

- 209 Relativity and Chaos

*Policy Analysis and Management*

- 210 Introduction to Statistics

*Psychology*

- 350 Statistics and Research Design

*Sociology*

- 301 Evaluating Statistical Evidence

If students choose two courses from this list to satisfy part of the distribution requirement, those two courses may not have significant overlap. For example, students may not choose two beginning courses in statistics. Nor may they earn credit toward the degree for overlapping courses: BTRY 301 (formerly 261) Statistical Methods I, CRP 223 Introduction to Statistical Reasoning, ECON 321 Applied Econometrics, ILRST 212 Statistical Reasoning, MATH 171 Statistical Theory and Application in the Real World, PSYCH 350 Statistics Research and Design, SOC 301 Evaluating Statistical Evidence.

**Breadth Requirements**

Students must include in their undergraduate program at least one Arts and Sciences course that focuses on an area or a people other than those of the United States, Canada, or Europe and one course that focuses on an historical period before the 20th century. Courses that satisfy the geographic breadth requirement are marked with an @ when described in this catalog. Courses that satisfy the historical breadth requirement are marked with a #. Many courses satisfy both requirements, and students may in fact use the same course to satisfy both. Students may use courses satisfying distribution, major, or elective—but not writing—requirements in satisfaction of either of the breadth requirements. They may also apply Cornell courses (not credit from an examination) conferring proficiency in a non-Western language toward the geographical breadth requirement.

**Restrictions on Applying AP Courses and Credit from Other Institutions to the Distribution Requirements**

Students may not apply AP credit or transfer credit from another institution to the breadth requirements or to any distribution requirement.

**Students who transfer to the college from another institution** are under the above rules for advanced placement credit, but are eligible to have credit for post high school course work taken during regular semesters (not summer school) at their previous institution count toward all distribution requirements. Transfer students receive a detailed credit evaluation when they are accepted for admission.

### Restrictions on Applying Cornell Courses to the Distribution and Breadth Requirements

1. First-year writing seminars may not count toward any other college requirement.
2. No single course may satisfy more than one distribution requirement.
3. Students may count courses in their major toward distribution and breadth.

### The Major

In their last two years, students devote roughly one-half their time to acquiring depth and competence in a major subject. The major does not necessarily define a student's intellect or character or lead directly to a lifetime occupation, although it sometimes does some of each. Through the major, students focus and develop their imaginative and intellectual capacities through a subject they find especially interesting.

Most departments and programs specify certain prerequisites for admission to the major; they are found on the following pages in the descriptions of each department and program.

Students may apply for acceptance into the major as soon as they have completed the prerequisites and are confident of their choice. This may be as early as the second semester of freshman year, and must be no later than second semester of sophomore year. To apply, they take a copy of their official transcript to an appointment with the director of undergraduate studies in their prospective major. A department or program may refuse admission into the major if the applicant's performance does not meet established standards. A student without a major at the beginning of the junior year is not making satisfactory progress toward the degree. That student must meet with an advising dean and may not be allowed to continue in the college.

### Available majors

Majors are offered by each of the departments. There are also majors in American Studies, Archaeology, Biology and Society, Information Science, Religious Studies, Science of Earth Systems, and Feminist, Gender, and Sexuality Studies.

Some students want to pursue a subject that cannot be met within an established major. They may plan, with the help of their faculty advisor, an independent major that includes courses from several departments and even colleges. See "Independent Major Program," under "Special Academic Options." Whatever the major—chemistry, math, philosophy, or music—graduates from the College of Arts and Sciences earn the one degree the college awards, a Bachelor of Arts.

### Double majors

Only one major is required for graduation. Some students choose to complete two or even more majors. No special permission or procedure is required; students simply become accepted into multiple majors and find an advisor in each department. All completed majors are posted on the official transcript. However, even though courses in a second major count among the required 15 credits of electives (see immediately below), double majoring can constrict the variety of electives that might be valuable for an education in

the liberal arts and sciences. Students should "double major" only if their intellects and deep interests direct them to do so.

### Electives

Of the 34 courses and 120 credits required for graduation, almost one-third are free electives. How students use these electives frequently makes the difference between an ordinary and a truly interesting course of study. Students must complete at least four courses and at least 15 credits offered outside the major field and not used to fill another requirement except breadth. AP credits not otherwise used may fulfill elective requirements. Students may group electives to complete one of the established interdisciplinary concentrations or may form their own unofficial concentration or "minor" separate from their major. Students may also group electives into a second major. Since only one major is required, students may count courses in a second major as electives. Some students choose to explore a variety of subjects; some develop a concentration in a department or subject outside Arts and Sciences to gain applied training or specialized knowledge.

### Residence

The College of Arts and Sciences is a residential community for students who devote their energy and spirit to full-time study. The faculty believes that integrated, full-time study for a defined period best promotes intellectual and creative development and best prepares people for citizenship and careers.

Consequently, eight semesters of full-time study in the College of Arts and Sciences are integral to earning the B.A. degree. Even if the minimum requirements can be met in fewer semesters, the faculty of the college expects students to take advantage of the resources of the university for eight full semesters and obtain as rich and advanced an education in the liberal arts and sciences as possible. Students may complete their undergraduate degrees with credits earned at other institutions or as part-time or summer students at Cornell only if they have completed their eight full-time semesters of residence or satisfied the criteria listed below under "Part-time study in final semester."

For transfer students from other institutions, each full semester of study at their previous institution counts as one of the eight semesters of residence. However, even if transfer students have completed more than four full semesters at their previous institution, they must spend a minimum of four semesters on the Cornell campus in Ithaca enrolled in the College of Arts and Sciences. Internal transfers from other colleges at Cornell must spend four semesters on campus in Ithaca as students in the Internal Transfer Division or in the college.

Approved study abroad, SEA Semester, Urban Semester, FALCON, and Cornell in Washington are considered semesters of residence but not semesters on the Cornell campus. Students may spend no more than two semesters on such programs and must be on campus during their last semester. Semesters of extramural study in Cornell's School of Continuing Education, semesters of study at other institutions while on leave from Cornell, and summer sessions anywhere do not count as semesters of residence.

### Acceleration

Some students decide that they do not need eight semesters of residence to obtain a solid undergraduate education. These students must compress the first four semesters and spend four full semesters in the major. Benefitting from opportunities for advanced, seminar, and independent (sometimes honors) work is what best characterizes undergraduate education in the college. Students considering acceleration should discuss their plans with their major advisor.

Accelerants apply to graduate one semester before their intended new graduation date. They obtain an "Application to Graduate" for this purpose in the Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall. Accelerants must complete:

1. All graduation requirements except for the residency requirement (120 total credits, 100 Arts and Sciences credits, 34 courses, all college requirements, and the university's physical education requirement).
2. Either condition *a* or *b*:
  - a. 60 credits before beginning their last four semesters in the college and the prerequisites for admission to the major in time to spend *four* semesters in the major.
  - b. 48 credits in College of Arts and Sciences courses numbered 300 and above and prerequisites for admission to the major in time to spend *four* semesters in the major. Upper-level courses taken in other colleges at Cornell University may count toward the 48 only if approved as part of the major.
3. 100 credits at Cornell at "C" (not C-) or above. Courses completed with a grade of "S" will count toward the 100 credits. Advanced placement and transfer credits do not count toward this requirement.
4. Students may not use credits earned while on leave of absence to reduce their terms of residence. In other words, they must be eligible to accelerate without applying any credit toward the degree that they earned while on leave.
5. Accelerants may not finish the degree with credits earned through part-time study (unless they meet the guidelines for part-time study), or at an off-campus program, including Cornell in Washington, SEA Semester, Urban Semester, or study abroad. That is, they may not exit through any program other than a regular, full-time Cornell semester in Ithaca.

Students matriculating as freshmen may not compress their undergraduate education into fewer than six semesters of residence. Transfer students, both from other institutions and from other colleges at Cornell, must satisfy the eight-semester residence requirement and must spend at least four semesters in the college on campus in Ithaca.

### Ninth semester

Students who can graduate in eight semesters should do so. If a worthy academic plan for a full ninth or tenth semester is approved, the student enrolls in the college as a special student for the additional work. Such a status allows enrollment in a full schedule of



courses and full access to campus resources for full tuition, but allows financial aid only from loans or outside agencies, not from Cornell funds. Students who need fewer than 12 credits in a ninth or tenth semester to graduate should complete the outstanding courses and pay prorated tuition. Students may spend a ninth semester with Cornell aid only with permission of the Committee on Academic Records. Such permission is normally granted only to:

1. Students who have been ill or experienced other untoward circumstances beyond their control.
2. Students who were academically underprepared for the curriculum at Cornell and needed to begin with a lighter schedule of courses than normal. (See Dean Turner, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, about this option.)

#### Part-time study

Students in good academic standing may take a personal leave of absence and enroll in the School of Continuing Education, but such semesters of extramural study do not count as terms of residence and credits from such semesters may not be used to reduce the terms of residence.

#### Part-time study in special circumstances

The college and university support students (with financial aid and services) as best they can to make full-time study possible. Occasionally, however, extraordinary but nonfinancial personal, academic, or medical circumstances make studying part-time temporarily necessary and appropriate. Students in good academic standing who face extraordinary situations may petition the Committee on Academic Records for a part-time schedule and proration of tuition in the college.

#### Part-time study in final semester

Students may complete their degrees with part-time study and pay prorated tuition at Cornell after fewer than eight semesters of full-time residence only if:

1. They have completed all requirements by the end of the sixth or seventh semester, met the criteria for accelerated graduation, and are remaining to complete study beyond what is required for the degree.
2. They are writing an honors thesis in the eighth semester and can complete all degree requirements by taking exactly two courses, one of which is the thesis itself. They must register for the thesis and one additional course.

Students must obtain approval of an advising dean and complete the prorated tuition form in the semester before or during the first three weeks of the semester and confirm their status and registration with college registrar Sally O'Hanlon in 55 Goldwin Smith Hall.

## Courses and Credits

#### Counting courses and credits

Students must complete at least 34 courses to graduate—that is, an average of four courses during each of six semesters and five courses during each of two semesters. A 3- or 4-credit course counts as one course; a 2-credit course counts as one-half course. Single-credit courses do not count as part of the 34 except in certain cases when they form

a part of a series and two in the same series can be aggregated to count as one-half course (certain offerings in the Department of Music and Department of Theatre, Film and Dance fall into this category). Three 1-credit courses do not aggregate to count as one course.

A 6-credit language course counts as 1 1/2 courses, while the summer FALCON Programs in Asian languages count as 8 credits and two courses each and regular semester FALCON counts as 16 credits and four courses.

Archaeology and geology fieldwork for more than 6 credits counts as two courses each. BIOGD 281 counts as 1 1/2 courses. Other 5- or 6-credit courses count as one course. Courses students place out of with AP credit count toward the 34.

Students must also complete 120 credits, 100 of which must be from courses taken in the College of Arts and Sciences at Cornell. Liberal arts courses approved for study abroad during a semester or academic year of full-time study (not summer study) and courses taken in certain off-campus Cornell residential programs may be counted toward the 100 credits required in the college. Advanced placement credits, credits earned in other colleges at Cornell, or credits earned in any subject at institutions other than Cornell do not count as part of the 100. The only exceptions to the above restrictions are for courses (usually no more than three) that certain departments accept from other colleges at Cornell as fulfilling major requirements (and substituting for A&S courses) and for up to two courses that an advisor accepts as part of a completed and formally established cross-college, interdisciplinary concentration.

#### Using courses toward more than one requirement

A course may fulfill more than one college requirement in the following situations:

1. A course may be used to fulfill a distribution, breadth, and also a major requirement (except as noted under previous section of restrictions on applying AP credits, transfer credits, and Cornell courses to distribution requirements).
2. A one-semester course in foreign literature (not language) or culture that is acceptable for achieving proficiency or certifying Option I in that language may also be applied to the relevant distribution requirement and, if appropriate, to the breadth requirement.
3. Courses may count toward breadth requirements and toward any other requirement except first-year writing seminars.
4. Courses in a second major may count as electives.

#### Auditing

The college encourages its students to take advantage of its rich curriculum by sitting in on courses that interest them but that they prefer not to take for credit. As long as the instructor agrees, students are welcome to visit courses. Small seminars and language courses are sometimes not open to visitors. Audited courses do not appear on the student's schedule or transcript.

#### Repeating courses

Students occasionally need to repeat courses. If the instructor certifies that the course content is

different, credit is granted a second time. If the content is the same, both grades nonetheless appear on the transcript and are included in any GPA that is calculated, but the course and credit count toward the degree only once. Repeated courses do not count toward the 12 credits required for good standing. Students considering repeating a course under this circumstance should discuss the matter with their advisor and an advising dean. Students who plan to repeat a course submit a petition to the college registrar, Sally O'Hanlon, 55 Goldwin Smith Hall. If the original course grade was F, no petition is necessary.

#### Courses that do not count toward the degree

The college does not grant credit toward the degree for every course offered by the university. Courses in military training, training as emergency medical technician, service as a teaching assistant, physical education, remedial or developmental reading, precalculus mathematics (including EDUC 115), supplemental science and mathematics offered by the Learning Strategies Center, English as a second language, keyboarding, and shorthand are among those for which degree credit and credit toward the 12 credits required for good academic standing are not given. Additional information can be found at: [www.arts.cornell.edu/stu-adv/coursesdontcount.php](http://www.arts.cornell.edu/stu-adv/coursesdontcount.php).

Students enrolled in courses for undergraduate teaching assistants may petition once to have the nondegree credits count toward good academic standing. This would allow continued eligibility for graduating with distinction in all subjects, but would disqualify the student from being on the dean's list that semester.

#### Advanced placement credit

See p. 8. Advanced placement credits count as part of the 120 credits and 34 courses required for the degree. They do not count as part of the 100 credits required in Arts and Sciences at Cornell; their application to distribution and breadth requirements is restricted or prohibited, as explained previously under "Restrictions." AP credits are posted on the transcript during the summer between the freshman and sophomore years, after students have decided whether to accept the credit or forfeit it by taking the Cornell course they had placed out of.

#### Summer session credit

A student may earn credit toward the degree by completing courses in Cornell's summer session or by successfully petitioning for credit for summer courses at other colleges. Students should consult their advisors regarding summer study plans.

Credit for summer courses not taken at Cornell must be approved by the appropriate Cornell department. Approval forms and information are available online, [www.arts.cornell.edu](http://www.arts.cornell.edu), and in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall. Transcripts for completed work at other institutions must be sent to Robin Perry, 172 Goldwin Smith Hall. Credit approved for summer courses away from Cornell (including summer courses abroad) counts toward the 120 credits and 34 courses required for the degree, but not toward the 100 credits required in the college at Cornell. It may not be applied to breadth requirements but may be applied to elective

requirements and to major requirements (with the approval of the department).

Entering students who want to receive credit toward the degree for courses completed before matriculation in a summer session away from Cornell should obtain approval forms as soon as possible and have transcripts sent to Robin Perry, 172 Goldwin Smith Hall. Credits completed in Cornell summer sessions will be awarded automatically.

Summer session at Cornell or elsewhere does not count toward the eight-semester residence requirement. Students are permitted to earn up to 12 credits in one summer.

#### **Transferring credit earned away from Cornell while on leave of absence**

See "Leaves of Absence."

#### **Transferring credit (for transfer students from another institution or from another Cornell college)**

Transfer students must satisfy all normal requirements for the degree, including eight semesters of full-time study. They must always complete at least 60 credits and 16 courses at Cornell and be in residence on campus in the college for at least four regular semesters (summer session does not count toward the residence requirement). The college evaluates credit and residence earned either at another school or college at Cornell University or at another accredited institution of collegiate rank and determines the number of credits and courses the student may apply toward the various requirements for the bachelor of arts degree at Cornell. In addition, it reevaluates advanced placement credit allowed by another institution, including another college at Cornell. Evaluations of transfer credits are normally provided when students are notified of their admission. Once matriculated in Arts and Sciences at Cornell, transfer students must adhere to the same rules for transferring credit earned on leave as all other students.

## **SPECIAL ACADEMIC OPTIONS**

### **Degree Programs**

The following four programs allow students to alter the regular college or major requirements or to work toward more than one degree.

#### **College Scholar Program**

The College Scholar Program is meant to serve students whose interests and talents would benefit from a little more academic freedom than other students have, who demonstrate exceptional promise, and who show the maturity to plan and carry out, with the help of their advisor, a well-designed program of study. College Scholars design idiosyncratic programs: some pursue diverse interests; others integrate a variety of courses into a coherent subject. Up to 40 students in each class are accepted into the program.

College Scholars must complete 120 credits of course work (100 in the college), 34 courses, and, unless they receive permission from the program to accelerate, eight full terms of undergraduate study but are not required to fulfill the other usual college requirements for the degree. They must, however, also complete the university's physical education requirement. All college scholars must complete a senior project. Although they are

not required to complete or fulfill the general education requirements, members of the College Scholar Advisory Board believe that the spirit of those requirements is good.

Each applicant to the College Scholar Program is asked to write an essay, which is due the last Wednesday of classes before final exams in spring of the freshman year. Students should contact Dean Ken Gabard, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, for further information.

#### **Dual-Degree Program with Other Colleges**

The Dual-Degree Program enables especially ambitious undergraduate students to pursue programs of study in two colleges. Dual-degree candidates may earn both a Bachelor of Arts degree from the College of Arts and Sciences and: (1) a bachelor of science degree from the College of Engineering; or (2) a bachelor of fine arts degree from the Department of Art in the College of Architecture, Art, and Planning; or (3) a bachelor of science degree in urban and regional studies from the Department of City and Regional Planning in the College of Architecture, Art, and Planning; or (4) a bachelor of science degree in architectural history from the Department of Architecture in the College of Architecture, Art, and Planning. Students enter one of these colleges as freshmen or sophomores and begin the Dual-Degree Program with the second college in the second or, in some cases, the third year. The Dual-Degree Program ordinarily takes five years to complete, and students are eligible for 10 semesters with financial aid. For further information contact Dean Kay Wagner in the Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

#### **Independent Major Program**

The Independent Major Program allows students to design their own interdisciplinary majors and pursue a subject that cannot be found in an established major. Proposals for an independent major must be equivalent in coherence, breadth, and depth to a departmental major, well suited to the student's academic preparation, and consistent with a liberal education. Proposals must also be supported by a faculty advisor and are assessed by a board of faculty members. Independent majors substitute for established majors, but students must still satisfy all the other requirements for the bachelor's degree. Students should contact Dean Jim Finlay, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, for further information. Deadlines for submitting independent major proposals are listed on the calendar supplement for the College of Arts and Sciences.

#### **Double Registration with and Early Admission to Professional Schools**

Registration in the senior year of the College of Arts and Sciences and the first year of Cornell Law School or the Johnson Graduate School of Management is occasionally possible. A very few exceptionally well-prepared students who have earned 105 credits before the start of the senior year and have been accepted by one of the above-named professional schools may be permitted to register simultaneously in the college and in one or another of these professional schools during the seventh and eighth terms.

They earn the B.A. degree after the first year of professional school.

Students with 8 or fewer credits and two or fewer courses to complete may apply to enter the Master's of Engineering program during (but no earlier than) their eighth semester; dual-degree students may enter this program no earlier than the ninth semester. They earn the bachelor degree(s) after one semester of graduate school.

Students interested in the joint program with the Law School or the Graduate School of Management, or in early admission to the master's of engineering program should apply to the relevant program. All candidates should confirm their eligibility with an advising dean, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

Double-registered students must, of course, complete all requirements for the B.A. degree, including 100 credits in Arts and Sciences courses.

### **Teacher Education**

Students at Cornell may pursue teaching credentials in agriculture, biology, chemistry, earth science, general science, mathematics, and physics. Cornell students from any college are encouraged to apply for admission to the Cornell Teacher Education Program during their sophomore or junior year. Those who are admitted complete their undergraduate major in an agricultural science, mathematics or one of the sciences, while taking education courses. They are then able to complete a master of arts in teaching (MAT) in one year and earn certification in New York State. Students in agricultural science *may* be able to complete certification requirements as undergraduates.

For more information, contact the program coordinator at 255-9573.

### **Special-Interest Options**

The following options enable students to pursue special interests within the usual degree programs.

#### **Concentrations**

Established interdisciplinary concentrations, described in alphabetical order along with departments in the pages following, provide structures for organizing electives. Completed concentrations are noted on the transcript.

#### **Informal Minors**

Some students organize electives within a discipline or department in Arts and Sciences or another college. Such informal minors can be developed with the help of the departmental directors of undergraduate studies. They are not noted on the transcript.

#### **Independent Study**

Independent study affords students the opportunity to pursue special interests or research not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the independent course, must approve the proposed study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study (proposal forms are available in the Office of Undergraduate Admissions and Advising, 55 and 172 Goldwin Smith Hall). In one semester students may

earn up to 6 credits with one instructor or up to 8 credits with more than one instructor. Students who are being paid for assisting faculty in research *cannot* earn course credit for that work.

### Undergraduate Research

An excellent way to benefit from being an undergraduate at a research university, at Cornell in particular, is to become an apprentice in ongoing faculty research. About 400 students participate each year in creating new knowledge and earn independent study credit for what they learn and contribute. They sharpen their critical and creative abilities and test their interest in pursuing a research career. Sometimes they publish their work.

The Cornell Undergraduate Research Board, an undergraduate organization, conducts an annual open house to help students get started in research and an annual forum at which undergraduates present their work. See [www.rso.cornell.edu/curb/](http://www.rso.cornell.edu/curb/).

Students interested in this program should consult Dean David DeVries in the Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall, or consult [www.research.cornell.edu/undergrad/](http://www.research.cornell.edu/undergrad/).

### Language Study

**FALCON (Full-Year Asian Language Concentration).** FALCON allows students who are interested in the Far East to study Chinese or Japanese exclusively for one year. They gain proficiency in the language and familiarity with the culture. Students who are interested in the Far East should be aware of the opportunities to pursue rapid and thorough beginning studies on campus with the objective of studying abroad in China or Japan. Students interested in this program should contact the Department of Asian Studies, 350 Rockefeller Hall; e-mail: [falcon@cornell.edu](mailto:falcon@cornell.edu).

### Language House Program

A complement to classroom cultural and linguistic instruction, the Language House Program combines residential and academic opportunities for developing and practicing conversational skills in French, German, Italian, Japanese, Mandarin Chinese, and Spanish. It helps prepare students who plan to study abroad and helps returning students share their cultural experiences while further increasing their language skills. Students interested in this program should contact Clare McMillan, 726 University Ave., 255-6453.

### Prelaw Study

Law schools seek students with sound training in the liberal arts and sciences; they neither require nor prefer any particular program of study. Students should therefore study what they love and do well. While doing that, they should also develop their powers of precise, analytical thinking and proficiency in writing and speaking. Students in the College of Arts and Sciences who are applying to law school may consult Lisa Harris in the Office of Arts and Sciences Career Services, 55 Goldwin Smith Hall.

The college offers a concentration in law and society. This program offers a broad scope, complements almost any major, and attracts many students not intending to become lawyers as well as a subset of those intending to.

### Premedical Study

The breadth and depth afforded by a liberal arts education are invaluable for students planning medical careers, whether they intend to practice or go into research. Such education has a profound effect on the doctor's understanding of the world and hence usefulness to patients, and it affords the flexibility of mind that is needed for major research undertakings. Medical and dental schools do not prescribe or even prefer a particular major; they do, however, require particular undergraduate courses, and most students are well advised to begin chemistry in their freshman year. Students who are interested in medical careers are urged to visit the Health Careers Office, 203 Barnes Hall.

The advisor for students in the College of Arts and Sciences who are planning careers in medicine is Dean Janice Turner, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall.

### Off-Campus Programs

Many students find it important to their majors or to their overall academic programs to study off campus or abroad for one or two semesters. When it makes academic sense, the college encourages its students to pursue such studies and grants credit toward the degree for work satisfactorily completed. It rarely approves students' participation in more than one off-campus program.

### Study Abroad

The College of Arts and Sciences encourages study, both on campus and abroad, that provides a greater understanding of the world's peoples, cultures, economies, and environments, and prepares graduates for the challenges of international citizenship in the 21st century. Study abroad is open to students in any major who meet the college requirements and have a strong academic goal. Well-chosen and well-planned study abroad contributes a global or comparative dimension to your chosen field, enhances critical thinking and communications skills, and provides firsthand immersion in and appreciation of another culture. Focused academic work in the right institution abroad can be excellent preparation for advanced study or honors work in your final semesters at Cornell, and can lead to a career with a global component.

#### Requirements

- acceptance into a major
- area-studies course work
- fulfillment of the College of Arts and Sciences residence requirement
- GPA of 3.0 or higher and good academic standing
- language study at the required level
- fulfillment of the requirements of the foreign university or program

Cornell Study Abroad students must study alongside degree candidates in their host institutions rather than in self-contained programs that offer courses specially designed for foreigners. The college will approve only those study-abroad proposals that demonstrate realistic and coherent academic goals that are consistent with the philosophy of a liberal arts education.

The college advocates study abroad that enables students to become competent in another language, so that they can engage fully in daily life in another culture, develop social relationships, and complete formal course work in that language. To study abroad in a country where the host language is not English, the student must demonstrate competence in the language as a prerequisite.

For study abroad in Western Europe and Latin America, students must complete at least **two semesters of the appropriate foreign language at the 200 level** at Cornell; additional course work is strongly encouraged and will increase students' chances for acceptance into the most highly competitive programs. Consult this catalog for the required level of course work in specific languages. For study abroad in Asia, Eastern Europe, the Middle East, and parts of Africa, course work entirely in the host language is not always practical, even after several semesters of language preparation at Cornell. Students should still plan to complete as much language preparation as possible within the Cornell curriculum, at least one to two years of study, and may be approved for language-intensive programs (at least half of the permitted 15 credits) with appropriate course work in English. If Cornell does not offer instruction in the language of the proposed host country, the student may be approved for a program that combines intensive language instruction with subject course work in English. All students must continue to formally study the language of the host country while abroad.

For study abroad in English-speaking countries, direct university enrollment is approved and expected. Cornell students will engage in a full course of study, generally in their major field, alongside regular degree candidates in the host country. In general, the college requires that at least 50 percent of the classes the student enrolls in be advanced-level course work in their major field.

Students will need to acquire background knowledge of the country or region where they intend to study. At least one area-studies course or one course in the history, culture, economics, politics, or social relations of the country of destination (3 or more credits) *in addition to language study* should be part of every student's preparation for study abroad. Some especially competitive programs require substantial prior course work in the proposed course of study as a prerequisite to acceptance. Students who intend to enhance their major with study abroad may need advanced course work in that field. As with language study, area-studies preparation beyond the minimum is highly recommended.

All A&S students must be formally accepted into a major before going abroad, and should ideally be accepted into a major before beginning the application process. Most students plan a significant amount of academic work toward the major while abroad. Whether or not students intend to earn major credit, the college requires that time spent abroad will not impede their progress toward the degree. The student's faculty advisor and departmental director of undergraduate studies must review and approve the study-abroad plans before the application is submitted to the college.

Study abroad can earn up to 15 A&S credits per semester of full-time course work as long as the curriculum abroad is consistent

with that of the college. Completion of one trimester of study earns a maximum of 10 credits. Two terms at Oxford or Cambridge may earn up to 20 credits. You must carry a full course load as defined by the host institution, which should be equivalent to at least 15 credits at Cornell, and all courses must be taken for a letter grade. Courses that fall outside the scope of the liberal arts and sciences may only be taken with the **prior approval** of Dean Wasyliv, and will earn non-A&S credits. Some foreign universities offer courses for visiting students that do not carry any academic credit. Students may **not** earn additional credit for enrolling in extra courses during the semester or year abroad.

Credit for study abroad will be awarded only after completion of the semester abroad, and after the college receives your official transcript. To receive credit, students must fill out a **Request for Credit from Study Abroad** form and submit it to the advising office along with a copy of their transcript. All courses taken abroad will appear on the Cornell transcript and grades earned are reported in the system of the host institution. Grades earned through course work abroad do not become part of the Cornell GPA, since grades at other institutions are rarely equivalent to grades at Cornell. **Students must save all written work from all courses until their grades are received and recorded on their Cornell transcript.**

The maximum length of study abroad that can count toward A&S degree requirements is two semesters, which is also the amount of time recommended for true immersion in another culture and language. Approved semesters away from campus include Cornell in Washington, Urban Semester, and SEA Semester as well as all Cornell Abroad destinations. Students who transfer to Cornell must complete a minimum of four semesters of residence on campus in Ithaca and may not study abroad during any of those four semesters. Internal transfers must complete four semesters of residence on campus in the Internal Transfer Division and/or the College of Arts and Sciences. Students interested in the Cornell in Rome Program should contact Dean Wasyliv.

**All applicants for study abroad during the academic year must go through the Cornell Abroad office after being approved by the College of Arts and Sciences. For more information, see Dean Patricia Wasyliv, 55 Goldwin Smith Hall. The full A&S study-abroad policy can be found on the Cornell Abroad web site.**

#### Summer Residential Programs in Archaeology

During the summer months students may participate in a Cornell-sponsored archaeological project. In recent years the program has organized archaeological projects in Central America, Greece, Israel, Italy, Turkey, and New York State. Students should contact the Archaeology Program for information about the sites currently available. Students planning on attending field schools organized by other institutions should see Professor Peter Kuniholm, B48 Goldwin Smith Hall.

#### Marine Science

Shoals Marine Laboratory is a seasonal field station that offers a variety of courses and experiences designed to introduce

undergraduates to the marine sciences. The laboratory is located on Appledore Island, six miles off the Maine/New Hampshire coasts. Students should contact the Shoals Marine Laboratory Office, G14 Stimson Hall, for further information.

#### Cornell in Washington

The Cornell in Washington program offers students from all colleges in the university an opportunity to earn full academic credit for a semester in Washington, D.C. Students take courses from Cornell faculty members, conduct individual research projects, and work as externs. The Cornell in Washington program offers two study options: (1) studies in public policy, and (2) studies in the American experience. The program also offers unique externship opportunities: students serve as externs in a federal agency, congressional office, or nongovernmental organization and take part in a public policy or humanities seminar. They define and carry out individual research projects under the supervision of Cornell faculty members. Potential externships are arranged through, and approved by, the Cornell in Washington program. For further information, see p. 22 or inquire at M101 McGraw Hall, 255-4090. Study in Washington during a final semester of residence is allowed rarely and only by petition. Students should consult with the dean of seniors, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

### ACADEMIC INTEGRITY

Academic integrity is the heart of intellectual life—both in learning and in research. All members of the university community simply must support each other's efforts to master new material and discover new knowledge by sharing ideas and resources, by respecting each other's contributions, and by being honest about their own work. Otherwise the university will fail to accomplish its most central and important goals.

Cornell's Code of Academic Integrity and policy about acknowledging the work of others are among the documents new students receive. Students should read them carefully and not assume they understand what integrity and cheating are and are not. Academic integrity implies more here at the university than it usually did in high school. The standards of integrity are those that prevail in professional life. This means that students must acknowledge and cite ideas they adopt from others (not just direct quotations) and help they receive from colleagues or parents. With productive emphases on collaborative learning and writing, students must understand the general standards and policies about academic integrity and be sure they understand the expectations in individual courses as well. When in doubt, ask the instructor. For more information, consult <http://cuinfo.cornell.edu/Academic/AIC.html>.

### ADVISING

The following advisors and offices provide academic advising, help with problems, and information on college procedures and regulations.

### Faculty Advisors

Each new student is assigned a faculty advisor. Advisors help students plan programs of study and advise them about ways to achieve their academic goals. Advisors may also help students with study or personal problems or may direct them to other offices on campus where help is available. Academic difficulties may frequently be solved or avoided if students and advisors recognize and address problems early.

Advisors and new advisees meet first during orientation week to discuss course selection. New students are encouraged to see their advisors again early in the semester, before it is too late to drop courses, to discuss their academic progress and to become better acquainted. Advisors and advisees meet at least once each semester to discuss courses for the following semester, and more often if advisees wish to discuss academic or personal issues or to petition for an exception to college rules.

### Student Advisors

Student advisors pass on lore about the college and life at Cornell and help new students understand requirements and negotiate the university.

### Major Advisors

After acceptance into a major, students are assigned a major advisor, a faculty member in the major department, with whom they shape and direct their course of study. The advisor eventually certifies the completion of the major. Students should consult their major advisor about all academic plans, including honors, study abroad, acceleration, and graduate study. The advisor's support is especially important if a student petitions for an exception to the normal procedures or requirements.

### Office of Undergraduate Admissions and Advising

This office, located in 55 Goldwin Smith Hall, 255-5004, and 172 Goldwin Smith Hall, 255-4833, is a resource for faculty and student advisors and for individual students and their parents. Advising deans are available to help students define their academic and career goals, to help with special academic options and exceptions to college rules, and to help when problems arise:

David DeVries, associate dean for undergraduate admissions and advising and undergraduate research, 255-3386

Yolanda Clarke, juniors, seniors, internal transfers, and minority students, 255-4833

Juliette Corazón, minority students and liaison to Latino Studies Program, 255-4833

Maria Davidis, juniors, seniors, Tanner Dean's Scholars, Cornell Presidential Research Scholars, Mellon Mays Fellows, and postgraduate fellowships, 255-4833

James Finlay, first- and second-year students, Independent Major Program, Tanner Dean's Scholars, Cornell Presidential Research Scholars Fellowships, undergraduate research, and peer advisors, 255-5004

Ken Gabard, first- and second-year students and College Scholar Program, 255-5004



Lisa M. Harris, career services and pre-law advising, 255-6926

Ray Kim, first- and second-year students, student ambassadors, 255-4833

Irene Komor, career counseling, 254-5295

Clare McMillan, Language House Program, 255-6543

Diane J. Miller, career services, 255-6924

Sally O'Hanlon, registrar, 255-5004

Janice Turner, minority students and pre-med advising, 255-9497

Catherine Wagner, juniors, seniors, and dual-degree students, 255-4833

Peggy Walbridge, juniors, seniors, transfer students, and students with disabilities, 255-4833

Patricia Wasyliw, first- and second-year students, academic integrity, study abroad, 255-5004

## Committee on Academic Records

The college faculty's standing Committee on Academic Records has two main tasks: (1) to decide on students' petitions for exceptions to college requirements or rules and (2) to review the records of students who fail to maintain good academic standing and to take appropriate action. It accomplishes both those tasks without formulae and with attention to each individual situation. Its overriding goal is to help students achieve the best undergraduate education possible.

### Petitions

The college faculty takes graduation requirements seriously, and the faculty's Committee on Academic Records virtually never waives a requirement outright. However, some students, with the support of their advisors, propose structuring their educations or fulfilling the spirit of college requirements in ways other than the specified norms. The Committee on Academic Records decides on such requests. Students who find that their undergraduate education would be better realized by satisfying requirements or proceeding in a way that requires an exception to normal rules should meet with an advising dean in the Office of Undergraduate Admissions and Advising. The deans are expert in the college's expectations and procedures and can help the student formulate a petition, if appropriate. The committee decides petitions on the basis of their educational merit.

### Actions

The College of Arts and Sciences has no minimum grade requirement for graduation beyond the guideline that at least 100 Cornell credits of the 120 total required for graduation be passed with grades of C (not C-) or above. Consequently, only through actions of the Committee on Academic Records, described below under "Academic Standing," does the college maintain the quality of the degree and attend to individual situations when things academic are not going well.

## REGISTRATION AND COURSE SCHEDULING

### Enrollment in Courses in the College of Arts and Sciences

#### New Students

During orientation week, new students attend briefings and other information sessions, meet with faculty advisors, and sign into courses. The college reserves spaces in courses for its incoming students.

#### Continuing Students

Continuing students select and schedule up to five courses of 3 or more credits and as many 1- and 2-credit courses as they would like during the semester before the one in which the courses will be taken. Students who do not "pre-enroll" during the designated period must wait until the beginning of the semester and may have difficulty securing places in the courses they most want. Before enrolling in courses, students plan their programs and discuss long-range goals with their faculty advisors. In addition, all students are welcome to discuss programs and plans with an advising dean in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall.

At the beginning of each semester, students find their schedules on "Just the Facts." Periodically during the semester, they should confirm the accuracy of their records.

#### Limits on Numbers of Courses and Credits

To meet the 34-course requirement, students must normally take four courses during each of six semesters and five courses during each of two semesters. To meet the 120-credit requirement, students must average 15 credits per semester. (Note: AP credit and/or summer credits may reduce the average numbers of courses and credits required each semester.)

#### Minimum number of credits per semester

To maintain good academic standing as a full-time student, students must complete at least 12 degree credits per semester; if for compelling personal or academic reasons students need to carry fewer than 12 credits, they should consult their faculty advisor and an advising dean. Permission is by petition only.

#### Maximum number of credits per semester

First-semester freshmen must petition to enroll in more than 18 credits; other students may enroll in up to 22 credits if their previous semester's average was 3.0 or higher and they are in good academic standing. No more than 22 credits may be taken in a regular semester without permission of the college faculty's Committee on Academic Records. Students who fail to receive approval for excess credits from the committee may count only 18 or 22 credits, depending on their previous semester's average, toward the degree for that semester.

#### Attendance

Attendance in classes is expected. Absences are a matter between students and their instructors. If a student cannot attend classes because of illness or family crisis, the Office of Undergraduate Admissions and Advising will notify instructors at the request of the

student or the family. Nonetheless, the student must arrange to make up examinations or other work with each instructor. A student who will be absent because of religious holidays or athletic competitions must discuss arrangements for making up work with his or her instructors well in advance of the absence. A student who must miss an examination must also consult with the professor in advance. Alternative arrangements are at the discretion of the instructor.

Student athletes should discuss scheduled absences with their instructors at the beginning of the semester. Courses vary in their tolerance of absences. Instructors are not obligated to approve absences for purposes of participating in extracurricular activities, although most will be as flexible as is sensible for a student's academic program.

### Adding and Dropping Courses

After course enrollment (also known as pre-enrollment), students may not adjust their schedules until the new semester begins. During the first three weeks of the semester, students may change courses without petitioning. (Note: the add period for first-year writing seminars is only two weeks.)

After the third week of classes, students must petition to add courses and may add them only for a letter grade. They may drop courses through the seventh week of the semester if no issue of academic integrity is at stake. Between the seventh and 12th weeks students may petition to withdraw from courses, if (1) the instructor approves; (2) the advisor approves; (3) an advising dean approves; (4) the drop does not result in fewer than 12 credits; and (5) no issue of academic integrity is at stake. Students must meet with an advising dean to obtain petition forms.

Courses officially dropped after the seventh week will be noted on the transcript by a "W" where the grade would normally appear. **This is a matter of record and cannot be petitioned. Petitions to withdraw from courses may not be submitted after the end of the 12th week in the semester.** Deadlines for short courses will be adjusted according to the length of the courses.

The effective date of all course changes will be the day the student submits all completed paperwork to the Office of Undergraduate Admissions and Advising.

### Leaves of absence (LOAs)

Taking time off from college to gain experience or funds, or to find direction, is sometimes useful. In general, students arrange in advance for leaves to take effect the following semester. Students in good academic standing may take a personal leave of absence up to the beginning of the semester (defined as the first day of classes). Students not in good academic standing may pursue a conditional leave of absence from the college up to the first day of classes. If medical issues are involved, students must consult Gannett: Cornell University Health Services about the advisability of a medical leave of absence.

**Any student who wishes to take a leave of absence must consult with an advising dean in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall.**

Students sometimes find it necessary to take a leave of absence at some point during the semester. In addition to the serious



financial consequence of taking leaves after the semester has begun (see the Proration Schedule for Withdrawals and Leaves of Absence in the General Information section of this catalog), all leaves taken during the semester are granted at the discretion of the college. Students should discuss their need for a LOA with an advising dean.

#### Leaves of Absence are of four types:

1. *Personal leaves* impose no conditions concerning reentering the college except for the five-year limit (see "Return from Leave," below). Readmission is automatic upon written request made by August 1 for a fall semester, or January 1 for a spring semester.
2. *Conditional leaves* are granted by the college for students who wish to take a leave but are not in good academic standing, or for students who wish to take a leave during the current semester. In consultation with the student, an advising dean and the Committee on Academic Records set the conditions for the student's return. Students may not return from conditional leaves for at least two semesters and/or until specific and individual conditions, such as completing unfinished work, have been met. Students may be granted conditional leaves after the 12th week of a semester only under extraordinary circumstances and with the approval of the faculty's Committee on Academic Records.
3. *Medical leaves* are granted by the college only upon the recommendation of Gannett, and are usually issued for at least six months. The college may attach additional conditions appropriate to the individual situation. The student's academic standing is also subject to review at the time of the leave and on return. Students must then receive clearance from both Gannett and the college to be readmitted to study. Students wishing to return from a medical leave should contact Gannett several months in advance to initiate the return process, and only then contact the college.
4. *Required leaves.* The Committee on Academic Records may require a leave of absence if a student is not making satisfactory progress toward the degree. See "Academic Actions."

Students on conditional or required leaves of absence (LOA) may not attend any classes at Cornell through the School of Continuing Education and Summer Sessions. Students on a medical LOA may not register for classes at Cornell unless they obtain the permission of the college and a recommendation from Gannett. Courses taken without college permission will not count toward degree requirements.

#### Return from Leave

Students wishing to return from leave must contact the college and, where appropriate, provide documentation that all conditions for readmission have been satisfied. All requests for readmission must be received by the college by August 1 for the fall semester and January 1 for the spring semester. In the case of conditional and/or medical leaves, substantial advance consultation with both the college and Gannett: Cornell University Health

Services is necessary. On readmission, the student's graduation date will be recalculated. Five years is the maximum length of time a student may be on leave before being withdrawn from the college.

#### Transferring Credits Earned While on Leave

Students who take courses elsewhere in the United States while on leave may petition to have credits transferred. Petitions are available in 55 and 172 Goldwin Smith Hall and at [www.arts.cornell.edu](http://www.arts.cornell.edu). Approval depends on acceptable grades and the judgment of the relevant departments about the quality of the courses. If approved, these credits may be applied toward the 120 credits and 34 courses needed for graduation, but not toward the 100 credits required in the college. They may be applied to elective requirements or to the major, as allowed by the department, but not to any of the breadth or distribution requirements. **Credits earned during a leave do not count toward the eight semesters of residence and may not be used to reduce the terms of residence below the required eight. See "Residence."**

#### Study Abroad and International Students on Leave of Absence

Study abroad undertaken during a leave of absence will not receive academic credit. International students on leave of absence from the College of Arts and Sciences may enroll in courses at a college or university in their home country **only**, as such enrollment is not defined as study abroad. They may petition for transfer of credit upon return to Cornell. If approved, the credit will count as described in the previous paragraph.

#### Withdrawals

A withdrawal is a permanent severance from the university and from candidacy for the degree. Students planning to withdraw should consult an advising dean. Students not requesting a leave and failing to register for a semester will be withdrawn from the college. The college faculty's Committee on Academic Records may require a student to withdraw because of a highly unsatisfactory academic record.

#### Transferring within Cornell (Internal Transfer)

Internal transfer from one college or school at Cornell into another is attractive for many students whose intellectual interests change (or become more focused). Students who want to transfer should discuss their eligibility with a counselor in the new school or college.

In some cases, students who want to transfer into the College of Arts and Sciences may transfer directly. In other cases, they may be referred to the Internal Transfer Division. During the semester immediately preceding transfer into the College of Arts and Sciences, students should complete at least 12 credits of courses in the College of Arts and Sciences with a 3.0 average and with no grades of *Incomplete*, S-U grades (unless only S-U grades are offered for that particular course), or grade below C (C- is below C). Satisfying this minimum requirement does not, however, guarantee admission. Admission to the college is based on consideration of the student's entire record at Cornell and the high school record, not just the work of one semester. It is also based on ability to complete the B.A. degree within a reasonable time. Internal

transfers are required to spend four semesters in Arts and Sciences and thus should initiate the transfer process no later than the second semester of sophomore year. They also must complete at least 100 credits at Cornell with grades of C (not C-) or above. Interested students should see Dean Yolanda Clarke, 172 Goldwin Smith Hall.

## ACADEMIC STANDING

Students are in good academic standing for the semester if they successfully complete at least 12 degree credits by the end of the semester and earn no more than one D and no F or U grades. If a student completes only three courses, all grades must be above D. In addition, students are expected to make satisfactory progress toward satisfying requirements for the degree and to earn grades of C (not C-) or better in at least 100 of the 120 credits for the degree. Courses listed under "courses that do not count toward the degree" do not count toward good academic standing in a semester.

### Academic Actions

Students who are not in good academic standing will be considered for academic action by the college faculty's Committee on Academic Records or by one of the advising deans of the college. Students are urged to explain their poor academic performance and submit corroborating documentation. Students may appeal a decision or action of the committee if they have new relevant information and documentation. They must consult an advising dean about appealing.

### Warning

Any student who fails to maintain good academic standing will, at a minimum, be warned. A warning is posted on a student's college record but is not reported to the university registrar and does not appear on official transcripts.

### Required leave of absence

A student in serious academic difficulty may be required by the faculty Committee on Academic Records to take a leave of absence, normally for a full year. Usually, but not always or necessarily, the Committee on Academic Records warns students before suspending them. Before being allowed to return and reregister in the college, students must document what they did on leave and how they resolved their problems, and they must submit a plan for completing the degree. In some cases students will be required to furnish evidence that they are ready to return or satisfy other conditions before being allowed to reregister in the college. Students who request to return in less than a year must present to the committee extraordinarily convincing evidence of their readiness to return. "Required leave" is posted on the student's official transcript.

### Required withdrawal

The faculty Committee on Academic Records may dismiss a student from the college because of a highly unsatisfactory record for one semester or for failure to make satisfactory overall progress in grades, credits, or degree requirements. This action expels the student permanently from the college.

"Required withdrawal" is posted on the student's official transcript.

### Forgery or Fraud on Forms

Forging signatures or credentials on college forms is an academic offense and constitutes academic fraud. In all cases of forgery on academic forms, the effect of the forged documents shall be negated; such incidents will be recorded in the Academic Integrity Hearing Board's confidential file for forgeries. If the student forges more than once, or if the forgery would advance the student's academic standing unfairly or fraudulently, or if for any reason the situation requires some response in addition to the uniform penalty, the Academic Integrity Hearing Board might recommend further action, such as a notation on the student's transcript, suspension, or dismissal.

## GRADES

### Letter Grades

See "Grading Guidelines," p. 15.

### S-U Grades

The S-U (satisfactory-unsatisfactory) option allows students to explore unfamiliar subjects or take advanced courses in subjects relatively new to them without being under pressure to compete with better-prepared students for high grades. Students are expected to devote full effort and commitment to a course and complete all work in a course they take for an S-U grade. The S-U option is contingent upon the instructor's willingness to assign such grades. **Students must select their grading option and obtain the instructor's approval for the S-U option during the first three weeks of the semester.** No exceptions to this deadline are permitted, and consequently students adding courses after the third week of the semester must add them for a letter grade. A grade of S is equivalent to a grade of C- or higher; a grade of U, which is equivalent to any grade below C-, is a *failing* grade equal to an F. S means the student receives the credit specified for the course. U means no credit is given. A few courses in the college are graded exclusively S-U; in that case, the final grade appears on the transcript as SX or UX.

Prerequisite courses for graduate school and courses counting toward the major should not be taken for an S-U grade, unless the department grants permission. Students may elect the S-U option in courses used to satisfy distribution and elective requirements, provided that such courses do not also count toward major requirements or serve as prerequisites for admission to the major. First-year writing seminars and most language courses disallow the S-U option. In any case, students are advised to use the S-U option sparingly, if they intend to apply to graduate school or for transfer to another college. There is no limit on the number of courses each semester for which students may elect the S-U grade, but within the 120 credits required for the degree, a minimum of 80 credits must be in courses for which a letter grade was received.

### Note of Incomplete

An incomplete (INC) signifies that a course was not completed before the end of the semester for reasons beyond the student's control and acceptable to the instructor. Students must have substantial (normally at least 50 percent) equity in the course, be able to complete the remaining work, and have a passing grade for the completed portion. When a grade of incomplete is reported, the instructor submits a form stating what work must be completed, when it must be completed, and the grade (or permanent—"frozen"—incomplete) earned if the work is not completed by that date. When a final grade is determined, it is recorded on the official transcript with an asterisk and a footnote explaining that this grade was formerly an incomplete.

Students must resolve (make up or "freeze") any incompletes with their instructors before graduation.

### Note of R (Yearlong Courses)

R is recorded for satisfactory progress at the end of the first semester of a two-semester course. Students enroll in such courses both semesters, each time for the full number of credits for the whole course. The grade recorded at the end of the second semester evaluates the student's performance in the course for the entire year.

### Grade Reports

Grade reports are available online on Just the Facts; they are not mailed to students. Students should periodically check their courses and grades to be sure that they are recorded correctly.

### Class Rank

The college does not compute class rank.

### Dean's List

Inclusion on the Dean's List is an academic honor bestowed by the dean of the college semester by semester. Based on grades, the criteria include about the top 30 percent of students and vary with the number of credits the student completes. The criteria are subject to slight changes from semester to semester and are available at [www.arts.cornell.edu/stu-adv/deanslist.asp](http://www.arts.cornell.edu/stu-adv/deanslist.asp) and in the Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall.

## GRADUATION

### The Degree

The College of Arts and Sciences grants only one degree (no matter the student's major): the A.B. (or B.A.). A.B. is the abbreviation of the Latin name for the degree, "artium baccalarius," or translated into English, B.A., "Bachelor of Arts."

### Application to Graduate

In the first semester of their senior year, students complete an application to graduate. The application allows the college to check each student's plan for fulfilling college requirements. This process is intended to help seniors identify problems early enough in the final year to make any necessary changes in

course selection to satisfy those requirements. *Nonetheless, meeting graduation requirements is the student's responsibility;* problems that are discovered, even late in the final semester, must be resolved by the student before the degree can be granted.

### Degree Dates

There are three degree dates in the year: May, August, and January. Students who plan to graduate in August may attend graduation ceremonies in the preceding May. Students graduating in January are invited to a special recognition ceremony in December; they may also attend graduation ceremonies the following May.

### Honors

#### Bachelor of Arts with Honors

Almost all departments offer honors programs for students who have demonstrated exceptional accomplishment in the major and succeeded in research. The honors programs are described by individual departments. The degree of Bachelor of Arts *cum laude*, *magna cum laude*, or *summa cum laude* will be conferred upon a student who, in addition to having completed the requirements for the degree of Bachelor of Arts, has been recommended for a level of honors by the major department, the Independent Major Program, or the College Scholar Program. Concentrations do not offer honors programs.

#### Bachelor of Arts with Distinction

The degree of Bachelor of Arts with distinction in all subjects will be conferred on students who have completed the requirements for the degree of Bachelor of Arts, if they have met the following requirements by the end of their final semester:

1. completed at least 60 credits while registered in regular sessions at Cornell;
2. ranked in the upper 30 percent of their class at the end of the seventh semester, or next-to-last semester for transfers and accelerants;
3. received a grade below C- in no more than one course;
4. received no failing grade;
5. have no frozen *Incompletes* on their records; and
6. maintained good academic standing, including completing a full schedule of at least 12 credits, in each of their last four semesters.

## CALENDAR SUPPLEMENT

All of the dates in the university calendar at the front of this volume apply to all Cornell students. Listed below are some additional dates that are of importance for students in the College of Arts and Sciences.

	<i>Fall 2006</i>	<i>Spring 2007</i>
Last day for adding courses without petition	Sept. 15	Feb. 9
Last day for adding a first-year writing seminar	Sept. 8	Feb. 2
Last day for changing grade option to S-U or letter	Sept. 15	Feb. 9
First deadline for submitting independent major requests. Go to 55 Goldwin Smith Hall for further information.	Sept. 25	Feb. 26
Last day for dropping courses without petition	Oct. 13	March 9
Last day to petition to withdraw from a course	Nov. 17	April 20
Second deadline for submitting independent major requests. Go to the Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, for further information.	Nov. 27	April 2
Deadline for requesting internal transfer to the College of Arts and Sciences for the following semester.	Dec. 2	May 4
Deadline for applying to the College Scholar Program.		May 3
Deadline for applying Office, to study abroad	See Cornell Abroad 474 Uris Hall	
Course enrollment (preregistration) for the following semester.	TBA	TBA

## Departments, Programs and Courses

### AFRIKAANS

See "Department of German Studies (Dutch)."

### AFRICANA STUDIES AND RESEARCH CENTER

S. Hassan, Director (254-1592); N. Assié-Lumumba, A. Bekerie, L. Edmondson, R. Harris, A. Mazrui, A. Nanji, J. Turner. Offices: 310 Triphammer Road, 255-4625 or 255-4291.

The Africana Studies and Research Center is concerned with the examination of the history, culture, intellectual development, and social organization of Black people and cultures in the Americas, Africa, and the

Caribbean. Its program is structured from an interdisciplinary and comparative perspective and presents a variety of subjects in focal areas of history, literature, social sciences, and African languages. African languages such as Swahili are consistently offered fall and spring semesters and also taught during summer/winter session.

The center offers a unique and specialized program of study that leads to an undergraduate degree through the College of Arts and Sciences and a graduate degree, the Master of Professional Studies (African and African-American), through the university's Graduate School.

A student may major in Africana Studies; however, another attractive alternative is the center's minor concentration program. This program enables the student to complete a major in any of the other disciplines represented in the college while at the same time fulfilling requirements for a minor in Africana Studies. This requires only a few more credits than is usually the case when one completes a single major course of study. Courses offered by the center are open to both majors and nonmajors and may be used to meet a number of college distribution requirements, including historical/temporal breadth (#) and geographical breadth (@) requirements, such as first-year writing seminars, language (Swahili), expressive arts, humanities, social sciences, and history.

The center also brings distinguished visitors to the campus, sponsors a colloquium series, and houses its own library.

### The Africana Major

The undergraduate major offers interdisciplinary study of the fundamental dimensions of the African-American, African, and Caribbean experiences. Because of the comprehensive nature of the program, it is to students' advantage to declare themselves Africana majors as early as possible. The following are prerequisites for admission to the major.

Students should submit:

1. a statement of why they want to be an Africana Studies major;
2. a tentative outline of the area of study they are considering (African, African-American, or Caribbean) for the major; and
3. a full transcript of courses taken and grades received.

The center's director of undergraduate studies, A. Bekerie, will review the applications and notify students within two weeks of the status of their request.

After acceptance as a major in the Africana Center, a student must maintain a C+ cumulative average in the center's courses while completing the major program. The Africana major must complete 36 credits in courses offered by the center, to include the following four core courses: AS&RC 205, 231, 290, and 422. Beyond the core courses, the student must take 8 credits of center courses numbered 200 or above and 15 credits numbered 300 or above. The program of an undergraduate major may have a specifically African American or African focus.

### Joint Majors (Minor Concentration)

The center encourages joint majors (minor concentration) in the College of Arts and Sciences and in other colleges. Joint majors are individualized programs that must be worked out between the departments concerned. The center's director of undergraduate studies, A. Bekerie, will assist students in the design and coordination of joint major programs. However, in any joint major program, the center will require that at least 16 credits be taken in Africana Studies courses, including AS&RC 290.

### Double Majors

In the case of double majors (as distinct from joint majors) students undertake to carry the full load of stipulated requirements for a major in each of the two departments they have selected.

### Certificate in African Studies

In conjunction with the Institute for African Development, the Africana Studies and Research Center administers an undergraduate Certificate in African Studies program. The certificate is offered as a minor concentration available to students in all of the undergraduate colleges at Cornell. Many of the courses in the program might be used to fulfill other course distribution requirements. By pursuing this certificate, students acquire an interdisciplinary understanding of Africa. After developing a foundation of knowledge on the culture, society, and development of Africa in the core course, AS&RC 191 Africa: The Continent and Its People, students pursue 15 credit hours in a humanities or development studies track or a combination of the two, including an additional core course, either AS&RC 205, African Civilizations and Cultures or CRP 477/677 Issues in African Development. The requirements for the certificate are a minimum of 18 credit hours, including the core courses. Students interested in the certificate program must contact A. Bekerie (the center's director of undergraduate studies), who will register them in the program and assign them a faculty advisor from their own college. The faculty advisor will be responsible for determining completion of the certificate requirements.

### Honors

The honors program offers students the opportunity to complete a library research thesis, a field project in conjunction with a report on the field experience, or a project or experiment designed by the student. The requirements for admission to the honors program for all students—regular majors, joint majors, and double majors—are a B- cumulative average in all courses and a B+ cumulative average in the center's courses. Each student accepted into the honors program will have an honors faculty committee consisting of the student's advisor and one additional faculty member, which is responsible for final evaluation of the student's work. The honors committee must approve the thesis or project before May 1 of the student's junior year. The completed thesis or project should be filed with the student's faculty committee by May 10 of the senior year.

### Language Requirement

Courses in Swahili, Arabic, and Yoruba may be used to satisfy the College of Arts and

Sciences language requirement. In Swahili, successful completion of AS&RC 202 satisfies Option 1. For Yoruba, successful completion of AS&RC 203 satisfies Option 1. For Arabic, AS&RC 212 and AS&RC 312 satisfy Option 1. AS&RC majors are not required to take an African language, but the center recommends the study of an African language to complete the language requirement.

**AS&RC 111/112(1104/1105) Elementary Arabic I and II (also NES 111/112[1201/1202])**

Fall/spring. 4 credits. M. Younes.  
For description, see NES 111/112.

**AS&RC 113/212(1106/2101) Intermediate Arabic I and II (also NES 113/210[1203/2200])**

Fall/spring. 4 credits. AS&RC 212 @ satisfies Option 1. M. Younes.  
For description, see NES 113/210.

**AS&RC 121/122(1108/1109) Introduction to Yoruba I and II**

Fall/spring. 4 credits. A. Ademoyo.  
A two-semester beginner's course in Yoruba Language and Culture. Organized to offer Yoruba language skills and proficiency in speaking, reading, listening, writing, and translation. Focus is placed on familiar informal and formal contexts, e.g. home, school, work, family, social situations, politics, etc. Course uses Yoruba oral literature, proverbs, rhetoric, songs, popular videos, and theatre, as learning tools for class comprehension. First semester focuses on conversation, speaking and listening. Second semester focuses on writing, translation and grammatical formation. Through the language course students gain basic background for the study of an African culture, arts, and history both in the continent and in the diaspora. Yoruba language is widely spoken along the west coast of Africa and in some African communities in diaspora. Yoruba video culture, theatre, music, and arts have strong influence along the west coast and in the diaspora.

**AS&RC 123(1110) Intermediate Yoruba I**

Fall. 4 credits. A. Ademoyo.  
The intermediate course extends the development of the main language skills, reading, writing, listening, and conversation. The course deepens the development of correct native pronunciation, the accuracy of grammatical and syntactic structures; and the idiomatic nuances of the language. Students who take the course are able to (i) prepare, illustrate and present Yoruba texts such as poems, folktales, advertisements, compositions, letters, (ii) read Yoruba literature of average complexity, (iii) interpret Yoruba visual texts of average difficulty, (iv) comprehend Yoruba oral literature and philosophy—within the context of African oral literature and philosophy—of basic complexity. Through the Yoruba language students appreciate African oral literature and philosophy. The primary textual media are Yoruba short stories, poems, short plays, films, songs, and newspapers.

**AS&RC 124/125(1112/1113) Elementary Twi/Akan I and II**

Fall/spring. 4 credits. Faculty.  
A two-semester beginner's course in Twi/Akan language and culture. Twi/Akan is a major West African language spoken in Ghana, Cote-d'Ivoire, and parts of Togo and Benin. This is an elementary course which

introduces students to the basic structures of the language which are applied to rapidly develop the primary speaking, reading, and writing skills of the Twi/Akan. The class will also explore traditional and contemporary cultures of Twi/Akan people.

**AS&RC 131(1100) Swahili**

Fall. 4 credits. Language lab times TBA.  
A. Nanji.  
Beginner's Swahili. Part 1—Grammar for speaking, reading, and writing. Requires no knowledge of language. Swahili is spoken in the East and Central parts of Africa.

**AS&RC 132(1101) Swahili**

Spring. 4 credits. Prerequisite: AS&RC 131.  
A. Nanji.  
Continued study of the basic grammatical formation of the language and the introduction of reading material ranging from songs to short stories. A great many drills are used in this course to help develop the student's comprehension of the language. Swahili tapes are used during all of these sequences.

**AS&RC 133(1102) Swahili**

Fall. 4 credits. Prerequisites: AS&RC 131 and 132. A. Nanji.  
Advanced study in reading and composition.

**AS&RC 134(1103) Swahili**

Spring. 4 credits. Prerequisite: AS&RC 133.  
A. Nanji.  
Places more emphasis on the development of reading ability and the acquisition of writing skills. Students are expected to read and comprehend selected Swahili stories and write compositions on chosen topics. Ample consideration is given to oral practice in the classroom.

**AS&RC 140/141(1114/1115) Elementary Zulu I and II**

Fall/spring. 4 credits. Faculty.  
Zulu, known by native speakers as IsiZulu, is one of the 11 official languages of South Africa. Out of the four Nguni languages (Zulu, Xhosa, Swati, and Ndebele), Zulu is the most widely spoken. The advantage of learning IsiZulu is that it forms the basis for understanding the other Nguni languages. This is a two-semester elementary course which introduces students to the basic structures of the language which are applied to rapidly develop the primary speaking, reading, and writing skills of the Zulus. The class will also explore traditional and contemporary cultures of the Zulu people.

**AS&RC 171(1600) Black Families and the Socialization of Black Children (SBA)**

Fall. 3 credits. L. Wilton.  
Examination of the evolution of the Black family from its roots in Africa, the evolution of family forms, the impact of social policy, and a consideration of the literature stressing family and child well-being. Among the major topics considered are male/female relationships, childbearing and parental roles, the extended family, and economic and health issues. The component of the course focusing on youth primarily covers child and adolescent development.

**AS&RC 191(1300) Africa: The Continent and Its People @ (HA)**

Fall. 3 credits. L. Edmondson.  
Introductory interdisciplinary course focusing on Africa's geographical, ecological, and demographic characteristics; indigenous institutions and values; the triple cultural heritage of Africanity, Islam, and Western

civilization; main historical developments and transitions; and contemporary political, economic, social, and cultural change. Africa's ties with the United States (from trans-Atlantic slavery to the present), its impact on the emerging world order, and its contribution to world civilization are also explored.

**AS&RC 202(2100) Swahili Literature @ (LA)**

Fall. 4 credits. Satisfies Option 1.  
Prerequisite: AS&RC 134. A. Nanji.  
Students gain mastery over spoken Swahili and are introduced to the predominant Swahili literary forms.

**AS&RC 203(1111) Intermediate Yoruba II @**

Spring. 4 credits. Satisfies Option 1.  
A. Ademoyo.  
The Intermediate Yoruba II is a follow-up to Intermediate Yoruba I. It is a fourth semester Yoruba Language course. The course assists students to acquire advanced level proficiency in reading, speaking, writing and listening in Yoruba language. Students are introduced to grammatical and syntactic structures in the language that will assist them in describing, presenting, and narrating information in the basic tenses. At the end of the course, students will be able to listen to, process and understand programs produced for native speakers in media such as television, radio, films etc. They will be able to read and understand short stories, novels, plays written for native speakers of the language.

**AS&RC 205(2300) African Cultures and Civilizations # @ (CA)**

Spring, summer. 3 credits. A. Bekerie.  
Concerned with the peoples of Africa and the development of African cultures and civilizations from the earliest times to the present day. Focuses on the near modern civilizations of Africa south of the Sahara, and the ancient civilizations of Egypt and the Nile Valley, together with their contributions to the development of the major world civilizations. Also deals with the sociopolitical organization of African societies, their kinship systems, cross-cutting ties, rites of passage, gender relations, and arts (including music, dance, folklore, architecture, sculpture, painting, and body decoration).

**AS&RC 212(2101) Intermediate Arabic II (also NES 210[2200]) @**

Spring. 4 credits. M. Younes.  
For description, see NES 210.

**AS&RC 231(2601) Afro-American Social and Political Thought (SBA)**

Spring. 3 credits. J. Turner.  
This is an introductory course that reviews and analyzes the major theoretical and ideological formulations developed and espoused by African-Americans in the struggle for liberation. We focus specifically on the political philosophy and historical significance of Malcolm X, and the work and movement of Marcus Garvey, as the prime movers of nationalism and pan-Africanism among Black people in this century. Such themes as slave resistance, nationalism, Pan-Africanism, emigration, anti-imperialism, socialism and internal colonialism, and the political and social views of Black women are discussed. Black political thought is viewed in its development as responses to concrete conditions of oppression and expression.



**AS&RC 241(2303) Riot and Revolution in 19C Africa (also HIST 241[2410]) @ # (HA)**

Fall. 4 credits. S. Greene.  
For description, see HIST 241.

**AS&RC 256(2303) The Past and Present of Pre-colonial Africa (also HIST 255[2550])**

Spring. 4 credits. S. Greene.  
For description, see HIST 255.

**AS&RC 277(2504) Literatures of the Black Atlantic (also ENGL 277[2770])**

Spring. 4 credits. D. Woubshet.  
For description, see ENGL 277.

**AS&RC 290(2602) The Sociology of the African-American Experience (SBA)**

Fall. 3 credits. J. Turner.  
This is an introductory course to the field of Africana Studies. It assumes a historical/sociological approach to the examination of the African-American experience. The course surveys the African beginnings of humankind and the classical role of Black people in world civilization and the making of early culture. The course treats issues in the humanities, social sciences, and history. The course is required for all undergraduate students majoring at the Africana Center.

**AS&RC 308/312(3100/3101) Advanced Intermediate Arabic I and II @ (also NES 311/312[3201/3202])**

Fall/spring. 4 credits. *AS&RC 308 satisfies Option 1.* M. Younes.  
For description, see NES 311/312.

**AS&RC 310(3501) Introduction to African Art (also ART H 378[3510]) @ (LA)**

Fall. 3 credits. S. Hassan.  
Survey of the visual art and material cultural traditions of sub-Saharan Africa. Aims at investigating the different forms of visual artistic traditions in relation to their historical and sociocultural context. Explores the symbolism and complexity of traditional African art through the analysis of myth, ritual, and cosmology. Uses in-depth analysis of particular African societies to examine the relationship of the arts to indigenous concepts of time, space, color, form, and sociopolitical order. Also explores new and contemporary art forms associated with major socioeconomic changes and processes of assimilation and acculturation. These include tourist art, popular art, and elite art.

**AS&RC 311(3600) Government and Politics in Africa (also AS&RC 504[6201]) SBA**

Spring. 3 credits. A. Mazrui.  
This course deals with power and political participation in Africa. Topics include: the colonial background and its political consequences; the pre-colonial continuities in the post-colonial politics; ethnicity and allegiance in the African polity; and the monarchical tendency in African political culture. Discussion covers a spectrum of topics from the warrior tradition to the military coup in the post-colonial era; from the elder tradition to presidential gerontocracy; from the sage tradition to intellectual meritocracy. Other major topics include class versus ethnicity in African politics; the one-party versus the multiparty state; socio-cultural versus socio-economic ideologies; the gender question in African politics; the soldier and the state; and the African political experience in a global context.

**AS&RC 312(3101) Advanced Intermediate Arabic II (also NES 312[3202])**

Spring. 4 credits. D. Bakhri.  
For description, see NES 312.

**AS&RC 365(3302) West Africa and West: 1450-1850 (also HIST 365[3650])**

Fall. 4 credits. S. Greene.  
For description, see HIST 365.

**AS&RC 375(1603) Black Child and Adolescent Development (also HD 375[3750]) (SBA)**

Spring. 3 credits. L. Wilton.  
This course will survey Black child and adolescent development and focus on conceptual and theoretical aspects of psychological development within an African Diasporic context. In particular, we explore how Black culture and Black communities have been instrumental in shaping the lives of Black youth. Within this context, we will focus on how social identity (i.e. race, ethnicity, gender, social class, sexuality) and socio-cultural factors relate to Black child and adolescent development. Specifically, we will examine the complexities of color in Black children's experience; socio-historical/-political contexts of Black child/adolescent development; parenting, racial socialization, and education for Black children and adolescents; racial attitudes and socialization in children; Impact of Hierarchical Social Structures on Youth of Color; Black adolescents and Black racial identity development; and contemporary models of psychological development for Black youth.

**AS&RC 384(3204) Anthropology and the African Diaspora (also AM ST 384[3204], ANTHR 386)**

Fall. 4 credits. W. Battle-Baptiste.  
The primary objective of this course is to introduce students to the African Diaspora through the works of anthropologists of African descent. In the early twentieth-century anthropology became a tool for Black intellectuals to celebrate African heritage, shape an ethnic identity, and fight for racial equality in the United States. The work of many of these trained anthropologists have blurred the boundaries between social science and art, folklore and fiction, ethnography and autobiography, and social analysis and journalism. This course will highlight the classic works of pioneers such as, W. E. B. DuBois, Zora Neale Hurston, Katherine Dunham, St. Claire Drake, and Ellen Irene Diggs as anthropologists and emphasize their unique perspectives of particular points in the African Diaspora, such as Northern urban centers of the U.S., Haiti, and Cuba. We will then explore and reflect on the impact these pioneers have on practitioners of African Diaspora anthropology today.

**AS&RC 385(3204) Arkeo and the African Diaspora**

Spring. 3 credits. W. Battle-Baptiste.  
This course is a comparative survey of the institution of slavery in the Americas from the sixteenth through the nineteenth-century. We will examine major themes, ideas, and discussions current in African Diaspora archaeology. An interdisciplinary perspective will be employed through readings, exercises, lectures and discussions pertaining to the archaeology, ethnohistory and history of slavery at different points in the African Diaspora. These kinds of interdisciplinary approaches, complemented with historical

documentation and oral history accounts, are essential for a more thorough interpretation of the African experience in the New World. We will also explore the recent trends in African Diaspora Archaeology and current dialogues between archaeologists working in West Africa, the Caribbean, South America and the United States. There will be a comparative analysis of plantation economics and issues related to society, culture, resistance, and identity formation.

**AS&RC 404(4200) Afrocentricity: Paradigm and Critical Readings @ (CA)**

Fall. 4 credits. A. Bekerie.  
What is Afrocentricity? It is a theoretical framework designed to study and interpret the histories and cultures of peoples of Africa and African descent by locating them at the center of their experiences. In other words, it is a method of knowing the life experiences of African peoples from the inside out. The course examines—through the writings of Asante, Keto, Clarke, Jean, Myers, Amin, Mazrui, Gates, Appiah, Richards, Schlesinger, and Thiongo—the conception and depth of the paradigm, its relevance in the production and utilization of knowledge, particularly emancipatory knowledge, the history of the paradigm, and the debate it generates among a wide range of thinkers and scholars.

**AS&RC 408(4504) Exhibiting Cultures (also AS&RC 608[6508], ART H/AM ST 408[4508], ART H 608[6508])**

Fall. 4 credits. C. Finley.  
For description, see ART H 408.

**AS&RC 410(4300) African American Politics (HA)**

Fall. 4 credits. J. Turner.  
The central thesis of African-American politics has been its movements for political change and democratic access and human rights. This development since the seventeenth century is a complex political legacy. This course conducts a close study of African-American political practice and theoretical analysis of the American political system. Implications of the political systems for prospects and limitations to participation by Black people are analyzed. Critical historical stages in the process of Black politics are examined. The development of electoral offices in federal and statewide politics in critical industrial centers, as well as rural hamlets, center the course. Presidential politics—the Jesse Jackson campaigns—and new political formations including Black Republicans/conservatives constitute the emphasis on contemporary events. The course reviews the development of the literature in African-American politics.

**AS&RC 419 Transnational Method: Then and Now (also S HUM 419)**

Fall. 4 credits. M. Seigel.  
For description, see S HUM 419.

**AS&RC 420(4605) Public Policy and the African-American Urban Community (SBA)**

Spring. 4 credits. J. Turner.  
The socio-economic conditions of the African-American urban community are the central focus of the course. Community development models are explored in relationship to the social needs of the African-American population. The changing configuration of internal organization of the African-American community nationally is examined.



**AS&RC 427 Caribbean Popular Literature (also S HUM 423)**

Spring. 4 credits. B. Edmondson.  
For description, see S HUM 423.

**AS&RC 435(4502) African Cinema (also ART H 478[4578]) @ (LA)**

Spring. 4 credits. S. Hassan.  
This course offers an overview of African cinema and filmmaking. It surveys historically the evolution of African cinema from its early days to the present. Through screening of selected African films, different trends within African cinema will be explored, such as "Return to the Sources" and the rediscovery of the pre-colonial past; the "Social Realist" narrative and critique of post-independence Africa; reconstructing the story of colonialism from the perspective of the colonized; and the entertainment genre. Techniques, styles, and aesthetics of African cinema will also be discussed. The course offers a unique opportunity of looking at African culture and society, and at issues of social change, gender, class, tradition, and modernization through African eyes.

**AS&RC 442(4305) To Be Enslaved (also HIST 442[4421])**

Spring. 4 credits. S. Greene.  
For description, see HIST 422.

**AS&RC 451(4600) Politics and Social Change in the Caribbean @ (SBA)**

Fall. 4 credits. L. Edmondson.  
Study of the historical, geostrategic, political, economic, and social (including racial and cultural) forces affecting the domestic and international experiences of Caribbean societies. Special attention is given to conflicting definitions and perceptions of the Caribbean; contending theories of Caribbean social structure and models of development; the continuing salience of struggles for change and transformation; prospects of regional integration; and Caribbean challenges to the global system, especially with regard to the region's relations with the United States and the region's position in the Third World in the context of the North-South cleavage.

**AS&RC 453(4204) The Archaeology of Slavery (also AM ST 453[4204], ARKEO 453[4253], ANTHR 453[4253]) (CA)**

Fall. 4 credits. W. Battle-Baptiste.  
Material culture and the built environment not only reflect human behavior, but also help archaeologists to recognize the functional and symbolic dimensions of people experiencing life within specific cultural spaces. This seminar is an exploratory effort to provide interdisciplinary methods for students engaged in the research and analysis of African American life and history. This course will also address the meaning and significance of how material culture enhances the interpretation of black cultural production and African Diaspora theory.

**[AS&RC 459(4601) Innovation in Africa and the Diaspora (also EDUC 459[4590]) @ (SBA)**

Fall. 4 credits. Next offered 2007–2008.  
N. Assié-Lumumba.]

**AS&RC 463(4201) Islam in Africa and Its Diaspora (CA) (also NES 471[4710], AS&RC 663[4205])**

Fall. 4 credits. A. Mazrui.  
It has been estimated that one-third of the Muslim population of the world is in Africa and the African Diaspora. This course

addresses the historical dimension of Islam in the Black experience examining Global Africa as a whole. Within the African continent, Islam is part of the triple religious heritage, which includes rivalry with Christianity and co-existence with African indigenous religions. In the Americas, Islam is up against Western secularism and Christianity. We are concerned with how Islam has affected the politics and cultures of the African peoples worldwide, issue of slavery and Islam, and the interaction between Islam and contemporary ideologies of socialism, nationalism and race consciousness in the Black experience.

**AS&RC 468–469(4900–4901) Honors Thesis**

468, fall; 469, spring. Prerequisite: permission of AS&RC director of undergraduate studies. Africana Center faculty.  
For senior Africana Studies majors working on honors theses, with selected reading, research projects, etc., under the supervision of a member of the Africana Studies and Research Center faculty.

**[AS&RC 475(4301) Black Leaders and Movements in African-American History (HA)**

Fall. 4 credits. Next offered 2007–2008.  
R. Harris.]

**[AS&RC 478(4606) The Family and Society in Africa (also SOC 478) @ (SBA)**

Fall. 4 credits. Next offered 2007–2008.  
N. Assié-Lumumba.]

**AS&RC 479(4602) Women and Gender Issues in Africa @ (SBA)**

Spring. 4 credits. N. Assié-Lumumba.  
There are two contrasting views of the status and role of women in Africa. One view portrays African women as dominated and exploited by men. According to another view women have a favorable social position in Africa: indigenous ideologies consider women to be the foundation of society, they are economically active and independent and they have an identity independent of men. In this seminar we discuss the status and role of women in Africa historically as well as in the contemporary period. Topics include women in non-westernized/precolonial societies; the impact of colonial policies on the status of women; gender and access to schooling, participation in the economy and politics; women and the law; women and health issues; gender issues in southern Africa; womanism and feminism; the United Nations Decade of Women; and the four World Conferences on Women (Mexico 1975, Copenhagen 1986, Nairobi 1985, and Beijing 1995).

**AS&RC 484(4603) Politics and Social Change in Southern Africa @ (SBA)**

Spring. 4 credits. L. Edmondson.  
Focuses on the legacies of apartheid and the challenges of transformation toward a post-apartheid society in South Africa. Topics include the rise and decline of apartheid; the historical continuity of Black resistance against racism; women under, against, and after apartheid; South Africa's relations with its neighbors; geo-political, economic, and racial dimensions of the American connection; politics of negotiation and transition to majority rule; prospects for stability, democracy, and equality; and South Africa's new role in the African continental and global

arenas. Instructor's lectures are supplemented by films and class discussions.

**AS&RC 490(4302) Nile Valley Civilization: Ethiopia, Nubia, and Egypt @ (HA)**

Spring. 4 credits. A. Bekerie.  
Focuses on Nile Valley civilizations and their contributions to African and world history. Since natural and human resources provide the foundation for civilizations, the course also examines the ecological and cultural compositions of the river. Concentrates on the Aksumite civilization of Ethiopia, Nubian civilizations of the Sudan, and the Kemetic civilizations of Egypt. Uses archaeological, literary, oral, biological, and religious sources to study civilization centers along the Nile. Students discuss civilizations as artifacts that have material, spiritual, social, and philosophical dimensions. Students are introduced to the Ethiopic writing system as a practical lesson in the conception and understanding of aspects of African civilizations.

**AS&RC 498–499(4902–4903) Independent Study**

498, fall; 499, spring. Africana Studies faculty.  
For students working on special topics, with selected reading, research projects, etc., under the supervision of a member of the Africana Studies and Research Center faculty.

**AS&RC 502(6600) Education and Development in Africa**

Spring. 4 credits. N. Assié-Lumumba.  
Human capital theory establishes a positive and linear relationship between formal education and individual productivity and socioeconomic attainment and economic growth and development of nations. While enjoying considerable popularity in industrial and developing countries, including African countries, education has also been perceived as a hindrance to development. The concept of human capital and paradigms of development including modernization, dependency, and Third World Forum are first introduced. Specific issues discussed include schooling and nonformal education; the role of primary, secondary, and higher education in development; and language, access, output, and outcome based on social class, ethnicity, race, and gender. Employment, migration and international brain drain, the information and communication technologies, indigenous knowledge systems, and the role of higher education in regional and international cooperation are also examined.

**AS&RC 503(6506) African Aesthetics (also ART H 571[5571], VISST 503[5030])**

Fall. 4 credits. S. Hassan.  
The goal of this course is to investigate in depth the principles of aesthetics and philosophy of African visual arts. The course offers a critical survey of the different writings and the growing body of research on this relatively new area of inquiry. The objectives of the course are to review how African aesthetics have been studied to date, to provide a critical analysis of the different approaches to the subject and related issues, and to suggest future directions of research. In-depth analysis of particular African societies is used to examine the relationship of arts and aesthetics to indigenous concept of time, space, color, form, and sociopolitical order. In addition, issues related to African aesthetics

and arts such as style, gender, class, and social change are also explored.

**AS&RC 504(6201) Political Change in Africa (also AS&RC 311[3600]) SBA**

Spring. 4 credits. A. Mazrui.

The study of African can be approached dialectically (focusing on the tension between opposing forces) or thematically (focusing on themes as chapters of experience). This course borrows from both these approaches. In their class assignments and examinations students are free to use either approach. The first approach explores the dialectic between continuity and change; tradition and modernity; dependency and liberation; foreign and indigenous influences; anarchy and order; political decay and political development; democracy and authoritarianism; and socialism and capitalism. The thematic approach examines African Nationalism; race consciousness and Pan-Africanism; political parties and interest groups; executive power; ethnicity in politics; class-formation; civil-military relations; economic and cultural dependency; sub-regional and continental Pan-Africanism; crisis of the African state; and Africa in World Politics.

**AS&RC 506(6500) Contemporary African Diaspora Art (also ART H 506[5505])**

Spring. 4 credits. C. Finley.

Since the 1950s, projects of black liberation and empowerment have influenced the work of African Diaspora artists in the black Atlantic. Pivotal historic events, such as the Civil Rights Movement, the dismantling of colonial rule in Africa and the Brixton race riots in England, have urged black artists to reexamine issues of memory, identity, history and belonging. This course considers those artists who trace a visual genealogy of the African Diaspora and work in what has been identified as a practice of remembrance. The focus is on artists working after 1960, but students also study the roots of this tradition in the beginning of the 20th century and in earlier periods.

**AS&RC 598-599(6900-6901) Independent Study**

598, fall; 599, spring. Variable credit.

Prerequisite: graduate standing. Africana Studies faculty.

**AS&RC 601-602(6902-6903) Africana Studies Graduate Seminar**

601, fall; 602, spring. 4 credits. Africana Studies faculty.

Designed for first-year AS&RC graduate students. The seminar is coordinated and supervised by one professor but team-taught by three or four faculty members per semester. Each participating faculty member is responsible for a topical *segment* of the course related to her or his areas of specialization or an area of interest pertaining to theory and methodology of Africana Studies.

**AS&RC 608(6508) Exhibiting Cultures (also AS&RC 408[4504], ART H 408[4508], ART H 608[6508])**

Fall. 4 credits. C. Finley.

For description, see ART H 608.

**AS&RC 612(6203) Gender and Slavery in the Americas (also FGSS 622[6220])**

Spring. 4 credits. W. Battle-Baptiste.

This course provides an introduction to some of the main concerns and debates associated with slavery and slave societies in the Americas. We will seek to place New World African slavery as it related to women and

place them in our understanding of African slavery thereby attempting to engender traditional notions of slavery in the Americas. By taking a historical approach, we will explore how, in various ways and specific places, the production and representation of difference as a mode of subordination was forged and resisted in the context of slavery and colonialism. We will explore the intersectionality of race, class, and genders as multiple sites of oppression experienced by enslaved women in the United States, the Caribbean, and Brazil. This course also critically engages the ways in which gendered approaches raise new questions and reformulate traditional notions of the impact of slavery on African peoples in the New World. Through the use of film, literature, history and anthropological theory, we will address larger issues of kinship and the black family, community life, sexual exploitation, collective resistance, women in the plantation economy, and self-expression as transformative strategies used by enslaved women to survive slavery and positively contribute to black cultural production.

**AS&RC 615(6604) Psychology of Black Identity (also FGSS 615[6150], HD 615[6150])**

Spring. 4 credits. L. Wilton.

This course will provide students with an opportunity to examine the psychology of Black identity with a focus on critical works in this area (i.e., Daryl Michael Scott's *Contempt and Pity: Social Policy and the Image of the Damaged Black Psyche, 1880-1996*, William E. Cross, Jr.'s *Shades of Black: Diversity in African-American Identity*, Tiffany Patterson's *Zora Neale Hurston and the History of Southern Life*, Thomas Glave's *Words to Our Now: Imagination and Dissent*). Earlier work on Black identity focused on a Black self-hatred theme, locating Black identity in a self-hatred/deficit paradigm. With the advent of socio-historical and -political movements (i.e., Civil Rights and Black Power Movements), critical work on Black identity began to (re)emerge in the field of Black psychology. Through the development of Nigrescence, or the developmental process of becoming Black, Black racial identity theory has moved in the direction of exploring how Black identity influences Black people's perceptions, mental health, and behavior. In this course, students will examine a range of topics including theorizing Black identity in the African Diaspora; conceptualizing the psychology of Black identity in historical perspective; the intersection of Black, gender, and queer identities; Black identity and the psychology of Nigrescence; Black aesthetics; the impact of Black dialect on the identity and culture for Black youth.

**AS&RC 620(6602) Black Communities and Politics and Health (also FGSS 621[6210], HD 622[6220])**

Fall. 4 credits. L. Wilton.

This course will provide students with an opportunity to examine how socio-historical, -political, and -economic social structures have an impact on the politics of health in Black communities. Specifically, major health topics will focus on critical works in this area (i.e., Darlene Clark Hine's *Black Women in White: Racial Conflict and Cooperation in the Nursing Profession, 1890-1930*, Cathy Cohen's *Boundaries of Blackness: AIDS and the Breakdown of Black Politics*, Angela Davis' *Are Prisons Obsolete?* Dorothy

Roberts' *Shattered Bonds: The Color of Child Welfare*, Wesley Crichlow's *Buller Men and Batty Bwoys: Hidden Men in Toronto and Halifax Black Communities*). Building on a critical approach to the field of health, a critical emphasis will be placed on how power relations structure organizations and communities within their broader socio-historical, -political, -economic, and -cultural contexts. Students will engage in critical analysis and thoughtful reflection in exploring and challenging their values, assumptions, perceptions, and biases related to health care, as well as a critique of service of micro- and macro sociopolitical processes that influence asymmetrical power relationships in Black communities (i.e., role of medical authority, development and professionalization of medicine).

**AS&RC 663(4205) Islam In Africa and Its Diaspora (also AS&RC 463[4201], NES 671[6710])**

Fall. 4 credits. A. Mazrui.

For description, see AS&RC 463.

**AS&RC 698-699(8900-8901) Thesis**

698, fall; 699, spring. Prerequisite: AS&RC graduate students. Africana Studies faculty.

## AKKADIAN

See "Department of Near Eastern Studies."

## AMERICAN STUDIES

M. Jones-Correa, director; G. Altschuler, E. Baptist, R. Bensel, S. Blumin, M. P. Brady, J. Brumberg, D. Chang, E. Cheyfitz, J. Cowie, J. Frank, J. E. Gainor, M. C. Garcia, F. Gleach, S. Haenni, R. Harris, K. Jordan, M. Kammen, J. Kirschner, R. Kline, I. Kramnick, F. Logevall, T. J. Lowi, B. Maxwell, K. McCullough, L. L. Meixner, R. Mize, R. L. Moore, V. Nee, M. B. Norton, J. Parmenter, R. Polenberg, S. Pond, J. Rabkin, A. Sachs, N. Salvatore, S. Samuels, M. E. Sanders, V. Santiago-Irizarry, M. Shefter, A. Simpson, A. M. Smith, H. Spillers, T. Tu, S. Villenas, N. Waligora-Davis, M. Washington, S. Wong, M. Woods. Affiliated faculty: J. E. Bernstock, H. Gottfried, M. Hatch, L. Herrin, J. Jennings, P. McClelland, J. Peraino, P. Sawyer. Emeritus: D. E. McCall, J. Porte, J. Silbey

### The Major

The major in American Studies, appropriate for a wide array of future professions, began as a program of coordinated study in the history, literature, and politics of the United States. These remain the core elements, but American Studies aims to be inclusive in its subject matter. Given the nation's diverse population and cultures, the program wants its majors to examine American experience in broad terms, drawing on the materials and methods of a variety of disciplines.

Students who contemplate becoming American Studies majors are encouraged to speak with the program director as early as possible to arrange for a major advisor.

All students majoring in American Studies must take a minimum of 12 courses selected from the American Studies roster. No more than six of these courses can come from any one discipline. Of the 12 courses at

least three must have a substantial focus on material before 1900, at least two must deal with American diversity (AM ST 109 and 110 are especially recommended), and at least one must be a 400 level seminar, either an American Studies 430 course or an appropriate substitute seminar at the 400 level (AM ST 500/501, taught in Washington, D.C., does not fulfill the seminar requirement though it counts as one course toward the major). Note: A single course may satisfy more than one of these requirements: e.g., a course on Native Americans in the 1800s is both a course dealing substantially with pre-1900 material and one dealing with American diversity.

Although a good bit of freedom is encouraged in the selection of courses, American Studies majors, in consultation with their advisor, must define an area of concentration and complete six courses in that area. The area of concentration can be designed to fit the particular interests of a student, but it must include subjects in at least two disciplines. Possible areas of concentration include "visual studies," "cultural studies," "race and ethnicity," "legal and Constitutional studies," "American institutions," "class and social structure," "the American environment". (Courses taken to satisfy the concentration may be used to fulfill other requirements for the major.)

Students may find courses relevant to American experience that they wish to take but that are not on the American Studies course list. With their advisor's approval, students may count two such courses toward fulfilling the major.

## Honors

Candidates for honors must maintain an average of B+ in courses pertinent to the major and have taken at least one course in which they wrote a research paper. Normally, at the end of the junior year students who wish to write a senior honors essay must approach a member of the American Studies faculty and discuss their ideas for a project. With approval from the faculty member students may then register in the fall of their senior year for AM ST 493, the honors essay tutorial. At the end of the fall semester, honors candidates meet with their advisor and a second member of the American Studies faculty to discuss their progress. If satisfactory, honors students complete their honors essays in the spring by enrolling in AM ST 494.

## American Studies 430 Seminars

### AM ST 430.5(4301) The Rabinor Seminar (also AAS 430[4301], ENGL 430[4030], HIST 448[4480])

Spring. 4 credits. Prerequisite: permission of instructor. S. Wong.

The Rabinor Seminar explores the role of diversity in the formation of a distinct American tapestry. The specific topic varies each year, but the general subject is the promise and experience of pluralism. Topic for spring 2007: "The Stranger in American Literature." Who, or what, is a stranger? How is the category of the "stranger" to be marked off from, for example, that of the foreigner, outsider, refugee, exile, wanderer, pariah, or barbarian? What is the history of the social function of the stranger in American life? What does this figure tell us about belonging or not belonging? How has the "stranger" (across registers of race, class, sexuality, gender or nationality) figured in twentieth-century U.S.

literature? What can we learn about the figure of the stranger as sociological type and as literary type? These are some questions that will guide our inquiry this semester.

### [AM ST 430.6(4300) The Milman Seminar

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2007–2008. G. C. Altschuler.]

### AM ST 430.9(4308) American Political Culture From JFK to Bill Clinton

Fall. 4 credits. Limited to 15 students. Preference given to AM ST majors and seniors. N. Salvatore.

The course will examine the changes in American political culture across this forty year period. With a broad focus on the fluctuating fortunes of a once dominant liberalism and an ever more powerful modern conservatism—and the impact of religious activism on both, we will also explore a series of specific issues at the center of these changes. Among these would be the civil rights movement and the student movements of the 1960s, and reactions to them; the debates over abortion, the role of the federal government, and the direction of American foreign policy; and the re-emergence of an evangelical impulse in political discussion and its impact on liberal as well as conservative thought. Class discussions of that week's book, a series of short essays, and a research paper selected in consultation with the professor constitute the requirements.

### AM ST 430.10(4309) The Cinema and the American City (also FILM 430[4300], VISST 430[4630])

Fall. 4 credits. Limited to 15 students. Priority given to AM ST majors and seniors. S. Haenni.

The emergence of the cinema in the late-nineteenth century coincided with the emergence of a new kind of metropolis, characterized, among other things, by new traffic systems (elevated train, subway, automobile), new racial, ethnic, and sexual regimes, and new urban planning. The cinema was inevitably affected by the ways in which the city developed, while at the same time it also made the city legible. In this course, we will examine how American cities and towns have been represented in film in different ways, as, for instance, musical symphonies, mysteries to be deciphered, or post-apocalyptic wastelands. We will explore how gender, racial, ethnic, class and sexual identities are negotiated in the modern, cinematic city. Screenings will range from silent and early sound films, such as *The Crowd* and 1930s musicals, to contemporary cinema, such as *Do the Right Thing* and *Blade Runner*; our viewings will be guided by readings in film and urban theory and history.

## Anthropology, Sociology, and Economics

### [AM ST 221(2721) Anthropological Representation: Ethnographies of Latino Culture (also ANTHR/LSP 221[2721])

3 credits. Next offered 2007–2008. V. Santiago-Irizarry.]

### AM ST 231(2300) Latino Communities (also D SOC/LSP 230[2300])

Spring. 4 credits. R. Mize. For description, see D SOC 230.

### AM ST 235(2350) Archaeology of North American Indians (also AIS 235[2350], ANTHR 235[2235], ARKEO 235[2235])

Spring. 4 credits. K. Jordan. For description, see ANTHR 235.

### AM ST 353(3453) Anthropology of Colonialism (also AIS 353[3530], ANTHR 353[3453])

Fall. 4 credits. A. Simpson. For description, see ANTHR 353.

### AM ST 375(3750) Comparative Race and Ethnicity (also D SOC/LSP 375[3750])

Spring. 4 credits. R. Mize. For description, see D SOC 375.

### [AM ST 377(3777) The United States (also ANTHR/LSP 377[3777])

4 credits. Next offered 2007–2008. V. Santiago-Irizarry. For description, see ANTHR 377.]

### AM ST 384(3204) Introduction to the Anthropology of the African Diaspora (also AS&RC 384[3204])

Fall. 4 credits. W. Battle-Baptiste. For description, see AS&RC 384.

### AM ST 453(4204) The Archaeology of Slavery (also AS&RC 453[4204], ANTHRO 453[4253], ARKEO 453[4253])

Fall. 4 credits. W. Battle-Baptiste. For description, see AS&RC 453.

### AM ST 472(4272) Historical Archaeology (also AM ST 672[6272], ANTHR 472/772[4272/7272], ARKEO 472/772[4272/7272])

Fall. 4 credits. K. Jordan. For description, see ANTHR 472.

### AM ST 642(6424) Ethnoracial Identity in Anthropology, Language, and Law (also ANTHR 624[6424], LSP 624[6424], LAW 723[7231])

Spring. 4 credits. V. Santiago-Irizarry. For description, see ANTHR 624.

### AM ST 672(6272) Historical Archaeology (also AM ST 472[4272], ANTHR 472/772[4272/7272], ARKEO 472/772[4272/7272])

Fall. 4 credits. K. Jordan. For description, see ANTHR 472.

## Literature and Theatre Arts

### AM ST 206(2030) Introduction to American Literature (also ENGL 203[2030])

Fall. 4 credits. A. Galloway. For description, see ENGL 203.

### AM ST 207(2040) Introduction to American Literature (also ENGL 204[2040])

Spring. 4 credits. J. Carlacio. For description, see ENGL 204.

### [AM ST 215(2150) SSP: Comparative American Literature (also COM L 215[2150])

4 credits. Next offered 2007–2008. B. Maxwell. For description, see COM L 215.]

### [AM ST 219(2060) The Great American Novel (also ENGL 206[2060])

4 credits. Next offered 2007–2008. M. Hite.]

**[AM ST 230(2760) Survey of American Film (also FILM 276[2760], VISST 230[2300]) (LA)]**

4 credits. Each student must enroll in a section and attend one screening per week. Next offered 2007-2008. S. Haenni.

Focusing mostly on Hollywood film, this course surveys some major developments in and approaches to 20th-century American cinema. We trace changes in film aesthetics and film style, the development of the American cinema as an institution that comprises an industrial system of production, social and aesthetic norms and codes, and particular modes of reception. The course introduces methodological issues in American film history—especially questions of narrative, genre, stardom, and authorship—and focuses on the ways film shapes gender, race, class, ethnic, and national identities. Screenings include work by D. W. Griffith, John Ford, Howard Hawks, Orson Welles, Vincente Minnelli, Robert Altman, Charles Burnett, Spike Lee, and others and are supplemented by readings in film criticism and history.]

**[AM ST 252(2510) 20th-Century Women Writers (also ENGL/FGSS 251[2510])]**

4 credits. Next offered 2007-2008. E. DeLoughrey.

For description, see ENGL 251.]

**[AM ST 253(2520) Late 20th-Century Women Writers and Visual Culture (also ENGL/FGSS/VISST 252[2520])]**

4 credits. Next offered 2007-2008.

For description, see ENGL 252.]

**[AM ST 260(2600) Introduction to American Indian Literature (also ENGL 260[2600])]**

4 credits. Next offered 2007-2008.

E. Cheyfitz.

For description, see ENGL 260.]

**[AM ST 262(2620) Asian American Literature (also ENGL/AAS 262[2620])]**

Fall. 4 credits. S. Wong.

For description, see ENGL 262.]

**[AM ST 268(2680) The Culture of the 1960s (also ENGL 268[3680])]**

Fall. 4 credits. P. Sawyer.

For description, see ENGL 263.]

**[AM ST 275(2750) The American Literary Tradition (also ENGL 275[2750])]**

4 credits. Next offered 2007-2008.

N. Waligora-Davis.

The problem of an American national literature is explored through the reading, discussion, and close analysis of texts across the range of American literary history. Not a survey, this course focuses on the relations of the texts to each other, the shaping of national identities in those relationships, and the assumptions about history, language, and the self that underlie them.]

**[AM ST 293(2650) Survey in African American Literature (also ENGL 293[2930])]**

4 credits. Next offered 2007-2008.

H. Spillers.

For description, see ENGL 293.]

**[AM ST 335(3370) Contemporary American Theatre (also THETR/ENGL 337[3370])]**

Fall. 4 credits. Next offered 2007-2008.

S. Warner.

For description, see THETR 337.]

**[AM ST 338(3440) American Film Melodrama (also FILM/ENGL 344[3440])]**

4 credits. Next offered 2007-2008.

S. Haenni.

See FILM 344.]

**[AM ST 348(3480) Film Noir (also FILM 346[3460], VISST 348[3480]) (LA)]**

Spring. 4 credits. Recommended: some course work in film. S. Haenni.

At the close of World War II, the French coined the semester "film noir" to describe a new, "dark," and "gloomy" set of Hollywood films that were populated by femmes fatales, criminal gangs, private eyes, and lovers on the run, and that centered on issues of violence, crime, paranoia, betrayal, pessimism, and self-doubt. Deriving from a hard-boiled detective fiction, and influenced by German expressionist cinema, *film noir* has now become one of the most acclaimed genres in Hollywood film. In this course we explore both the stylistic characteristics and thematic and cultural contexts of *film noir*. We examine the history and function of "noir" as a critical term; the evolution of *noir* style and *noir* narratives; the influence of hard-boiled fiction. We investigate how *film noir* articulates anxieties about postwar masculinity and about the sexual and social roles of women; how it popularizes psychology; how it portrays the city as an "urban jungle"; and how it represents a response to fears about communism and the atomic bomb. Screenings include major studio features such as *Double Integrity* and *Laura*, B-pictures such as *Detour* and *Gun Crazy*, and "neo-noirs" such as *Chinatown* and *Devil in a Blue Dress*. The discussion of films is guided by readings in film criticism and history.

**[AM ST 361(3610) Studies in the Formation of U.S. Literature: Emerson to Melville (also ENGL 361[3610])]**

4 credits. Next offered 2007-2008.

D. Fried.]

**[AM ST 364(3640) Studies in U.S. Literature after 1850 (also ENGL 362[3620])]**

Fall. 4 credits. N. Waligora-Davis.

For description, see ENGL 362.]

**[AM ST 365(3650) American Literature Since 1945 (also ENGL 365[3650])]**

4 credits. Next offered 2007-2008.

B. Maxwell.]

**[AM ST 366(3660) Studies in U.S. Fiction before 1900: The 19th-Century American Novel (also ENGL 366[3660])]**

Spring. 4 credits. S. Samuels.

For description, see ENGL 366.]

**[AM ST 367(3670) Studies in U.S. Fiction after 1900 (also ENGL 367[3670])]**

Spring. 4 credits. M. P. Brady.

For description, see ENGL 367.]

**[AM ST 368(3680) The American Novel Since 1950 (also ENGL 368[3680])]**

4 credits. H. Spillers.

For description, see ENGL 368.]

**[AM ST 372(3780) American Poetry Since 1950 (also ENGL 378[3780])]**

4 credits. Next offered 2007-2008.

R. Gilbert.]

**[AM ST 373 Studies in U.S. Literature After 1950 (also ENGL 364[3640])]**

Fall. 4 credits. D. Woubshet.

For description, see ENGL 364.]

**[AM ST 374(3681) Slavery in 20th-Century American Film and Fiction (also ENGL 374[3740])]**

Spring. 4 credits. N. Waligora-Davis.

For description, see ENGL 374.]

**[AM ST 387(3910) Studies in African-American Literature (also ENGL 391[3910])]**

Fall. 4 credits. H. Spillers.

For description, see ENGL 391.]

**[AM ST 393(3930) International Film of the 1970s (also FILM 393[3930], VISST 393[3930])]**

4 credits. Next offered 2007-2008.

S. Haenni.

For description, see FILM 393.]

**[AM ST 395(3970) Policing and Prisons in American Culture (also ENGL 397[3970])]**

Spring. 4 credits. B. Maxwell.

For description, see ENGL 397.]

**[AM ST 396(3981) Latino/a Popular Cultural Practices (also ENGL/LSP 398[3980])]**

Spring. 4 credits. M. P. Brady.

For description, see ENGL 398.]

**[AM ST 403(4030) Senior Seminar in Poetry: Studies in American Poetry: 1955-1980 (also ENGL 403[4030])]**

Fall. 4 credits. R. Gilbert.

For description, see ENGL 403.]

**[AM ST 465(4650) American Violence (also ENGL 465[4650])]**

4 credits. Next offered 2007-2008.

S. Samuels.

For description, see ENGL 465.]

**[AM ST 468(4780) Intersections in Lesbian Fiction (also ENGL 478[4780], FGSS 477[4770])]**

4 credits. Next offered 2007-2008.

K. McCullough.]

**[AM ST 475(4750) Seminar in Cinema I (also FILM 475[4750])]**

4 credits. Next offered 2007-2008.

D. Fredericksen.

For description, see FILM 475.]

**[AM ST 476(4760) American Melodrama and Film (also FILM 476[4760])]**

4 credits. Next offered 2007-2008.

S. Haenni.

For description, see FILM 476.]

**[AM ST 477(4601) Melville (also ENGL 477[4600])]**

Fall. 4 credits. B. Maxwell.

For description, see ENGL 477.]

**[AM ST 479(4790) Advanced Seminar in American Literature: Visual Culture & Women's Literature (also ENGL 479[4790], FGSS 479[4790], VISST 476[4760])]**

Fall. 4 credits. S. Samuels.

For description, see ENGL 479.]



## Government and Public Policy

### GOVT 111(1111) Introduction to American Government and Politics

Fall. 3 credits. T. Lowi.

Introduction to government through the American experience. Concentration on analysis of the institutions of government and politics as mechanisms of social control.

### AM ST 263(2615) Feminist Theory/State Theory (also GOVT 261[2615], FGSS 261[2610])

Spring. 4 credits. A. M. Smith.

For description, see GOVT 261.

### [AM ST 302(3021) Social Movement in American Politics (also GOVT 302[3021])

4 credits. Next offered 2007–2008.

M. E. Sanders.

For description, see GOVT 302.]

### [AM ST 310(3271) Civil Liberties in the United States (also GOVT 327[3271])

4 credits. Next offered 2007–2008.

J. Rabkin.

For description, see GOVT 327.]

### AM ST 311(3111) Urban Politics (also GOVT 311[3111])

Fall. 4 credits. M. Shefter.

For description, see GOVT 311.

### AM ST 313(3191) Racial and Ethnic Politics (also GOVT 319[3191], LSP 319[3191])

Spring. 4 credits. M. Jones-Correa.

For description, see GOVT 313.

### AM ST 315(3141) Prisons (also GOVT 314[3141])

Fall. 4 credits. M. Katzenstein.

For description, see GOVT 314.

### AM ST 316(3161) The American Presidency (also GOVT 316[3161])

Spring. 4 credits. M. E. Sanders.

For description, see GOVT 316.

### AM ST 319(3181) The U.S. Congress (also GOVT 318[3181])

Spring. 4 credits. M. Shefter.

For description, see GOVT 318.

### AM ST 326(3031) Imagining America: Race and National Fantasy in European Travel Writing from De Tocqueville to Baudrillard (also COM L 341[3410], GOVT 303[3031], FRLIT 324[3240]) (CA)

Fall. 4 credits. D. Rubenstein.

Addresses 19th- and 20th-century European travel writing about America from Alexis de Tocqueville's landmark work, *Democracy in America*, to Jean Baudrillard's polemical *America and Umberto Eco's Travels in Hyperreality*. Concerned with the question of what America, as both "utopian" ideal and as a living example, represents for the European philosophical voyager. For example, what role does national fantasy play in the encounters revealed in Julia Kristeva's excursion to American universities in *The Samurai* or in Simone de Beauvoir's guided (by Richard Wright) tour as recounted in her diary *America Day by Day*? Also discusses Francois-René de Chateaubriand's *René* and *Atala* as a literary limit case of intercultural exchange. Also considers how race is implicated in these writings (e.g., de Tocqueville, de Beauvoir; Kristeva's consideration of "the foreigner") and the pertinence of American genres such as the captivity narrative for readings

of Chateaubriand or de Tocqueville and Beaumont's writings on prison.

### [AM ST 328(3281) Constitutional Politics: The United States Supreme Court (also GOVT 328[3281])

4 credits. Next offered 2007–2008.

J. Rabkin.

For description, see GOVT 328.]

### [AM ST 362(3655) Politics and Literature (also GOVT 365[3655])

4 credits. Next offered 2007–2008. J. Frank.

For description, see GOVT 365.]

### AM ST 376(3665) American Political Thought from Madison to Malcolm X (also GOVT 366[3665], HIST 316[3160])

Fall. 4 credits. I. Kramnick.

For description, see GOVT 366.

### AM ST 389(3911) Science in the American Polity, 1960 to Now (also S&TS 391[3901], GOVT 309[3091])

Spring. 4 credits. S. Hilgartner.

For description, see S&TS 391.

### [AM ST 404(4041) American Political Development in the 20th Century (also GOVT 404[4041])

4 credits. Next offered 2008–2009.

M. E. Sanders.

For description, see GOVT 404.]

### AM ST 406(4061) The Politics of Slow-Moving Crises (also GOVT 406[4061], GOVT 616[6161])

Fall. 4 credits. M. Jones-Correa.

For description, see GOVT 406.

### [AM ST 422(4201) War at Home (also GOVT 420[4201])

4 credits. Next offered 2007–2008.

M. Shefter and J. Rabkin.

See GOVT 420.]

### AM ST 424(4241) Contemporary American Politics (also AM ST 624[6291], GOVT 424/624 [4241/6291])

Fall. 4 credits. M. Shefter.

For description, see GOVT 424.

### AM ST 425(4231) The 1960s: Conceptualizing the Future from the Past (also GOVT 423[4231])

Fall. 4 credits. J. Kirshner and T. Lowi.

For description, see GOVT 423.

### AM ST 428(4281) Government and Public Policy: An Introduction to Analysis and Criticism (also AM ST 628[6281], GOVT 428/728[4281/7281])

Fall. 4 credits. T. Lowi.

For description, see GOVT 428.

### [AM ST 458(4585) American Political Thought (also GOVT 458[4585], GOVT 658[6585])

4 credits. Next offered 2008–2009. J. Frank.

For description, see GOVT 458.]

### AM ST 460(4265) Sexuality and the Law (also AM ST 660[6625], GOVT 462/762[4265/7625], FGSS 461/762[4610/7620])

Spring. 4 credits. A. M. Smith.

For description, see GOVT 462.

### AM ST 501(4998) Politics and Policy: Theory, Research, and Practice (also GOVT 500[4998], ALS 500[4998], PAM 406)

Fall and spring. 8 credits each semester.

S. Jackson.

Offered in Cornell in Washington Program. This course, taught in Washington, D.C., forms the core of the public policy option of the Cornell in Washington Program.

### AM ST 616(6161) Politics of Slow-Moving Crises (also AM ST 406[4061], GOVT 406/616[4061/6161])

Fall. 4 credits. M. Jones-Correa.

For description, see GOVT 406.

### AM ST 624(6291) Contemporary American Politics (also AM ST 424[4241], GOVT 424/624[4241/6291])

Fall. 4 credits. M. Shefter.

For description, see GOVT 424.

### AM ST 628(6281) Government and Public Policy: An Introduction to Analysis and Criticism (also AM ST 428[4281], GOVT 428/728[4281/7281])

Fall. 4 credits. T. Lowi.

For description, see GOVT 428.

### AM ST 660(6625) Sexuality and the Law (also AM ST 460[4265], GOVT 462/762[4265/7625], FGSS 461/762[4610/7620])

Spring. 4 credits. A. M. Smith.

For description, see GOVT 462.

### AM ST 664(6645) Democratic Theory (also GOVT 664[6645])

Fall. 4 credits. J. Frank.

For description, see GOVT 664.

## History

### AM ST 103(1530) Introduction to American History (also HIST 153[1530])

Fall. 4 credits. M. Washington.

For description, see HIST 153.

### AM ST 104(1531) Introduction to American History (also HIST 154[1531])

Spring. 4 credits. A. Sachs.

An introductory survey of the development of the United States since the Civil War.

### [AM ST 109(1109) Introduction to American Studies: New Approaches to Understanding American Diversity, the 19th Century # (HA)

4 credits. Next offered 2007–2008.

N. Salvatore.]

### [AM ST 110(1110) Introduction to American Studies: New Approaches to Understanding American Diversity, the 20th Century (also AAS 111 [1110]) (HA)

4 credits. Next offered 2007–2008.

M. C. Garcia and D. Chang.]

### AM ST 111(1111) Introduction to Asian American Studies (also AAS 111[1100])

Spring. 4 credits. T. Tu.

For description, see AAS 111.

### AM ST 124(1240) Democracy and Its Discontents: Political Traditions in the United States (also HIST 124[1240]) (HA)

Summer. 3 credits. N. Salvatore.

An examination of democracy and its critics. The course explores the evolution of democracy in America, focusing on some of the dramatic and important episodes in American history. It considers the struggles over the emancipation of slaves in the 19th century and expanded rights for women and working people in the 20th



century, free-speech issues, the civil-rights movement, religious-based critiques of American culture, and conservative critiques of American liberalism. The course serves as an investigation of the ways in which political expression takes forms in modern American culture. In addition to lectures, the course features several afternoon programs that include guest lecturers and hands-on instruction in how to use the modern electronic research library.

**AM ST 201[2010] Popular Culture in the United States, 1900 to 1945 (HA)**

Fall. 4 credits. G. Altschuler.

AM ST 201 deals with American popular culture in the period between 1900 and the end of World War II. As we examine best-sellers, films, sports and television, radio, ads, newspapers, magazines, and music, the goal is to better understand the ways in which popular culture as "contested terrain," the place where social classes, racial and ethnic groups, women and men, the powerful and the less powerful, seek to "control" images and themes. Topics include: the Western; Cultural Heroes and the Cult of Individualism in the 1920s; The Hays Code and the Black Sox scandal; Mae West and the "New Women"; Advertising in an Age of Consumption; Gangsters and G-Men; and Jackie Robinson and the American Dilemma.

**AM ST 202[2020] Popular Culture in the United States, 1945 to Present (HA)**

Spring. 4 credits. G. Altschuler.

AM ST 202 treats the period from 1945 to the present as we examine best-sellers, films, sports and television, radio, ads, newspapers, magazines, and music. We try to better understand the ways in which popular culture shapes and/or reflects American values. The course also depicts popular culture as "contested terrain," the place where social classes, racial and ethnic groups, women and men, the powerful and less powerful, seek to "control" images and themes. Topics include: *The Honeymooners* and 1950s television, soap operas; "gross-out" movies; Elvis; the Beatles and Guns 'n Roses; gothic romances; and *People Magazine* and *USA Today*.

**[AM ST 203[2033] Wilderness in North American History and Culture (also HIST 203[2030])**

4 credits. Next offered 2008-2009.

A. Sachs.

For description, see HIST 203.]

**[AM ST 204[2022] Court, Crime, and Constitution (also HIST 202[2020])**

4 credits. Next offered 2007-2008.

R. Polenberg.

For description, see HIST 202.]

**AMST 205[2211] Seminar: The Blues and American Culture (also HIST 221[2211])**

Fall. 4 credits. R. Polenberg.

For description, see HIST 221.

**AM ST 209[2090] Seminar in Early America (also HIST/FGSS 209[2090])**

Fall. 4 credits. Limited to 20 students.

M. B. Norton.

For description, see HIST 209.

**[AM ST 210[2100] The Emergence of Modern Conservative Movement: From Strom Thurmond to Ronald Reagan**

4 credits. Limited to 15 students. Priority given to sophomores. Next offered 2007-2008. N. Salvatore.

This course explores the social and cultural roots of modern American conservatism and its rise to political prominence in the post-1945 era. We examine the movement's intellectual origins, social and cultural attitudes, and the political figures who presented conservatism's analysis to the public. The interplay between this revived political movement and a more liberal approach deeply grounded in the New Deal and its legacy receives attention as well.]

**[AM ST 212[2120] African American Women: 20th Century (also HIST/FGSS 212[2120])**

4 credits. Next offered 2007-2008.

M. Washington.

For description, see HIST 212.]

**[AM ST 213[2640] Introduction to Asian American History (also HIST 264[2640], AAS 213[2130])**

4 credits. Next offered 2007-2008.

D. Chang.

For description, see HIST 264.]

**AM ST 216[2104] Dutch and English in Colonial NY (also HIST 204[2041])**

Fall. 4 credits. J. Jacobs.

For description, see HIST 204.

**[AM ST 218[2200] Road Trip in American History and Culture (also HIST 220[2200])**

4 credits. Next offered 2008-2009.

A. Sachs.

For description, see HIST 220.]

**[AM ST 229[2290] Jefferson and Lincoln (also HIST 229[2290])**

4 credits. Limited to 15 students. Priority given to underclassmen. Next offered 2007-2008. E. Baptist.

For description, see HIST 229.]

**AM ST 236[2360] Native People of the Northeast, Pre-Contact to the Present (also HIST/AIS 236[2360])**

Spring. 4 credits. J. Parmenter.

For description, see HIST 236.

**[AM ST 238[2390] Seminar in Iroquois History (also HIST 239[2390])**

4 credits. Next offered 2007-2008.

J. Parmenter.

For description, see HIST 239.]

**AM ST 242[2420] Religion and Politics in American History from J. Winthrop to R. Reed (also HIST/RELST 242[2420])**

Spring. 4 credits. Prerequisite: permission of instructor. R. L. Moore.

For description, see HIST 242.

**[AM ST 251[2110] Black Religious Traditions from Slavery to Freedom (also HIST/RELST 211[2110])**

4 credits. Next offered 2007-2008.

M. Washington.

For description, see HIST 211.]

**AM ST 259[2599] Latinos in the United States: Colonial Period to 1898 (also HIST 260[2600], LSP 260[2600])**

Fall. 4 credits. M. C. Garcia.

For description, see HIST 260.

**AM ST 261[2610] Latinos in the United States: 1898 to the Present (also HIST/LSP 261[2610])**

Spring. 4 credits. M. C. Garcia.

For description, see HIST 261.

**AM ST 266[2660] Introduction to Native American History (also HIST/AIS 266[2660])**

Spring. 4 credits. J. Parmenter.

For description, see HIST 266.

**[AM ST 272[2720] The Atlantic World from Conquest to Revolution (also HIST 272[2720])**

4 credits. Next offered 2008-2009.

M. B. Norton and R. Weil.

For description, see HIST 272.]

**[AM ST 273[2730] Women in American Society, Past and Present (also HIST 273[2730])**

4 credits. Next offered 2007-2008.

M. B. Norton.

For description, see HIST 273.]

**AM ST 283[2831] The Dutch and the Atlantic World (also HIST 283[2831])**

Fall. 4 credits. J. Jacobs.

For description, see HIST 283.

**AM ST 292[2980] Inventing an Information Society (ECE/ENGRG 298[2980], HIST 292[2920], S&TS 292[2921])**

Spring. 3 credits. R. Kline.

For description, see ECE 298.

**[AM ST 303[3030] African American Women in Slavery and Freedom (also HIST 303[3030], FGSS 307[3070])**

4 credits. Next offered 2007-2008.

M. Washington.

For description, see HIST 303.]

**AM ST 304[3040] American Culture and Social Change, 1880 to 1980 (also HIST 304[3040])**

Fall. 4 credits. M. Kammen.

For description, see HIST 304.

**[AM ST 306[3060] History of American Workers: 1960 to 1990s (also ILCRB 306[3060])**

3 credits. Next offered 2007-2008.

J. Cowie.

For description, see ILCRB 306.]

**[AM ST 308[3003] Working-Class America in Mass Media and Popular Culture (also ILCRB 303[3030])**

3 credits. Next offered 2007-2008.

J. Cowie.

For description, see ILCRB 303.]

**[AM ST 309[3090] The Cinema and the American City**

4 credits. Next offered 2007-2008.

S. Haenni.

The emergence of the cinema in the late 19th century coincided with the emergence of a new kind of metropolis, characterized by, among other things, new traffic systems (elevated train, subway, automobile); new racial, ethnic, and sexual regimes; and new urban planning. The cinema was inevitably affected by the ways in which the city developed, while at the same time it also made the city legible. In this course we examine how American cities and towns have been represented in film in different ways, as, for instance, musical symphonies, mysteries to be deciphered, or post-apocalyptic wastelands. We explore how gender, racial, ethnic, class, and sexual identities are negotiated in the modern, cinematic city. Screenings range from silent and early sound films, such as *The Crowd* and 1930s musicals, to contemporary cinema, such as *Do the Right Thing* and *Blade Runner*; our viewings are guided by readings in film and urban theory and history.]

**[AM ST 312(3140) History of American Foreign Policy (also HIST 314[3140])]**  
4 credits. Next offered 2007–2008.  
F. Logevall.  
For description, see HIST 314.]

**AM ST 317(3180) American Constitutional Development (also HIST 318[3180])**  
Fall. 4 credits. R. Polenberg.  
For description, see HIST 318.

**AM ST 321(3210) Colonial North America to 1763 (also HIST 321[3210])**  
Fall. 4 credits. M. B. Norton.  
For description, see HIST 321.

**AM ST 322(3250) Age of the American Revolution, 1763 to 1815 (also HIST 325[3250])**  
Spring. 4 credits. M. B. Norton.  
For description, see HIST 325.

**AM ST 324(3240) Varieties of American Dissent, 1880 to 1990 (also HIST 324[3240])**  
Spring. 4 credits. N. Salvatore.  
The idea of dissent in American society raises a variety of images. Civil rights activists, striking workers, and student radicals of the 1960s are familiar enough symbols of dissent. But might we understand a Pentecostal believer, filled with the spirit of his or her God in critiquing contemporary society, as an example of American dissent? This course explores the varieties of economic, political, and cultural dissent in American between 1880 and 1990, and examines how understanding dissent in its specific historical context illuminates major aspects of American life and culture.

**[AM ST 331(3310) Causes of the American Civil War, 1815 to 1860 (also HIST 331[3310])]**  
4 credits. Next offered 2007–2008.  
E. Baptist.  
For description, see HIST 331.]

**[AM ST 340(3400) Recent American History, 1925 to 1960 (also HIST 340[3400])]**  
4 credits. Next offered 2007–2008.  
R. Polenberg.  
For description, see HIST 340.]

**AM ST 341(3410) Recent American History, 1960 to Present (also HIST 341[3410])**  
Spring. 4 credits. R. Vanderlan.  
For description, see HIST 341.

**[AM ST 343(3430) American Civil War and Reconstruction, 1860 to 1877 (also HIST 343[3430])]**  
4 credits. Next offered 2008–2009.  
E. Baptist.  
For description, see HIST 343.]

**[AM ST 345(3450) Intellectual/Cultural Life of 19th-Century Americans (also HIST/RELST 345[3450])]**  
4 credits. Next offered 2007–2008.  
A. Sachs.  
For description, see HIST 345.]

**[AM ST 346(3460) Modernization of the American Mind (also HIST 346[3460])]**  
4 credits. Next offered 2008–2009.  
R. L. Moore.  
For description, see HIST 346.]

**[AM ST 349(3510) Environmental History: The United States and the World Culture (also HIST 315[3150])]**  
4 credits. Next offered 2008–2009.  
A. Sachs.]

**AM ST 351(3470) Asian American Women's History (also HIST 347[3470], AAS 347[3470], FGSS 347[3470])**  
Spring. 4 credits. D. Chang.  
For description, see HIST 347.

**[AM ST 356(3570) Engineering in American Culture (also ENGRG/HIST/S&TS 357[3570])]**  
4 credits. Next offered 2007–2008. R. Kline.  
For description, see ENGRG 357.]

**[AM ST 357(3550) Latinos, Law, and Identity (also LSP/D SOC 355[3550])]**  
3 credits. Next offered 2007–2008. R. Mize.  
See D SOC 355.]

**[AM ST 378(3708) Topics in U.S. Women's History (also HIST/FGSS 378[3780])]**  
4 credits. Next offered 2007–2008.  
M. B. Norton.  
See HIST 378.]

**AM ST 402 America in the 1970s (also S HUM 419)**  
Fall. 4 credits. J. Cowie.  
For description, see S HUM 419.

**AM ST 405(4050) U.S.–Cuba Relations (also AM ST 605[6050], HIST 405/605[4050/6050], LAT A 405[4050], LSP 405/605[4050/6050])**  
Fall. 4 credits. M. C. Garcia.  
For description, see HIST 405.

**[AM ST 417(4170) History of Female Adolescence (also HD 417[4170], HIST 458[4580], FGSS 438[4380])]**  
4 credits. Prerequisite: permission of instructor. Next offered 2007–2008.  
J. Brumberg.  
For description, see HD 417.]

**AM ST 419(4190) Seminar in American Social History (also HIST 419[4190])**  
Fall. 4 credits. Taught in Washington, D.C.  
S. Blumin.  
See HIST 419.

**[AM ST 420(4220) Asian American Communities (also HIST 420[4200], AAS 424[4240])]**  
4 credits. Limited to 15 students. Next offered 2008–2009. D. Chang.]

**AM ST 421(4120) Undergraduate Seminar in American Cultural History (also HIST 421[4210], ART H 421[4021])**  
Fall. 4 credits. Prerequisite: permission of instructor. M. Kammen.  
For description, see HIST 421.

**AM ST 426(4260) The West and Beyond: Frontiers and Borders in American History and Culture (also HIST 426[4260])**  
Spring. 4 credits. A. Sachs.  
For description, see HIST 426.

**[AM ST 427(4261) Sex, Rugs, Salt, and Coal (also HIST 428[4261])]**  
4 credits. Next offered 2007–2008.  
A. Sachs.  
See HIST 428.]

**[AM ST 439(4039) Reconstruction and the New South (also HIST 439[4390])]**  
4 credits. Limited to 15 students. Next offered 2008–2009. M. Washington.  
See HIST 439.]

**[AM ST 444(4440) American Men (also HIST 444[4440])]**  
4 credits. Next offered 2008–2009.  
E. Baptist.  
See HIST 444.]

**[AM ST 466(4660) Iroquois History (also HIST 466[4660])]**  
4 credits. Not open to freshmen. Next offered 2008–2009. J. Parmenter.  
See HIST 466.]

**[AM ST 497(4970) Jim Crow and Exclusion Era America (also AM ST 697[6970], HIST 497/697[4970/6970])]**  
4 credits. Next offered 2007–2008.  
D. Chang.  
See HIST 497.]

**[AM ST 499(4900) New World Encounters, 1500 to 1800 (also HIST 490[4900])]**  
4 credits. Next offered 2007–2008.  
J. Parmenter.  
See HIST 490.]

**AM ST 500(4997) Research Seminar in American Studies (also HIST 500[4997])**  
Fall or spring. Offered in Cornell in Washington Program only. S. Blumin and others.  
For description, see HIST 500.

**AM ST 605(6050) U.S.–Cuba Relations (also AM ST 405[4050], HIST 405/605[4050/6050], LSP 405/605[4050/6050])**  
Fall. 4 credits. M. C. Garcia.  
For description, see HIST 405.

**AM ST 610(6101) African-American Historiography (also HIST 610[6101])**  
Fall. 4 credits. M. Washington.  
For description, see HIST 610.

**[AM ST 697(6970) Jim Crow and Exclusion Era America (also AM ST 497[4970], HIST 497/697[4970/6970])]**  
4 credits. Not offered 2007–2008.  
D. Chang.  
For description, see HIST 497.]

## Music and Visual Studies

**[AM ST 105(1311) Popular Music in America: 1850 to 1985 (also MUSIC 101[1311])]**  
3 credits. Next offered 2007–2008. S. Pond.  
See MUSIC 101.]

**[AM ST 222(1313) A Survey of Jazz (also MUSIC 222[1313])]**  
3 credits. Next offered 2007–2008. S. Pond.  
For description, see MUSIC 222.]

**AM ST 223(1312) History of Rock Music (also MUSIC 221[1212])**  
Spring. 3 credits. J. Peraino.  
For description, see MUSIC 221.

**AM ST 227(2091) SSP: The Immigrant Imagination (also ART H 209[2190], AAS 209[2090])**  
Fall. 4 credits. T. Tu.  
For description, see ART H 209.

**[AM ST 270(2700) Mapping America (also ART H 270(2700))]**

4 credits. Next offered 2007-2008.

L. L. Meixner.

See ART H 270.]

**AM ST 282(2820) Photography and the American Landscape (also LA 282(2820))**

Fall. 3 credits. A. Hammer.

For description, see LA 282.

**AM ST 355(3605) U.S. Art from FDR to Reagan (also ART H 365(3605))**

Fall. 4 credits. J. E. Bernstock.

For description, see ART H 365.

**AM ST 360(3740) Painting in 19th-Century America (also ART H 360(3740))**

Spring. 4 credits. L. L. Meixner.

For description, see ART H 360.

**AM ST 390(3810) American Architecture and Building I (also ARCH 390(3810))**

Fall. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. M. Woods.

For description, see ARCH 390.

**AM ST 391(3811) American Architecture and Building II (also ARCH 391(3811))**

Spring. 3 credits. Prerequisites: ARCH 181-182 or permission of instructor. M. Woods.

**[AM ST 397(3818) Special Topics in the History of Architecture and Urbanism (also ARCH 398(3818))]**

3 credits. Prerequisites: ARCH 181-182 or permission of instructor. Next offered 2007-2008. M. Woods.

For description, see ARCH 398.]

**AM ST 408(4508) Exhibiting Cultures (also AM ST 608(6508); ART H 408/608(4508/6508); AS&RC 408/608(4504/6508))**

Fall. 4 credits. C. Finley.

For description, see ART H 408.

**[AM ST 412(4113) Race, Technology, and Visuality (also ART H 413(4113), AAS 413(4130))]**

4 credits. Next offered 2007-2008. T. Tu.

See ART H 413.]

**AM ST 414(4114) Popular Culture and Visual Practice in Asian America (also ART H 414(4114), AAS 414(4140))**

Spring. 4 credits. T. Tu.

For description, see ART H 414.

**AM ST 463(4761) Art and Social Histories (also ART H 461(4761))**

Fall and spring. 4 credits. L. L. Meixner.

For description, see ART H 461.

**Honors**

Please see description of major for information about registration in these courses.

**AM ST 493-494(4993-4994) Honors Essay Tutorial**

493, fall; 494, spring. Up to 8 credits each semester. See M. Jones-Correa for appropriate advisors.

**ANTHROPOLOGY**

D. Holmberg, chair; J. Fajans, director of graduate studies; K. Jordan, director of undergraduate studies; A. Clark Arcadi, D. Boyer, M. Fiskesjo, F. Gleach, D. Greenwood, J. Henderson, E. Kohn, B. Lambert, S. Langwick, K. March, H. Miyazaki, V. Munasinghe, M. Ralph, J. Rigi, A. Riles, N. Russell, S. Sangren, V. Santiago-Irizarry, J. Schoss, J. Siegel, A. Simpson, M. Small, T. Volman, M. Welker, A. Willford. Emeritus: R. Ascher, B. J. Isbell, J. Murra, R. Smith.

Anthropology is one of the most diverse disciplines in the university. Spanning human evolution, the development and heterogeneity of language and culture, human history, and the diversity of cultures past and present, the field has broad scope, uses a variety of methods, addresses basic issues about human origins and human life, and maintains commitment to understanding social life and using this understanding to improve society. Anthropology is an ideal "liberal arts" major. It also serves as a major that, when well designed by the student with his or her advisor, prepares students for a wide range of professional careers, e.g., law, medicine, foreign service, human rights, social services, international development, and business, among others.

Courses for nonmajors: Anthropology welcomes nonmajors into many of its courses. Unless prerequisites are explicitly stated, 200- and 300-level courses do not have formal prerequisites and can be taken by students without prior experience in anthropology. Such students are welcome in these upper-level courses. For additional information to assist nonmajors and students from other colleges in selecting anthropology courses, see the anthropology department web page ([falcon.arts.cornell.edu/Anthro/](http://falcon.arts.cornell.edu/Anthro/)).

**The Major**

The major is structured to provide both general grounding in three subfields of anthropology (sociocultural anthropology, anthropological archaeology, and biological anthropology) and detailed focus on a particular area of concentration. Areas of concentration include a wide variety of subjects within and between these three subfields. Topics ranging from identity politics and globalization to prehistory and human evolution can be pursued in classes focused on every major geographical region in the world. Upper level courses span a range of topical and theoretical issues related to religion, gender, economics, colonialism, democratization, prehistoric cultures, race, behavioral evolution, and conservation, to name a few.

No prerequisites are required to enter the anthropology major. Students should see the director of undergraduate studies to apply to the major and obtain an advisor. Majors prepare a short statement about their interests and goals for the major, and then meet with their advisor. Majors and advisors collaboratively build a program of study that reflects the students' individual interests and the intellectual breadth of the field. Our goal is to provide a close and supportive advising relationship and a strong and coherent structure for the student's major.

A total of 38 credits are necessary to complete the major. Students are required to take at least one course at any level in the curriculum in each of the three subfields (cultural anthropology, archaeology, and biological anthropology). At least 5 courses must be at the 300 level or higher, and all majors must take a 400-level seminar course in their senior year (420, 458, 460, and 463 are not seminar courses and do not fill the requirement). When warranted, the advisor is free to approve up to two courses from other departments totaling up to eight credit hours to contribute to the 38-credit requirement.

The 400-level seminar serves as a space where students can synthesize their undergraduate work in anthropology. Although individual classes vary to some extent, most meet weekly, are discussion-based, and are limited to 15 students. Collaboration is encouraged between students to pursue their individual interests, and some form of student presentation is a typical part of the course.

**Study abroad and off-campus study programs:**

The Department of Anthropology encourages students to consider a semester of study abroad or off-campus study developed as an integral part of the student's major concentration. The director of undergraduate studies serves as the anthropology study abroad advisor.

**The Cornell-Nepal Study Program:** The Cornell-Nepal Study Program is a joint program of Cornell University and Tribhuvan University, the national university of Nepal. Qualified juniors, seniors, and first- or second-year graduate students work with faculty from both universities to prepare for and undertake field research projects in Nepal. Students receive 15 credits per semester; students may enroll for either fall or spring semester, or for the entire year; application is through Cornell Abroad. For further information, consult David Holmberg or Kathryn March in the Department of Anthropology.

Other anthropologically relevant study abroad options, using existing Cornell Abroad and off-campus options, can be worked out in consultation with the major advisor, the anthropology study abroad advisor, and Cornell Abroad.

**Honors**

Honors in anthropology are awarded for excellence in the major, which includes overall GPA and completion of an honors thesis. Anthropology majors interested in the honors program should consult the chair of the Honors Committee in their junior year. To qualify for entrance into the honors program, a student must have at least a 3.0 GPA overall and 3.3 GPA in the major, and the consent of a faculty member in anthropology who will guide the honors thesis. After applying to the program and being admitted as a candidate by the Honors Committee, the student conducts research and writes a thesis. This thesis is evaluated by the faculty research advisor and two other faculty members. Honors (i.e., cum laude, magna cum laude, or summa cum laude) are awarded based on the quality of the thesis and the student's overall record. Honors candidates must start this process by consulting their major advisor about the honors program early in their junior year.

In addition, students may enroll in ANTHR 483 (fall or spring) Honors Thesis Research.

To complete the thesis, students must enroll in 491 (fall or spring) Honors Thesis Write-up. Only ANTHR 483 may count toward hours for completion of the anthropology major requirements. The credit hours for these courses are variable. Grades for these courses are given by the faculty research advisor, and they are based on performance during thesis research and writing.

Any honors candidate whose research directly involves working with human subjects must receive approval for the project from the Cornell University Committee on Human Subjects.

## Special Programs and Facilities

**Collections:** the department has an extensive collection of archaeological and ethnological materials housed in the Anthropology Collections. A limited number of students can make arrangements to serve as interns in the Anthropology Collections. Olin Library houses some of the most extensive collections of materials on the ethnology of Southeast Asia, South Asia, East Asia, and Latin America to be found anywhere in the United States. The biological anthropology laboratory (B65 McGraw Hall) houses an extensive collection of materials for teaching purposes, including (1) human skeletal remains, (2) articulated skeletons and cranial casts of primates, and (3) casts of important fossils in the human lineage.

**Independent Study:** specialized individual study programs are offered in ANTHR 497, Topics in Anthropology, a course open to a limited number of juniors and seniors who have obtained permission and supervision of a faculty member. Undergraduates should note that many 600-level courses are open to them by permission of the instructor.

**Colloquia:** The Department of Anthropology holds colloquia almost every week of the semester on Friday at 3:30 P.M. in 215 McGraw Hall. Faculty members from Cornell and other universities participate in discussions of current research and problems in anthropology. Students are encouraged to attend.

For more complete information about the anthropology major, see the director of undergraduate studies or visit the Department of Anthropology web page ([falcon.arts.cornell.edu/Anthro/](http://falcon.arts.cornell.edu/Anthro/)).

## I. Sociocultural Anthropology

Sociocultural anthropology is rooted in the precise observation and rigorous analysis of human cultural capacities and human social practices, relations, and institutions. All sociocultural anthropology involves both inquiry into the diversity of human cultures (ethnography) and comparative analysis of human social dynamics (social theory). Historically, sociocultural anthropology specialized in the study of non-western peoples, but today there are few places and domains of human activity that sociocultural anthropologists do not study. To give a few examples, sociocultural anthropologists study nuclear weapons scientists in California, the transformation of state power in Russia, and the politics of development in India. They study how television producers in Egypt contribute to nationalism, the social effects of truth commissions in Guatemala and South Africa, and the emergence of new religious

and social movements in Latin America. What distinguishes sociocultural anthropology as a field is its engagement with the full abundance of human lived experience and its integrated, comparative effort to make sense of the key processes shaping this experience. As such, sociocultural anthropology is an excellent, flexible choice of major. It teaches core critical, analytical, and expressive skills and important perspectives on human cultural creativity and social life that are widely applicable. Recently, our majors have gone into careers as diverse as academic scholarship, activism, advertising, consulting, design, film, journalism, marketing, medicine, NGO-work, and politics and government.

### ANTHR 102(1400) The Comparison of Cultures @ (CA)

Spring. 3 credits. A. Riles.

Introduction to cultural anthropology through ethnographies, or the descriptive accounts of anthropologists. Through readings and lectures, students acquaint themselves with a number of cultures from several parts of the world. The cultures range in form from those of small-scale tribal societies to those of state societies. Throughout the course, students attempt to make sense of exotic cultures in their own terms. Attention is focused on variation in cultural patterns as they are expressed in social, economic, and ritual practices. In this encounter, the principles of anthropology as a comparative enterprise that pose distinct cultural systems in belief are developed. Fiction, films, and exercises supplement the formal anthropological materials.

### ANTHR 103(1401) The Scope of Anthropology

Spring. 1 credit. Does not satisfy major requirement to take two broad introductory courses. Pre- or corequisite: ANTHR 101 or 102. S-U grades only. Staff.

Intended for majors or prospective majors in anthropology. Each week a different member of the faculty in anthropology at Cornell makes a presentation on the nature of his or her work within the field and discusses their interests with students. The course is meant to introduce the range of approaches found within anthropology and help students in planning future course work.

### ANTHR 200(1420) Cultural Diversity and Contemporary Issues @ (SBA)

Fall. 3 credits. M. Fiskejo.

Introduces students to the meaning and significance of forms of cultural diversity for understanding contemporary issues. Drawing from films, videos, and selected readings, students are confronted with different representational forms that portray cultures in various parts of the world and they are asked to critically examine their own prejudices as they influence the perception and evaluation of cultural differences. The course approaches cultures holistically, assuming the inseparability of economies, kinship, religion, and politics, as well as interconnections and dependencies between world areas (e.g., Africa, Latin America, the West). Among the issues considered are "political correctness" and truth; nativism and ecological diversity; race, ethnicity, and sexuality; sin, religion, and war; and global process and cultural integrity.

### ANTHR 205(2405) SSP: The Anthropology of Sport @ (CA)

Spring. 4 credits. Limited to 15 students. Sophomore writing seminar. S. Sangren.

Long overlooked by anthropologists, sport and recreation are increasingly recognized as important windows into culture. Sport can be approached from a number of directions—interpreted as a ritual; viewed as a spectacle of ethnic, regional, or national identity; seen as a metaphor for life; understood as a major industry. This course will consider these and other approaches to sport, encouraging students to bring their own involvements in sport to reflect not only upon sport itself, but also upon how such reflection can illuminate cultural, psychological, and political dimensions of social life. Why, for example, do we take sport (and other forms of recreation) so seriously? Why do many of us apparently invest more passion in such pursuits than to life's allegedly more serious activities? How is sport integrated into people's identities? Readings will draw from popular literature and media as well as academic writing from a variety of disciplines (psychology, sociology, history) in addition to anthropology.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

### [ANTHR 210(2410) SSP: South Asian Diaspora (also AAS 210(2110)) (CA)

Spring. 3 credits. Limited to 15 students. Sophomore writing seminar. Next offered 2008–2009. V. Munasinghe.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.]

### [ANTHR 221(2721) Anthropological Representation: Ethnographies on Latino Culture (also LSP 272(2721), AM ST 221(2721)) (CA)

Fall. 3 credits. Next offered 2007–2008. V. Santiago-Irizarry.]

### [ANTHR 228(2428) Slavery and Human Trafficking # (CA)

Fall. 4 credits. Next offered 2007–2008. M. Fiskejo.]

### ANTHR 230(2730) Cultures of Native North America @ # (CA)

Fall. 4 credits. B. Lambert.

Survey of the principal Eskimo and American Indian culture areas north of Mexico. Selected cultures are examined to bring out distinctive features of the economy, social organization, religion, and worldview. Although the course concentrates on traditional cultures, some lectures and readings deal with changes in native ways of life that have occurred during the period of European-Indian contact.



**ANTHR 232(2432) Media, Culture, and Society (SBA)**

Fall. 3 credits. D. Boyer.

Introduction to understanding the relationship between media and culture from an anthropological perspective. The primary goal is to help students develop an ethnographic awareness of the complex factors influencing mass media production, representation, and reception. The course works toward this goal by studying how media technologies effect the representation and reproduction of cultural identities, how mass media representations mediate the negotiation of national identities and moralities, how institutional situations and professional practices influence media production, and how state and market forces both create and restrict possibilities of media expression. A wide range of social and historical cases are covered by both reading and lectures. Course materials include print, visual, and electronic media. Assignments encourage students to engage the contemporary American media both analytically and critically.

**ANTHR 246(2546) South Asian Religions in Practice @ (CA)**

Fall. 3 credits. A. Willford.

This course offers an anthropological approach to the study of religious traditions and practices in South Asia (India, Pakistan, Sri Lanka, and Nepal). The course begins with a short survey of the major religious traditions of South Asia: Hinduism, Buddhism, Jainism, Sikhism, and Islam. We look to the development of these traditions through historical and cultural perspectives. The course then turns to the modern period, considering the impact of colonialism, nationalism, and globalization upon religious ideologies and practices. The primary focus of the course will be the ethnographic study of contemporary religious practices in the region. We examine phenomena such as ritual, pilgrimage, possession, devotionism, monasticism, asceticism, and revivalism through a series of ethnographic case studies. In so doing, we also seek to understand the impact of politics, modernity, diasporic movement, social inequality, changing gender roles and mass mediation upon these traditions and practices.

**ANTHR 250(2450) The Anthropology of Food and Cuisine @ (CA)**

Spring. 4 credits. J. Fajans.

You are what you eat! This course examines the way food is produced, prepared, exchanged, presented, and given meaning in cultures around the world. It examines the symbolism of specific foodstuffs. Who prepares food and how is it done? Who feeds whom and how these relations are expressed and valued? In addition to looking at these questions we analyze ideas about commensality; how food is used in public contexts for presentation or exchange, and how food is a marker of gender, class, status, ethnicity, and identity. In addition to looking specifically at food, we analyze cultural ideas about gender, the body, and identity in terms of how these cultural patterns are produced and expressed through concrete activities like eating, fasting, and special diets. In this class we stress critical and comparative thinking about subjects we tend to take for granted.

**ANTHR 260(2560) Japanese Society Through Film @ (CA)**

Fall. 3 credits. H. Miyazaki.

This is an anthropological introduction to Japanese society through a critical investigation of a wide range of films from Ozu Yasujiro's classic films to Miyazaki Hayao's animated films. Topics of investigation include kinship and marriage, work and workplaces, gender and sexuality, bureaucracy, crime and legal culture, nationalism and nostalgia, and technoscientific utopia.

**ANTHR 303(3703) Asians in the Americas: A Comparative Perspective (also AAS 303[3030]) (CA)**

Spring. 4 credits. V. Munasinghe.

The common perception of ethnicity is that it is a "natural" and an inevitable consequence of cultural difference. "Asians" overseas, in particular, have won reputé as a people who cling tenaciously to their culture and refuse to assimilate into their host societies and cultures. But, who are the "Asians"? On what basis can we label "Asians" an ethnic group? Although there is a significant Asian presence in the Caribbean, the category "Asian" itself does not exist in the Caribbean. What does this say about the nature of categories that label and demarcate groups of people on the basis of alleged cultural and phenotypical characteristics? This course examines the dynamics behind group identity, namely ethnicity, by comparing and contrasting the multicultural experience of Asian populations in the Caribbean and the United States. Ethnographic case studies focus on the East Indian and Chinese experiences in the Caribbean and the Chinese, Korean, Japanese, Filipino, and Indian experiences in the United States.

**ANTHR 304(3104) Questioning Kin, Queering Family (also FGSS 305[3050])**Fall. 3 credits. L. Ramberg.  
For description, see FGSS 305.**[ANTHR 310(3410) Nationalism and Revivalism (CA)]**Spring. 4 credits. Next offered 2008-2009.  
A. Willford.]**[ANTHR 314(3514) Learning in Japan @ (SBA)]**Spring. 4 credits. Next offered 2008-2009.  
H. Miyazaki.]**[ANTHR 316(3516) Power, Society, and Culture in Southeast Asia @ (CA)]**Spring. 4 credits. Next offered 2008-2009.  
A. Willford.]**ANTHR 320(3420) Myth, Ritual, and Symbol (also RELST 320[3720]) @ (CA)**

Spring. 4 credits. A. Willford.

Examines how systems of thought, symbolic forms, and ritual practice are formulated and expressed in primarily non-Western societies. Focuses on anthropological interpretations of space, time, cosmology, myth, classificatory systems (e.g., color, totems, food, dress, kinship), taboos, sacrifice, witchcraft, sorcery, and rites of passage (birth, initiation, marriage, death). Examines both the roles of specialists (e.g., spirit mediums, curers, priests, ascetics) and nonspecialists in producing these cultural forms.

**ANTHR 321(3421) Sex and Gender in Cross-Cultural Perspective (also ANTHR 621[6421], FGSS 321[3210], FGSS 631[6320]) @ (SBA)**

Fall. 4 credits. K. March.

Introduction to the study of sex roles cross-culturally and to anthropological theories of sex and gender. Examines various aspects of the place of the sexes in social, political, economic, ideological, and biological systems to emphasize the diversity in gender and sex-role definitions around the world.

**ANTHR 323(3423) Kinship and Social Organization (SBA)**

Spring. 4 credits. B. Lambert.

Much of this course is a survey of forms of the family, descent groups, and marriage systems. The role of age and sex in the social structure is also considered. The last part of the course is devoted to a history of the British and American family and to its fate in utopian communities.

**[ANTHR 325(3425) Anthropology of the University (SBA)]**Fall. 4 credits. Next offered 2007-2008.  
D. Greenwood.]**[ANTHR 327(3427) Anthropology and the Environment]**Spring. 4 credits. Next offered 2007-2008.  
E. Kohn.

What is nature? Is it something objectively real or is it a culturally variable social construction? If other people do not share our ideas of nature, what does this say about concepts such as conservation or sustainable development? Because it reveals the culturally specific ways in which people engage with a world that is not fully of their making, Environmental Anthropology constitutes a privileged window onto such questions. Accordingly, we will examine these by exploring how different people—from sub-arctic hunters to autistic animal scientists—actually go about engaging with the nonhuman world. And, instead of just asking ourselves what constitutes nature, we will look to them for possible answers.]

**[ANTHR 328(3428) Conflict, Dispute Resolution, and Law in Cultural Context (SBA)]**Fall. 4 credits. Next offered 2007-2008.  
V. Santiago-Irizarry.]**[ANTHR 335(3535) The Situation of China's Minorities: Anthropological Perspectives # @ (CA)]**Spring. 4 credits. Next offered 2007-2008.  
M. Fiskesjo.]**[ANTHR 337(3537) Gender, Identity, and Exchange in Melanesia @ (SBA)]**Fall. 4 credits. Next offered 2007-2008.  
J. Fajans.]**ANTHR 339(3545) Peoples and Cultures of the Himalayas (also ANTHR 739[7545]) @ (CA)**

Spring. 4 credits. K. March.

A comprehensive exploration of the peoples and cultures of the Himalayas. Ethnographic materials draw on the lifeways of populations living in the Himalayan regions of Bhutan, India, Nepal, and Tibet. Some of the cultural issues to be examined through these sources include images of the Himalayas in the West, forms of social life, ethnic diversity, political and economic history, and religious complexity.

**ANTHR 342(3542) Culture and Ecology in the Globalized Pacific @ (CA)**

Fall. 4 credits. J. Fajans.

This course will examine the multitude of problems which Pacific Island nations face in their attempts to participate in the modern



world. We will look at tourism, logging, mining, global warming, independence movements, and migration in Melanesia, Micronesia and Polynesia.

**ANTHR 344(3554) Male and Female in Chinese Culture and Society (also FGSS 344[3440]) @ (SBA)**

Fall. 4 credits. S. Sangren.

This course explores the culture of gender, sex roles, and domestic relations in late traditional and modern Chinese society. Readings and lectures range from ethnographic descriptions of the dynamics of Chinese family life, kin relations, and socialization to representations of male and female in mythologies and ritual activities. The course also considers developments subsequent to political changes in China. Although the course's analytical focus is anthropological, readings will draw from the writings of historians and political scientists as well. A premise of the course is that understanding sex and gender in China is essential to understanding Chinese culture and its most fundamental values. The course also aims to introduce students interested in Chinese to techniques of anthropological analysis.

**[ANTHR 351(3451) Global Movements of Cultural Heritage @ (CA)]**

Spring. 4 credits. Next offered 2008–2009.  
M. Fiskesjo.]

**ANTHR 353(3453) Anthropology of Colonialism (also AIS 353[3530], AM ST 353[3453]) (CA)**

Fall. 4 credits. A. Simpson.

Examines the relationship between colonialism and anthropology and the ways in which the discipline has engaged this global process locally in North America. One of the aims of this course is to gain an appreciation of colonialism both as a theory of political legitimacy and as a set of governmental practices. As such, North America is re-imagined in light of the colonial project and its technologies of rule such as education, law, policy that worked to transform indigenous notions of gender, property and territory. This is done to appreciate the ways in which these forms of knowledge and practice advanced the settlement of space and place and both settled and unsettled peoples. This course is comparative in scope but is grounded within the literature from Native North America.

**[ANTHR 354(3754) Amazonia and Personhood**

Spring. 4 credits. Next offered 2007–2008.  
E. Kohn.

Why might people feed hallucinogens to their dogs before talking to them? Why were missionaries able to easily convince Amazonians of the existence of heaven but not hell? What transformations occur when an Amazonian politician dons a feather headdress in addition to a watch and a brief case? What is it like to encounter one's dead grandfather, now transformed into a jaguar, in the forest? All of these seemingly disparate examples are intimately related to Amazonian notions of personhood. As such, they challenge our own understandings of who or what counts as a person. Accordingly, in this course we will engage Amazonian ethnography to help us think through fundamental questions associated with what it means to be a person.]

**ANTHR 361(3461) Anthropology of Organizations (also ANTHR 661[6461]) (SBA)**

Spring. 4 credits. D. Greenwood.

Organizations are at once economic/social/political/cultural entities and organizational studies are found in all these social science fields. Anthropology's approaches to the study of organizational behavior, cultures, and political economies approaches to organizations are holistic, integrative, multi-method and emphasize ethnographic fieldwork. This course emphasizes both the analysis of organizations and change-oriented strategies to transform organizations. Cases from manufacturing, service organizations, and educational institutions are used.

**ANTHR 362(3462) Democratizing Research: Participation, Action, and Research (also ANTHR 662[6462]) (SBA)**

Fall. 4 credits. D. Greenwood.

This course poses an alternative to distanced, "objectivist" social science by reviewing some of the many numerous approaches to socially engaged research. Among the approaches discussed are those centering on the pedagogy of liberation, feminism, the industrial democracy movement, and "Southern" participatory action research, action science, and participatory evaluation.

**ANTHR 363(3463) Socialism (SBA)**

Spring. 4 credits. J. Rigi.

The course deals with the theories and practices of socialism and post-socialism. The course has two main focuses: (1) to provide an understanding of the culture and societies of post-Socialist societies with reference to their past; (2) to investigate critically the values and horizons of the contemporary utopian movements. Socialism and liberalism are the two major grand narratives of modernity. While liberalism, in various guises, has become an unquestionable dogma and its proponents represent it as the truth of human nature, the media and academia have declared socialism dead. Such a claim on socialism is contradicted by the following facts: (1) there is a strong desire for socialism among the dispossessed classes of the former Soviet Bloc; (2) The anti-globalization movement has put on its agenda some of the major values of socialism such as equality, justice, and freedom; (3) in some parts of the world, particularly in Latin America, parties that claim to be socialists have won elections. The course investigates the relevance of socialist values for the twenty-first century. This is an interdisciplinary course that will attract students from both the social sciences and the humanities.

**ANTHR 366(3466) Introduction to Anthropological Theory (CA)**

This seminar course is designed for anthropology majors to give them an introduction to classical and contemporary social and anthropological theory and to help prepare them for upper-level seminars in anthropology. The seminar format emphasizes close reading and active discussion of key texts and theorists. The reading list will vary from year to year but will include consideration of influential texts and debates in 19th, 20th and 21st century anthropological theory especially as they have sought to offer conceptual and analytical tools for making sense of human social experience and cultural capacities.

**[ANTHR 368(3468) Marx: An Overview of His Thought (also ANTHR 668[6468]) (SBA)]**

Spring. 4 credits. Next offered 2007–2008.  
J. Rigi.]

**[ANTHR 377(3777) The United States (also LSP/AM ST 377[3777]) (CA)]**

Fall. 4 credits. Next offered 2007–2008.  
V. Santiago-Irizarry.]

**ANTHR 379(3479) Culture, Language, and Thought (CA)**

Spring. 4 credits. V. Santiago-Irizarry.

The relationship among culture, language, and thought has been a core concern in anthropology. Language and culture are commonly defined as processes that are public and shared yet they also operate within and upon subliminal experiential realms. In this course we shall examine how anthropologists have explored this relationship, which is engendered in the interaction between culture and language as parallel mediating devices for the constitution, interpretation, and expression of human experience.

**[ANTHR 382(3482) Human Rights, Cultural Rights, and Economic Rights (SBA)]**

Fall. 4 credits. Next offered 2007–2008.  
J. Schoss.]

**[ANTHR 384(3684) Africa in the Global Economy (also ANTHR 784[7684]) @ (SBA)]**

Fall. 4 credits. Next offered 2007–2008.  
J. Schoss.]

**ANTHR 388(3488) Masks of Power and Strategies of Resistance and Subversion (also ANTHR 688) @ (SBA)**

Fall. 4 credits. J. Rigi.

The aim of the course is to provide a broad theoretical and ethnographic orientation on various forms of power relations, strategies of resistance/subversion and the role of human agency in historical change. It will explore various concepts of power on both macro and micro levels, tracing their genealogies and looking comparatively at relevant ethnographies. Although a pillar of the course will be the comparative anthropology of state, it also will examine power relations in stateless societies. Various forms of state will be contrasted to each other on the one hand and to forms of political power in the stateless societies on the other. The course will also cover micro processes of power relation related to gender relations and body politics.

**[ANTHR 403(4403) Ethnographic Field Methods (also ANTHR 603[6403]) (SBA)]**

Fall. 4 credits. Next offered 2007–2008.  
V. Santiago-Irizarry.]

**ANTHR 406(4406) The Culture of Lives (also FGSS 406[4060]) @ (CA)**

Spring. 4 credits. K. March.

This seminar will look at persons, lives, cultures, and methods in anthropological life history materials. Throughout the seminar we will attend to the evolution of interest in, forms of, and uses for life history materials in anthropology, with special attention to differences in men's and women's lives and life (re)presentations.

**[ANTHR 408(4408) Gender Symbolism @ (CA)]**

Spring. 4 credits. Next offered 2007-2008.  
K. March.]

**ANTHR 413(4513) Religion and Politics in Southeast Asia (also ASIAN 413[4413]) @ (CA)**

Spring. 4 credits. A. Willford.

This course explores how religious beliefs and practices in Southeast Asia have been transformed by the combined forces of colonialism, nationalism, and globalization. By examining both diversity and resurgence in one of the world's most rapidly modernizing regions, we aim to understand the common economic, social, and political conditions that are contributing to the popularity of contemporary religious movements. At the same time, we also consider the unique ideological, theological, and cultural understandings behind different religions and movements. Through this process we also rethink conceptions of modernity.

**ANTHR 420(4420) Development of Anthropological Thought (also ANTHR 720[7420]) (SBA)**

Fall. 4 credits. Prerequisite: for undergraduates, two prior anthropology courses or permission of instructor.  
H. Miyazaki.

Examination of the history and development of anthropological theory and practice. Focuses on the differences and continuities among the various national and historical approaches that have come to be regarded as the schools of anthropology.

**[ANTHR 423(4523) Making History on the Margins: The China-SE Asia Borderlands (also ANTHR 723[7523]) # @ (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
M. Fiskesjo.]

**ANTHR 426(4426) Ideology and Social Production (also ANTHR 726[7426]) @ (SBA)**

Spring. 4 credits. S. Sangren.

This course is premised on the notion that understanding social life requires understanding how social institutions are produced and sustained through time - that is to say, one must understand "society" as a process of production. By the same token, all cultures produce ideas or "representation" (e.g., about reality, nature, society, gender, authority) that serve to legitimize or validate each society's particular social arrangements. These ideologies play an important role in social production, on the one hand, and are also products of social processes, on the other. This course focuses on the linkages between ideology and social production in readings drawn from social theory and ethnographic case studies. We discuss strongly diverging views (psychoanalytic, postmodernist, poststructuralist, practice-theory, neoMarxist) on how best to conceive social processes. An integrating theme is that understanding ideology and its alienating operations is essential in developing a coherent understanding of what culture, in the last analysis, is.

**ANTHR 428(4428) Deconstruction and Anthropology (CA)**

Fall. 4 credits. J. Siegel.

Deconstruction offers a challenge to the idea of the study of the other and also suggests new studies. We read selected works of

Jacques Derrida in particular alongside ethnographic studies of death, witchcraft and language.

**[ANTHR 429(4429) Anthropology and Psychoanalysis @ (SBA)]**

Spring. 4 credits. Next offered 2007-2008.  
S. Sangren.]

**ANTHR 432(4432) Revolution (HA)**

Fall. 4 credits. J. Siegel.

Revolution as we know it was born in France. Infected further by the Bolshevik revolution, recent work in France and England has made the idea itself interestingly suspect. It is seldom any longer a source of hope built into a program of social action and is even ridiculed as bringing only disappointment if not catastrophe. And yet if the class basis of revolution has been questioned, scholars, at least, cannot yet throw the idea into the wastebasket. We will look first at the ideas underlying the notion and then at the anti colonial revolutions, in particular the Indonesian revolution, asking whether they deserve the name or should merely be called one more subclass of social action.

**ANTHR 436(4436) Tourist Encounters, Tourist Spaces (SBA)**

Fall. 4 credits. J. Schoss.

The course examines tourism as a complex social setting in which a variety of encounters and exchanges occur. Using cases from Africa, Asia, the Caribbean and the US, we will examine tourism through the lenses of culture, economics and the environment. The course is organized as a seminar and will address such issues as: tourism as a strategy for economic development; eco-tourism, wildlife and environmental conservation; guided tours as competing efforts at place- and space-making; and tourism as a context for cultural destruction or revitalization.

**ANTHR 437(4437) Anthropology of Development (also ANTHR 737[7437]) @ (CA)**

Fall. 4 credits. M. Welker.

This course provides an anthropological perspective on international development. After reading orthodox theories of development and considering them in historical context, we will examine ethnographic accounts of postcolonial development that draw on political economy and poststructuralist traditions. The final portion of the course looks critically at the emergence of discourses such as participation, empowerment, social capital, civil society, and sustainability in mainstream development.

**ANTHR 439(4439) Sovereignty and Biopolitics @ # (CA)**

Spring. 4 credits. M. Fiskesjo.

This seminar course's starting point is Agamben's widely discussed ideas about "bare life" in relation to modern state sovereignty and to continuities with earlier forms of sovereignty. The course unfolds as a political-legal anthropology of sovereignty and citizenship, the exclusion of undesirables, and modern biopolitical control mechanisms. Readings will draw on classics from the anthropology and other literature on sovereignty and kingship, as well as case studies dealing with the modern Chinese state, the US, the Soviet Union, etc.

**[ANTHR 440(4440) Ethnographic Approaches to Studying Professionals and Institutions (SBA)]**

Spring. 4 credits. Next offered 2007-2008.  
D. Boyer.]

**ANTHR 442(4542) Violence, Symbolic Violence, Terror, and Trauma in South Asia and the Himalayas (also ANTHR 642[6542]) @ (CA)**

Fall. 4 credits. D. Holmberg.

This working seminar will focus on violent conflict in South Asia. Key texts on social, ethnic, religious, and political violence in Sri Lanka, India, Nepal, and Pakistan as well as theoretical literature on violence, trauma, and human rights will provide the basis for general reassessment of the anthropological study of violence.

**[ANTHR 444(4444) God(s) and the Market @ (CA)]**

Spring. 4 credits. Next offered 2008-2009.  
H. Miyazaki.]

**[ANTHR 445(4445) Gift and Exchange @ (SBA)]**

Spring. 4 credits. Next offered 2007-2008.  
H. Miyazaki.]

**ANTHR 450(4852) Europe (also ANTHR 750[7852])**

Fall. 4 credits. D. Boyer, D. Greenwood, and J. Rigi.

Rotating seminar dealing with diverse topics related to the anthropology of Europe. Examples are postsocialist transitions, the ethnographic representation of transnational relations and institutions in Europe, integration in the West and disintegration in the East of Europe, immigration, regionalism, and ethnic conflict. Each year it is staffed by one of the three Europeanists in the Department of Anthropology—Dominic Boyer (post-Socialist transition), Davydd Greenwood (ethnicity and nationalism), and Jakob Rigi (post-Socialist capitalism). The course serves to balance the area curriculum of the department by adding Europe to our offerings. It also serves the Modern European Studies Concentration and the International Relations Concentration directly as an additional, much-needed offering at the upper levels. Because the topics and professors shift, students may take more than one of these seminars.

**ANTHR 452(4152) Latin America: Politics and Practice of Culture (also LAT A 452[4520]) @ (CA)**

Fall. 4 credits. C. Howe.

If Che Guevara were cruising across the Americas now, what would he see? Using theoretical and ethnographic material, this course travels from the Southern Cone, through the Central American isthmus, Caribbean and Mexico—troubling past distinctions between culture(s), nation states, and trajectories of people, technologies and capital. We will consider *mestizaje*, indigeneity and ethnicity; diaspora, migrations and mobility; genocide, state violence and repression; sexuality, gender and machismo; neo-colonialisms and neo-liberalisms; resistance, revolution and rights; and the commodification of life and labor. Stretching the geographic and cultural imagination, while accounting for shared and divergent histories in Latin America, this course questions how the politics and practice of culture inform our knowledge of the people of the Western hemisphere in these rapidly shifting times.

**ANTHR 455(4455) Anthropology in the Real World (SBA)**

Spring. 4 credits. J. Schoss.

Designed to expose students to the range of ways and fields within which practitioners employ anthropological theory, methods and perspectives. Course format includes both seminar discussions and workshop sessions with invited speakers. Both the invited speakers and the discussion topics represent different broadly defined fields in which anthropologists practice. Through class discussion and writing, students are expected to critically consider such issues as: research ethics, professional responsibility, the academic versus activist role, methodological practices, and the relationship between individual practitioners and the national, international, and organization contexts within which they work. Students produce a major research paper examining a particular field of "practical" anthropology of their interest.

**ANTHR 475(4475) Governmentality, Citizenship, and Indigenous Political Theory (SBA)**

Spring. 4 credits. A. Simpson.

This seminar explores the ways in which Indigenous peoples have theorized, deployed, critiqued notions of "nationhood", "citizenship" and "sovereignty" in order to articulate and claim rights to territory, to jurisdiction and to the past. Our aim is to gain an appreciation of what these critical concepts mean in the literature of anthropology, political theory and Native American Studies as well as to examine the ways in which Indigenous peoples understand and critique state practices, maintain and construct their own modes of governance and mobilize politically to achieve these ends. This course is comparative in scope, literature and cases will be drawn from various sites but will dwell largely within Native North America.

**ANTHR 476(4476) Semiotics Beyond the Social (also ANTHR 776[7476]) (CA)**

Fall. 4 credits. E. Kohn.

Where do signs come from? Do they exist outside of cultural, social, and linguistic worlds? Most semiotic approaches confine the study of signs to these (primarily) human realms. By doing so, they fail to understand the role that representation plays in domains beyond the human (e.g., in biology) and the various ways in which signs can be entangled with materiality. As a result we are left with a sort of ontological dualism—a study of meaning separate from that of things. If we wish to understand the proliferation of technoscientific "hybrids," material culture, ecological crises, or human evolution, such a division is untenable. Much of social theory, even when it attempts to overcome this division, is still hampered by theories of representation that implicitly reproduce it. By contrast, we will explore a more promising representational system, which grows out of the work of the philosopher Charles Peirce. Throughout his life Peirce tried to understand the continuity that lies between the material and the meaningful. To get at this continuity we will immerse ourselves in Peirce's system through close readings of carefully selected portions of his voluminous work. Our aims will be to understand Peirce's semiotics within the context of his writings on phenomenology, inference, and pragmatism and to think about how we can apply Peirce to current challenges that social theory faces.

**[ANTHR 479(4479) Ethnicity and Identity Politics: An Anthropological Perspective (also AAS 479[4790]) (SBA)]**

Spring. 4 credits. Next offered 2007–2008. V. Munasinghe.]

**ANTHR 480(4480) Anthropology and Globalization (also ANTHR 680[6480]) (CA)**

Fall. 4 credits. A. Willford.

Examines anthropological perspectives on globalization and assesses the cultural, political, and social implications of contemporary global processes. In exploring the factors that are contributing to the production of diasporic consciousness, the intensity and variety of transnational flows of culture, commodities, corporations, and people are considered to assess challenges these processes pose to the modern nation-state. Has culture been liberated from the control of the nation-state through the emergence of new cultural networks created by immigration, electronic media, tourism, and multinational corporations and organization? Or, has the acceleration of global processes within the modern world system created new tools of domination within an increasingly stratified global economy? This course addresses these and related questions using both anthropological theories of and ethnographic studies on globalization, ethnicity, diaspora, and nationalism.

**II. Anthropological Archaeology**

Anthropological archaeology studies the diverse societies of the past using the material traces they left behind in the archaeological record. In addition to studying artifacts, archaeologists use unique methods to study the settings in which artifacts were produced and used by examining regional settlement patterns, the structure of sites and communities, the organization of activities, and ancient symbolism and social relations. The concerns of anthropological archaeology range from basic questions about continuity and change in the past, to application of hard science methods to date sites and determine the sources of artifacts, criticism of the uses to which the past is put in contemporary society, and protection of the archaeological record. Anthropological archaeology can be distinguished from other forms of archaeology (such as Classical or Art Historical archaeology) based on its emphasis on holistically studying past cultural systems, and by the theories and approaches it shares with sociocultural and biological anthropology. There are numerous career opportunities for anthropological archaeologists, including work with museums, government agencies, and historic preservation groups in addition to academic employment. Private companies engaged in federally-mandated cultural resource management (or CRM) archaeology employ thousands of archaeologists in the United States, and similar management programs exist in many other countries.

**ANTHR 100(1200) Ancient Peoples and Places (also ARKEO 100[1200]) # @ (HA)**

Fall. 3 credits. F. Gleach.

Broad introduction to archaeology—the study of material remains to answer questions about the human past. Case studies highlight the variability of ancient societies and illustrate the varied methods and interpretive frameworks

archaeologists use to reconstruct them. This course can serve as a platform for both archaeology and anthropology undergraduate majors.

**ANTHR 203(2200) Early People: The Archaeological and Fossil Record (also ARKEO 203[2200]) # (HA)**

Spring. 3 credits. T. Volman.

Survey of the archaeological and fossil record of human evolution. Highlights contributions by researchers from a variety of disciplines as well as the discoveries that have enlivened the study of human evolution for more than a century. Stresses critical evaluation of evidence and interpretation. Demonstrations and films supplement the lectures.

**ANTHR 215(2215) Stone Age Art (also ARKEO 215[2215]) # (CA)**

Fall. 3 credits. T. Volman.

When did "art," however defined, appear during the human career, how was it produced and for what purposes? These are some of the questions we will investigate through a survey of the discovery, validation, analysis and interpretation of the earliest art. The course will cover a variety of finds from the Old World, including the well-known cave art of southwestern France and northern Spain, and also consider portable art and decoration. The contributions of new analytical techniques and interpretive approaches are highlighted.

**ANTHR 235(2235) Archaeology of North American Indians (also ARKEO 235[2235] AIS/AM ST 235[2350]) # (HA)**

Spring. 3 credits. K. Jordan.

Introductory course surveying archaeology's contributions to the study of American Indian cultural diversity and change in North America north of Mexico. Lectures and readings examine topics ranging from the debate over when the continent was first inhabited to present-day conflicts between Native Americans and archaeologists over excavation and the interpretation of the past. Reviews important archaeological sites such as Chaco Canyon, Cahokia, Lamoka Lake, and the Little Bighorn battlefield. A principal focus is on major transformations in lifeways such as the adoption of agriculture, the development of political-economic hierarchies, and the disruptions that accompanied the arrival of Europeans to the continent.

**ANTHR 242(2201) Early Agriculture (also ARKEO 242[2201]) # @ (HA)**

Spring. 3 credits. N. Russell.

Throughout most of the human career, people survived by hunting and gathering wild foods. The advent of food production is one of the most profound changes in (pre)history. This course examines the current evidence for the appearance and spread of agriculture (plant and animal domestication) around the world. We will consider definitions of agriculture and domestication, the conditions under which it arises, the consequences for those who adopt it, and why it has spread over most of the world.

**ANTHR 317(3217) Stone Age Archaeology (also ARKEO 317[3217]) (HA)**

Fall. 4 credits. T. Volman.

A survey of current approaches to the archaeological record of Stone Age peoples, from the earliest sites to those of recent times. Case studies are used to illustrate the nature of archaeological occurrences,

excavation procedures, and analytical methods. Multidisciplinary efforts to expand our knowledge of prehistoric lifeways and behaviors are a major concern of the course.

**ANTHR 330(3230) Humans and Animals (also ARKEO 330[3230]) @ # (CA)**

Fall. 4 credits. N. Russell.

Human-animal relationships are often seen in utilitarian, especially nutritional terms. This is especially true of the analysis of animal remains from archaeological sites. It is clear, however, that animals and meat have significance far beyond their economic value. This course focuses on these non-dietary roles of animals in human societies, past and present. We will explore a broad range of issues to gain a fuller view of human relations to animals. Domestication involves not only the technical process of controlling animal movements and breeding, but more crucially requires a fundamental shift in the human perception of animals and their relationship to them. Are pets domestic animals in the same sense as animals that are eaten, or does their owners' relationship with them more closely resemble that of hunters with their prey? Do wild animals mean the same thing to hunter-gatherers and farmers who hunt? We will also consider the importance of animals as wealth, as objects of sacrifice, as totems (metaphors for humans), and as symbols in art. Meat has undeniable dietary value, but the social aspect of consumption is also important. Meat can be used in the context of such behaviors as feasting and meat sharing to create, cement, and manipulate social relationships. In this seminar, we will examine these issues primarily (but not exclusively) in the context of the ethnography and archaeology of the Old World with which the instructor is most familiar, but students are encouraged to offer examples from their own areas of expertise. This course is open to students of archaeology, cultural anthropology, and other disciplines with an interest in human-animal relations.

**ANTHR 332(3232) Politics of the Past (also ARKEO 332[3232]) @ # (HA)**

Fall. 4 credits. N. Russell.

Archaeology has never operated in a vacuum. This course examines the political context of the study of the past, and the uses to which accounts of the past have been put in the present. Archaeology is often implicated in nationalist claims to territory, or claims of ethnic, racial, or religious superiority. Museum exhibits and other presentations to the public always have an agenda, consciously or otherwise. Archaeologists are increasingly required to interact with descendant communities, often in the context of postcolonial tensions. The antiquities trade and the protection of archaeological sites connects archaeologists to commercial and law enforcement sectors. We will also consider the internal politics of the practice of archaeology in various settings, including the implications of the funding sources that support archaeological work. This course is open to students of archaeology, socio-cultural anthropology, history, and other disciplines with an interest in the past.

**[ANTHR 348(3248) Iroquois Archaeology (also ANTHR 648[6248], ARKEO 348/648[3248/6248], AIS 348/648[3480/6480]) # (HA)**

Spring. 4 credits. Next offered 2007-2008. K. Jordan.]

**ANTHR 355(3255) Ancient Mexico and Central America (also ARKEO 355[3255]) @ # (HA)**

Spring. 4 credits. J. Henderson.

Survey of the cultural history of ancient Mexico and Central America, emphasizing Aztec and Maya civilizations. The use of ethnographic and historical information to enrich archaeological interpretation is a general theme. Specific topics include the emergence of settled farming life, the rise of civilization and the state, and the development of mechanisms that linked the many societies in the region into a single sphere of interaction.

**[ANTHR 356(3256) Archaeology of the Andes (also ARKEO 356[3256]) @ # (HA)**

Spring. 4 credits. Next offered 2008-2009. J. Henderson.]

**[ANTHR 369(3269) Gender and Age in Archaeology (also ANTHR 669[6269], ARKEO 369/669[3269/6269], FGSS 370/670[3700/6700]) (SBA)**

Fall. 4 credits. Next offered 2007-2008. N. Russell.

In recent years, feminist theory has begun to have an impact on archaeological thought. It is now recognized that gender is likely to have been a relevant dimension of social organization in past societies. Some archaeologists are also trying to take into account the differing interests and experiences of children, adults of reproductive age, and the elderly. This course is not limited to any period or geographical area, but ranges widely in examining how feminist theory has been applied to archaeological data and models. Considers whether it is necessary to identify women and men, adults and children in the archaeological record to take gender and age into account. Also examines the uses of archaeological data by contemporary feminists.]

**[ANTHR 370(3270) Environmental Archaeology (also ANTHR 670[6270], ARKEO 370/670[3270/6270]) (PBS Supplementary List)**

Fall. 4 credits. Next offered 2007-2008. T. Volman.]

**[ANTHR 372(3272) Hunters and Gatherers (also ANTHR 672[6272], ARKEO 372/672[3272/6272]) # @ (SBA)**

Fall. 4 credits. Next offered 2007-2008. T. Volman.]

**[ANTHR 456(4256) Mesoamerican Religion, Science, and History (also ARKEO 456[4256]) @ # (CA)**

Fall. 4 credits. Next offered 2007-2008. J. Henderson.]

**[ANTHR 458(4258) Archaeological Analysis (also ANTHR 658[6258], ARKEO 458/658[4258/6258]) (SBA)**

Spring. 4 credits. Limited to 15 students. Prerequisite: archaeology course or permission of instructor. Next offered 2007-2008. J. Henderson.]

**ANTHR 460(4260) Field and Analytical Methods in Archaeology (also ARKEO 460[4260]) # (SBA)**

Spring. 6 credits. K. Jordan.

This course provides a hands-on introduction to field, laboratory, and analytical methods in archaeology, focusing on historic-period American Indian sites in the Finger Lakes region. Students collectively will generate

new archaeological data, beginning the semester with study of an under-considered archaeological museum collection, and moving to survey and excavation at an archaeological site as the weather permits. Students will have an opportunity to formulate and test their own research designs in laboratory and field settings. Readings will provide an in-depth immersion into field and laboratory methodology, research design, and the culture history and material culture typologies appropriate to the site and era. In addition to laboratory and field work, students will write a 15-page term paper based on original data which can draw on museum collections, field data, documentary sources, or a combination of these sources. Most class time will be spent off-campus; transportation will be arranged by the instructor. Permission of the instructor is required.

**ANTHR 462(4262) Catalhoyuk and Archaeological Practice (also ARKEO 462[4262]) @ # (HA)**

Spring. 4 credits. N. Russell.

Catalhoyuk is a famous and extraordinary Neolithic site in Anatolia. It has intrinsic interest as one of the largest sites in the world at this time, for its spectacular wall paintings and other art, and for many claims of myths of origin that have been made about it (first city, first cattle domestication, first drum, first town plan, etc.). In addition to the many fascinating aspects of the site itself, it is also the nexus of many key issues in current archaeology. The current excavations not only employ a wide range of the latest scientific methods, but they aim to forge a new humanistic approach to fieldwork, putting postprocessual archaeology into practice. The site has been adopted as a sacred place by the goddess movement, and plays a role in local, national, and international politics as well as the construction of national identity. Thus it exemplifies the intersection of politics and archaeology. Both the earlier and the current project have made explicit efforts to communicate with non-archaeologists, thus engaging the issues of public archaeology. It is a key site, in the context of other work in the region, for the understanding of animal domestication, Neolithic ritual and religion, gender relations in the prehistoric Near East, and the effects of aggregated settlement. In this course, we will use the site as a focus to examine these and other issues in archaeological practice in general and the Neolithic of the Near East in particular.

**[ANTHR 463(4263) Zooarchaeological Method (also ARKEO 463[4263]) (PBS Supplementary List)**

Fall. 5 credits. Next offered 2007-2008. N. Russell.]

**[ANTHR 464(4264) Zooarchaeological Interpretation (also ARKEO 464[4264]) (PBS Supplementary List)**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. N. Russell.]

**[ANTHR 467(4267) Origins of Agriculture (also ARKEO 467[4267]) # (HA)**

Spring. 4 credits. Next offered 2008-2009. N. Russell.]

**[ANTHR 470(4270) Political Economy in Archaeology (also ANTHR 770[7270], ARKEO 470/770[4270/7270]) # (SBA)**

Spring. 4 credits. Next offered 2008-2009. K. Jordan.]



**ANTHR 472(4272) Historical Archaeology of Indigenous Peoples (also ANTHR 772(7272), ARKEO 472(772)(4272/7272), AM ST 472(4720)) # (HA)**

Spring. 4 credits. K. Jordan.

This seminar uses archaeology to examine the responses of nonstate indigenous peoples across the world to European expansion and colonialism over the past 500 years. Archaeology provides a perspective on indigenous lives that both supplements and challenges document-based histories. We will assess the strengths and weaknesses of various theories of culture contact, and explore a series of archaeological case studies, using examples primarily from North America with lesser emphasis on Africa and the Pacific. The seminar provides a comparative perspective on indigenous-colonial relationships, in particular exploring the hard-fought spaces of relative autonomy created and sustained by indigenous peoples.

**ANTHR 494(4294) Seminar in Archaeology: The Archaeology of Human Origins (also ARKEO 494(4294)) (HA)**

Spring. 4 credits. T. Volman.

Exploration of the archaeological record associated with early modern and near-modern humans as well as their nonmodern contemporaries, such as the Neanderthals. Major issues include: what behaviors and capabilities are indicated for various populations, and how and why did these change over the course of the later Pleistocene? To what extent does the archaeological record support the "Out-of-Africa" hypothesis of a recent, African origin for all modern humans?

### III. Biological Anthropology

Biological anthropology is the subfield of anthropology that explores the physical diversity, evolutionary history, and behavioral potential of our species. Consistent with anthropology more generally, biological anthropology is concerned with human variation. The distinctive perspective of this subfield is that it examines human variation within the framework of evolutionary theory. Analyses of both biology and culture, and of the interaction between the two, mark the broad boundaries of this discipline. Within that wide scope, specific areas of inquiry are diverse, including fossil studies, primate behavior, nutrition and development, sexual behavior, parental investment, molecular and population genetics, adaptation to environmental stress, disease evolution, life history analysis, and more. Some of the most pressing social issues of our time fall within the domain of biological anthropology as well as a range of professions: the controversy over evolution and intelligent design; race, gender, and genetic determinism; the control of disease; the roots of aggression; and conservation and the role of humans in ecological systems. Although the number of Anthropology courses offered in this subfield are limited, students can pursue their interests through a variety of related courses in other departments and by constructing independent study courses with specific faculty members.

**[ANTHR 101(1300) Human Evolution: Genes, Behavior, and the Fossil Record (PBS Supplementary List)]**

Fall. 3 credits. Lab usage and maintenance fee: \$5. A. Clark Arcadi.

This course provides a broad introduction to biological anthropology, the subfield of anthropology that explores the physical diversity, evolutionary history, and behavioral potential of our species. In addition to lectures, the class includes a weekly lab and discussion section. In sections, students have the opportunity to study our substantial collection of casts of early human fossils, as well as our comparative primate and non-primate skeletal materials. Sections also include a series of discussions on the influence of culture on biology, and of biology on culture, related to pressing social issues such as race, genetic determinism, cloning, sexual taboos, and the controversy surrounding evolution and intelligent design.

**[ANTHR 211(2411) Sophomore Seminar: Nature and Culture @ (SBA)]**

Spring. 4 credits. Limited to 15 students. Sophomore writing seminar. Next offered 2008–2009. S. Sangren.

Special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.]

**[ANTHR 275(2750) Human Biology and Evolution (also BIOEE/NS 275(2750)) (PBS)]**

Fall. 3 credits. Offered alternate years; next offered 2007–2008. J. D. Haas.]

**ANTHR 305(3305) Anthropology of Parenting @ (SBA)**

Spring. 4 credits. M. Small.

Human children are packets of genes that represent individual reproductive success. Like all animals, humans are selected by evolution to care for their offspring, but human infants and children require more intense parental investment than the offspring of most other species. Why is this so? Human parents are also influenced by cultural belief systems and ideology that play out in parenting styles. How do various belief systems influence parent-offspring interaction? In this course we will examine the human infant as a biologically designed organism that has co-evolved with caretakers, and then look at the various parenting styles across cultures that also mold our young. Prerequisites: Anthr 101.

**[ANTHR 375(3375) Evolutionary Theory and Human Behavior (also ANTHR 675(6375)) (PBS Supplementary List)]**

Spring. 4 credits. Next offered 2008–2009. M. Small.]

**[ANTHR 390(3390) Primate Behavior and Ecology (PBS Supplementary List)]**

Spring. 4 credits. Prerequisite: ANTHR 101 or permission of instructor. Next offered 2007–2008. A. Clark Arcadi.]

**ANTHR 490(4390) Topics in Biological Anthropology**

Spring. 4 credits. Prerequisites: ANTHR 101, 390, or permission of instructor.

Current topics in biological anthropology are explored. Topics change each semester. For further information, contact the professor or department office. Topic for Spring 2007: Scenarios of Hominid Evolution. M. Small. Topic for Spring 2008: Aggression and Reconciliation in Primates and Humans. A. Clark Arcadi.

### IV. Honors, Field Research, and Independent Study

**ANTHR 483(4980) Honors Thesis Research**

Fall or spring. Credit TBA. Prerequisite: permission of Honors Committee. Staff. Independent work under the close guidance of a faculty member selected by the student.

**ANTHR 491(4990) Honors Thesis Write-Up**

Fall or spring. Credit TBA. Staff.

**ANTHR 497(4910) Independent Study: Undergrad I**

Fall or spring. Credit TBA. Prerequisite: undergraduate standing. Staff. Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

**ANTHR 498(4920) Independent Study: Undergrad II**

Fall or spring. Credit and Times TBA. Prerequisite: undergraduate standing. Staff. For description, see ANTHR 497, section II, "Honors and Independent Study."

### Relevant courses in other departments

**BIOPL 247(2470) Ethnobiology**

Fall. 3 credits. D. M. Bates. For description, see BIOPL 247.

**BIOPL 348(3480) The Healing Forest**

Spring. 2 credits. D. M. Bates and E. Rodriguez.

**BIOPL 442(4420) Current Topics in Ethnobiology**

Fall. 2 credits. Limited to 12 students. Prerequisite: permission of instructor. D. Bates.

**[MUSIC 104(1302) Introduction to World Music II: Asia]**

Fall. 3 credits. Next offered 2007–2008. M. Hatch.]

**MUSIC 245(1311) Gamelan in Indonesian History and Cultures**

Fall. 3 credits. Prerequisite: permission of instructor. M. Hatch.

**NS/HD 347(3471), B&SOC 347(3471) Human Growth and Development: Biological and Social Interactions**

Spring. 3 credits. J. Haas and S. Robertson.

### V. Graduate Seminars

The graduate program in anthropology is described in much greater detail on the anthropology department web page at [falcon.arts.cornell.edu/Anthro/](http://falcon.arts.cornell.edu/Anthro/). The seminars



described immediately below pertain to the program in sociocultural anthropology. For information about graduate study in archaeology and biological anthropology, see the anthropology department web page.

A core set of seminars is required of all graduate students in sociocultural anthropology: ANTHR 600 and 601. ANTHR 603 is strongly recommended. These courses are open to graduate students from other related fields. This sequence, and the graduate curriculum in general, is premised on the idea that anthropology is best defined as the comparative study of human social life. This definition resists institutional pressures in the academy to distinguish social science from humanistic or cultural studies and scholarly from more worldly applications. Our most important method, ethnography, is at once scientific and humanistic; disciplinary aspirations refuse to view cultural interpretation and analytic explanation as separable values. Furthermore, theory in anthropology is directly related to practice in the world whether in relation to research or more action-oriented pursuits. Consequently, the core sequences as well as most other courses for graduate students are oriented explicitly toward subverting an ideological construction of social life as separable into cultural and social (or political-economic) domains.

**ANTHR 600(6000) Proseminar: Culture and Symbol**

Fall. 6 credits. D. Boyer.

Focuses on an appreciation of symbolic, expressive, and representational forms and processes both as producers and products of social activities. Through the study of symbolic anthropology, structuralism, exchange, myth and ritual, religion, gender, personhood, linguistics, semiology, etc., the course investigates how identity and meaning are linked to the practical exigencies of social life. While emphasizing aspects of the discipline generally associated with cultural anthropology, the course endeavors to set the stage for a dialectical understanding of social, political, economic, and symbolic activities as interrelated phenomena. The works of de Saussure, Levi-Strauss, Dumont, Geertz, Victor Turner, Sahlins, among others, as well as contemporary theories are given careful attention.

**ANTHR 601(6010) Proseminar: Social Organization**

Spring. 6 credits. J. Rigi.

Focuses on linkages between culture and social institutions, representations and practices. The nature of these linkages is debated from strongly contesting points of view in social theory (structuralist, poststructuralist, utilitarian, hermeneutic, Marxist). Unlike debates in critical theory where the form of contestation has been mainly philosophical, in anthropology, these issues have developed in ethnographic analyses. The course briefly surveys kinship theory and economic anthropology with a focus on implications for general issues in social theory. Discussion of attempts to develop dialectical syntheses around the motion of "practice" follows. The issues addressed in this section carry over into the next, colonialism and post-colonialism, in which poststructuralist readings of history are counterposed to Marxist ones. Finally, Lacanian and Marxist visions of ideology as

they relate to anthropological theory and ethnographic analysis are examined with particular emphasis on the cultural and social production of persons.

**[ANTHR 603(6403) Ethnographic Field Methods (also ANTHR 403[4403])**

Fall. 4 credits. Next offered 2007-2008.

V. Santiago-Irizarry.]

**ANTHR 608(6508) The Political Culture of Contemporary Indonesia**

Spring. 4 credits. J. Siegel.

Now that the New Order has passed it is recognized that it was not a popular regime. At the same time, it had the support of the great majority of Indonesians. An explanation of this situation raises questions of the relation of state to nation and of both to the family. These issues will be discussed in the context of nationalist thinking on the one hand and the massacres that initiated the New Order and that were central to its ideology.

**ANTHR 612(6412) The Oedipus Complex in Political Perspective**

Spring. 4 credits. J. Siegel.

Freud described the Oedipal complex as an element of individual psychology. And yet his discovery was based on a play in which the political and the psychological were intertwined. Without the movement out of the family that the complex resolves there is no political society. The nature of the relationship between the two is the subject of the seminar.

**ANTHR 621(6421) Sex and Gender in Cross-Cultural Perspective (also ANTHR 321[3421], FGSS 321/631[3210/6310])**

Fall. 4 credits. Corequisite: attendance at lectures and films of ANTHR/FGSS 321 and permission of instructor. K. March.

For description, see ANTHR 321.

**ANTHR 624(6424) Ethnoracial Identity in Anthropology, Language, and Law (also LSP 624[6424])**

Fall. 4 credits. V. Santiago-Irizarry.

This course examines the role that both law and language, as mutually constitutive mediating systems, occupy in constructing ethnoracial identity in the United States. We approach the law from a critical anthropological perspective, as a signifying and significant sociocultural system rather than as an abstract collection of rules, norms, and procedures, to examine how legal processes and discourses contribute to processes of cultural production and reproduction that contribute to the creation and maintenance of differential power relations. Course material draws on anthropological, linguistic, and critical race theory as well as ethnographic and legal material to guide and document our analyses.

**ANTHR 629(6543) Chinese Ethnology**

Fall. 4 credits. S. Sangren and M. Fiskesjo.

This seminar is designed for graduate students specializing in the study of Chinese culture and society and for advanced undergraduates who plan to pursue careers in the academic study of Chinese culture. The course focuses on close readings on theoretical and conceptual problems and issues in the study of Chinese culture and society, with an emphasis on perspectives provided by cultural anthropology. Among topics that may be included are the social production of gender, ideology in myth and ritual, the cultural uses of history, and political culture; however, the particular emphases of the seminar may

vary from year to year. Those with a reading knowledge of Chinese will be encouraged to explore Chinese sources, but use of such sources is not a requirement of the course.

**ANTHR 635(7520) Southeast Asia: Readings in Special Problems**

Fall or spring. Credit TBA. Staff.

Independent reading course on topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

**ANTHR 641(7530) South Asia: Readings in Special Problems**

Fall or spring. Credit TBA. Staff.

Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

**ANTHR 642(6542) Violence, Symbolic Violence, Terror and Trauma in South Asia and the Himalayas (also ANTHR 442[4542])**

Fall. 4 credits. D. Holmberg.

For description, see ANTHR 422.

**ANTHR 644(6440) Research Design**

Spring. 4 credits. M. Welker.

This seminar focuses on preparing a full-scale proposal for anthropological fieldwork for a dissertation. Topics include identifying of appropriate funding sources; defining a researchable problem; selecting and justifying a particular fieldwork site; situating the ethnographic case within appropriate theoretical contexts; selecting and justifying appropriate research methodologies; developing a feasible timetable for field research; ethical considerations and human subjects protection procedures; and preparing appropriate budgets. This is a writing seminar, and students will complete a proposal suitable for submission to a major funding agency in the social sciences.

**[ANTHR 648(6248) Iroquois Archaeology (also ANTHR 348[3248], ARKEO 348/648[3248/6248], AIS 348/648[3480/6480])**

Spring. 4 credits. Next offered 2008-2009.

K. Jordan.]

**[ANTHR 650(6450) Social Studies of Economics and Finance**

Fall. 4 credits. Next offered 2007-2008.

H. Miyazaki.]

**[ANTHR 652(6452) Evidence: Ethnography and Historical Method**

Fall. 4 credits. Next offered 2008-2009.

H. Miyazaki.]

**ANTHR 655(7550) East Asia: Readings in Special Problems**

Fall or spring. Credit TBA. Staff.

Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

**[ANTHR 656(6256) Maya History (also ARKEO 656[6256])**

Fall. 4 credits. Next offered 2008-2009.

J. Henderson.]

**[ANTHR 658(6258) Archaeological Analysis (also ANTHR 458[4258], ARKEO 458/658[4258/6258])]**

Spring. 4 credits. Next offered 2007–2008. J. Henderson.]

**[ANTHR 660(6460) Language, Ideologies, and Practices (also LSP 660[6460])]**

Spring. 4 credits. Next offered 2008–2009. V. Santiago-Irizarry.]

**[ANTHR 661(6461) Anthropology of Organizations (also ANTHR 361[3461])]**

Spring. 4 credits. D. Greenwood. For description, see ANTHR 361.

**[ANTHR 662(6462) Democratizing Research: Participation, Action, and Research (also ANTHR 362[3462])]**

Fall. 4 credits. D. J. Greenwood. For description, see ANTHR 362.

**[ANTHR 667(6267) Contemporary Archaeological Theory (also ARKEO 667[6267])]**

Spring. 4 credits. Prerequisite: for undergraduates, permission of instructor. Next offered 2008–2009. N. Russell.]

**[ANTHR 668(6468) Marx: An Overview of His Thought (also ANTHR 368[3468])]**

Spring. 4 credits. Next offered 2007–2008. J. Rigi.]

**[ANTHR 669(6269) Gender and Age in Archaeology (also ANTHR 469[4269], ARKEO 469/669[4269/6269])]**

Fall. 4 credits. Next offered 2007–2008. N. Russell.]

**[ANTHR 670(6270) Environmental Archaeology (also ANTHR 370[3720], ARKEO 370/670[3720/6720])]**

Fall. 4 credits. Next offered 2007–2008. T. Volman.]

**[ANTHR 671(6371) Palaeoanthropology of South Asia (also BIOEE 671[6710], ASIAN 620)]**

Fall. 3 credits. Next offered 2008–2009. K. A. R. Kennedy.]

**[ANTHR 672(6272) Hunters and Gatherers (also ANTHR 372[3272], ARKEO 372/672[3272/6272])]**

Fall. 4 credits. Next offered 2007–2008. T. Volman.]

**[ANTHR 673(6373) Human Evolution: Concepts, History, and Theory (also BIOEE 673[6730])]**

Fall. 3 credits. Prerequisite: one year introductory biology, ANTHR 101, or permission of instructor. Offered alternate years. Next offered 2008–2009. K. A. R. Kennedy.]

**[ANTHR 679(6479) Technocracy: Anthropological Approaches]**

Spring. 4 credits. Next offered 2007–2008. A. Riles.]

**[ANTHR 680(6480) Anthropology and Globalization (also ANTHR 480[4480])]**

Fall. 4 credits. A. Willford. For description, see ANTHR 480.

**[ANTHR 682(6482) Perspectives on the Nation]**

Fall. 4 credits. V. Munasinghe. Critical examination of the key texts that have informed our understanding of the nation and nationalism. Beginning with some of the founding texts such as Hahn Kohn's "The

Idea of Nationalism: A Study in its Origins and Backgrounds" (1994), Plamenatz's "Two Types of Nationalism" (1976), and Renan's "What is a Nation" (1939), the course moves on to more contemporary writings by Gellner, Hobsbawm and Anderson and ends with alternate analytical approaches that have been informed by the "national question" in the "Third World" such as Partha Chatterjee's "Nationalist Thought and the Colonial World." A central theme is how notions of culture, power, and history are implicated in constructions of "the Nation." Also explores the possibilities of an ethnographic approach to the nation and ask if such an analytical/methodological move may help us better grapple with the perplexing emotive dimension of nationalisms. The intersection of gender and nation also form a section of this course.

**[ANTHR 688(6488) Masks of Power and Strategies of Resistance and Subversion (also ANTHR 388[3488])]**

Fall. 4 credits. J. Rigi. For description, see ANTHR 388.

**[ANTHR 701(7910) Independent Study: Grad I]**

Fall or spring. Credit TBA. Prerequisite: graduate standing. Staff. Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

**[ANTHR 702(7920) Independent Study: Grad II]**

Fall or spring. Credit TBA. Prerequisite: graduate standing. Staff. For description, see ANTHR 701, section VII, "Graduate Seminars."

**[ANTHR 703(7930) Independent Study: Grad III]**

Fall or spring. Credit TBA. Prerequisite: graduate standing. Staff. For description, see ANTHR 701, section VII, "Graduate Seminars."

**[ANTHR 720(7420) Development of Anthropological Thought (also ANTHR 420[4240])]**

Fall. 4 credits. H. Miyazaki. For description, see ANTHR 420.

**[ANTHR 723(7523) Making History on the Margins: The China-SE Asia Borderlands (also ANTHR 423[4523])]**

Spring. 4 credits. Next offered 2008–2009. M. Fiskejso.]

**[ANTHR 726(7426) Ideology and Social Production (also ANTHR 426[4426])]**

Spring. 4 credits. S. Sangren. For description, see ANTHR 426.

**[ANTHR 739(7545) Peoples and Cultures of the Himalayas (also ANTHR 339[3545])]**

Spring. 4 credits. K. March. For description, see ANTHR 339.

**[ANTHR 750(7852) Europe (also ANTHR 450[4582])]**

Fall. 4 credits. D. Boyer, D. Greenwood, and J. Rigi. For description, see ANTHR 450.

**[ANTHR 762(7262) Catalhoyuk and Archaeological Practice (also ANTHR 462[4262], ARKEO 462/762[4262/7262])]**

Spring. 4 credits. N. Russell. For description, see ANTHR 462.

**[ANTHR 770(7270) Political Economy in Archaeology (also ANTHR 470[4270], ARKEO 470/770[4270/7270])]**

Fall. 4 credits. Next offered 2008–2009. K. Jordan.]

**[ANTHR 772(7272) Historical Archaeology of Indigenous Peoples (also ANTHR 472[4272], ARKEO 472/772[4272/7272], AM ST 472[4720])]**

Fall. 4 credits. K. Jordan. For description, see ANTHR 472.

**[ANTHR 776(7476) Semiotics Beyond the Social (also ANTHR 476[4476])]**

Fall. 4 credits. E. Kohn. For description, see ANTHR 476.

**[ANTHR 784(7684) Africa in the Global Economy (also ANTHR 384[3684])]**

Fall. 4 credits. Next offered 2008–2009. J. Schoss.]

## ARABIC AND ARAMAIC

See "Department of Near Eastern Studies."

## ARCHAEOLOGY

S. Baugher, director (Landscape Architecture), R. G. Calkins (History of Art), K. M. Clinton, director of graduate studies (Classics), J. E. Coleman (Classics), F. Gleach (Anthropology), K. L. Gleason (Landscape Architecture), J. S. Henderson (Anthropology), K. Jordan (Anthropology), K. A. R. Kennedy (Ecology and Evolutionary Biology), S. Manning (Classics), R. McNeal (Asian Studies), C. Monroe (Near Eastern Studies), D. I. Owen (Near Eastern Studies), A. Ramage (History of Art), E. Rebillard (Classics), N. Russell (Anthropology), B. S. Strauss (History), M. A. Tomlan (City and Regional Planning), T. P. Volman, director of undergraduate studies (Anthropology), J. R. Zorn (Near Eastern Studies).

Archaeology is an interdisciplinary field at Cornell, which is one of the few universities in the United States to offer a separate archaeology major and a master's degree. Program faculty members, affiliated with several departments, coordinate course offerings and help students identify opportunities for fieldwork, graduate study, and professional positions.

### The Major

Prospective majors must complete ARKEO 100 or one of the basic courses as defined below before they will be admitted to the major. This course is not counted toward the major requirements.

Because the major draws on the teaching and research interests of faculty from many departments to present a broad view of the archaeological process, interested students should discuss their course of study with a participating faculty member as early as possible. In some areas of specialization, intensive language training should be coordinated with other studies as early as the freshman year.

Once admitted to the major, students must take at least 32 additional credits from the courses listed below, or from related fields

selected in consultation with a major advisor of their choosing. The courses chosen should provide exposure to a broad range of cultures known through archaeology and the methods of uncovering and interpreting them. Sixteen of the credit hours should be at the 300 level or above. At least two courses must be taken from each of the following categories: II. Anthropological Archaeology; III. Classical, Near Eastern, and Medieval Archaeology; and IV. Methodology and Technology. Only 4 credits of ARKEO 300 Individual Study or other supervised study can count toward the major.

Courses basic to the discipline of archaeology are marked with the word "Basic" after the number of credit hours. It is recommended that majors who are planning to pursue graduate studies in archaeology take at least two of the basic courses in each category. Further courses in languages and geology are also recommended.

**Honors.** Honors in archaeology are awarded on the basis of the quality of an honors essay and the student's overall academic record. Prospective honors students should have at least a 3.5 GPA in the major and a 3.0 grade point overall. They should consult with the director of undergraduate studies before the beginning of the senior year. The honors essay is normally prepared over two semesters in consultation with a faculty advisor during the senior year. Students enroll in ARKEO 481 Honors Thesis Research, and to complete the thesis, they enroll in ARKEO 482 Honors Thesis Writeup. Both courses are offered in the fall and spring. Only ARKEO 481 may count toward hours for completion of the archaeology major requirements. The credit hours for these courses are variable.

**Fieldwork.** Every student should gain some practical experience in archaeological fieldwork on a project authorized by his or her advisor. This requirement may be waived in exceptional circumstances. The Jacob and Hedwig Hirsch bequest provides support for a limited number of students to work at excavations sponsored by Cornell and other approved institutions.

## The Concentration

Students in Cornell schools and colleges other than Arts and Sciences may elect a concentration in archaeology. To concentrate in archaeology, the student must complete five courses, all with a grade of C or better. The five courses must consist of either (1) ARKEO 100 and four other courses from categories II-IV (described above), at least three of which must be basic courses, or (2) five courses from categories II-IV, at least four of which must be basic courses. Concentrators are encouraged to gain some fieldwork experience. They are eligible for Hirsch Scholarships in support of fieldwork on the same basis as majors.

## First-Year Writing Seminars

For course descriptions, see the First-Year Writing Program brochure.

## I. Introductory Courses and Independent Study Courses

### ARKEO 100(1200) Ancient Peoples and Places (also ANTHR 100[1200]) # @ (HA)

Fall. 3 credits. Basic. F. Gleach.  
Broad introduction to archaeology: the study of material remains to answer questions about the human past. Case studies highlight the variability of ancient societies and illustrate the varied methods and interpretive frameworks archaeologists use to reconstruct them. This course can serve as a platform for both archaeology and anthropology undergraduate majors.

### ARKEO 300(3000) Individual Study in Archaeology and Related Fields

Fall and spring. Credit TBA. Prerequisite: ARKEO 100 or permission of instructor. Students pursue topics of particular interest with the guidance of a faculty member.

### ARKEO 481(4981) Honors Thesis Research

Fall or spring. 4 credits, variable.  
Prerequisite: admission to honors program. Independent work under the close guidance of a faculty member.

### ARKEO 482(4982) Honors Thesis Writeup

Fall or spring. 4 credits, variable.

### ARKEO 600(6000) Special Topics in Archaeology

Fall and spring. 4 credits, variable.  
Students pursue advanced topics of particular interest under the guidance of a faculty member(s).

### ARKEO 681-682(8901-8902) Master's Thesis

681, fall; 682, spring. 4 credits, variable.  
Prerequisite: master's students in archaeology. S-U grades only. Students, working individually with faculty member(s), prepare a master's thesis in archaeology.

## II. Anthropological Archaeology

### ARKEO 203(2200) Early People: The Archaeological and Fossil Record (also ANTHR 203[2200])

Spring. 3 credits. Basic. T. P. Volman.  
For description, see ANTHR 203.

### ARKEO 215(2215) Stone Age Art (also ANTHR 215[2215])

Fall. 3 credits. Basic. T. P. Volman.  
For description, see ANTHR 215.

### ARKEO 235(2235) Archaeology of North American Indians (also ANTHR 235[2235], AIS/AM ST 235[2350]) #

Spring. 3 credits. K. Jordan.  
For description, see ANTHR 235.

### ARKEO 242(2201) Early Agriculture (also ANTHR 242[2201])

Spring. 3 credits. Basic. N. Russell.  
For description, see ANTHR 242.

### ARKEO 317(3217) Stone Age Archaeology (also ANTHR 317[3217])

Fall. 4 credits. Basic. T. P. Volman.  
For description, see ANTHR 317.

### ARKEO 330(3230) Humans and Animals (also ANTHR 330[3230])

Fall. 4 credits. N. Russell.  
For description, see ANTHR 330.

### [ARKEO 348(3248) Iroquois Archaeology (also ARKEO 648[6248], ANTHR 348/648[3248/6248], AIS 348/648[3480/6480])

Fall. 4 credits. Next offered 2008-2009.  
K. Jordan.]

### ARKEO 355(3255) Ancient Mexico and Central America (also ANTHR 355[3255])

Spring. 4 credits. Basic. J. Henderson.  
For description, see ANTHR 355.

### [ARKEO 356(3256) Archaeology of the Andes (also ANTHR 356[3256]) # @ (HA)

Spring. 4 credits. Basic. Not offered 2008-2009. J. Henderson.]

### [ARKEO 369(3269) Gender and Age in Archaeology (also ARKEO 669[3269], ANTHR 369/669[3269/6269], FGSS 370/670[3700/6700])

Fall. 4 credits. Next offered 2007-2008.  
N. Russell.]

### [ARKEO 372(3272) Hunters and Gatherers (also ARKEO 672[6272], ANTHR 372/672[3272/6272])

Fall. 4 credits. Next offered 2007-2008.  
T. Volman.]

### ARKEO 453(4253) The Archaeology of Slavery (also AS&RC 453[4204], ANTHR 453(4253), AM ST 453[4204])

Fall. 4 credits. W. Battle-Baptise.  
For description, see AS&RC 453.

### [ARKEO 456(4256) Mesoamerican Religion, Science, and History (also ANTHR 456[4256])

Fall. 4 credits. Next offered 2007-2008.  
J. Henderson.]

### ARKEO 462(4262) Cataloyuk and Archaeological Practice (also ARKEO 762[7262], ANTHR 462/762[4262/7262])

Spring. 4 credits. N. Russell.  
For description, see ANTHR 462.

### [ARKEO 470(4270) Political Economy in Archaeology (also ARKEO 770[7270], ANTHR 470/770[4270/7270])

Spring. 4 credits. Next offered 2008-2009.  
K. Jordan.]

### ARKEO 472(4272) Historical Archaeology of Indigenous Peoples (also ARKEO 772[7272], ANTHR 472/772[4272/7272], AM ST 472[4272])

Spring. 4 credits. K. Jordan.  
For description, see ANTHR 472.

### ARKEO 494(4294) Seminar in Archaeology: The Archaeology of Human Origins (also ANTHR 494[4294])

Spring. 4 credits. T. P. Volman.  
For description, see ANTHR 494.

### [ARKEO 648(6248) Iroquois Archaeology (also ARKEO 348[3248], ANTHR 348/648[3248/6248], AIS 348/648[3480/6480])

Fall. 4 credits. Next offered 2008-2009.  
K. Jordan.]

### [ARKEO 656(6256) Maya History (also ANTHR 656[6256])

Fall. 4 credits. Next offered 2008-2009.  
J. Henderson.]

**[ARKEO 667(6267) Contemporary Archaeological Theory (also ANTHR 667(6267))]**

Spring. 4 credits. Limited to 14 students. Prerequisite: permission of instructor for undergraduates. Next offered 2008–2009. N. Russell.]

**[ARKEO 669(6269) Gender and Age in Archaeology (also ARKEO 369[3269], ANTHR 369/669[3269/6269])]**

Fall. 4 credits. Next offered 2007–2008. N. Russell.]

**[ARKEO 770(7270) Political Economy in Archaeology (also ARKEO 470[4270], ANTHR 470/770[4270/7270])]**

Spring. 4 credits. Next offered 2008–2009. K. Jordan.]

**ARKEO 772(7272) Historical Archaeology of Indigenous Peoples (also ARKEO 472[4272], ANTHR 472/772[4272/7272], AM ST 472[4272])]**

Fall. 4 credits. K. Jordan.  
For description, see ANTHR 472.

### III. Classical, Near Eastern, and Medieval Archaeology

**[ARKEO 221(2726) Minoan-Mycenaean Art and Archaeology (also CLASS 221[2726], ART H 221[2226])]**

Spring. 3 credits. Basic. Next offered 2007–2008. J. Coleman.  
For description, see CLASS 221.]

**ARKEO 260(2662) Daily Life in the Biblical World (also NES/JWST/RELST 262[2662])]**

Fall. 3 credits. Basic. J. Zorn.  
For description, see NES 262.

**ARKEO 266(2666) Jerusalem through the Ages (also NES/JWST/RELST 266[2666])]**

Spring. 3 credits. Basic. J. Zorn.  
For description, see NES 266.

**ARKEO 268(2668) Ancient Egyptian Civilization (also NES/JWST 268[2668])]**

Fall. 3 credits. Basic. C. Monroe.  
For description, see NES 268.

**[ARKEO 321(3721) Mycenae and Homer (also CLASS 321[3721], ART H 321[3226])]**

Fall. 4 credits. Basic. Prerequisite: at least one course in archaeology, classics, or history of art. Next offered 2008–2009. J. Coleman.  
For description, see CLASS 321.]

**ARKEO 334(3734) Archaeology of Slavery in the Roman World (also CLASS 334[3734])]**

Spring. 4 credits. K. McDonnell.  
For description, see CLASS 334.

**ARKEO 364(3764) Ancient Iraq: Mesopotamian Civilization (also NES/JWST 364[3664], 664[6664])]**

Fall. 4 credits. Basic. D. Owen.  
For description, see NES 364.

**ARKEO 380(3800) Introduction to the Arts of China (also ART H 380[3800])]**

Fall. 4 credits. A. Pan.  
For description, see ART H 380.

**[ARKEO 434(4340) The Rise of Classical Greece (also ART H 434[4254], CLASS 434[4734])]**

Spring. 4 credits. Recommended: CLASS 220 or 221 or ART H 220 or 221, or permission of instructor. Next offered 2008–2009. Staff.]

**[ARKEO 435(4207) Seminar on Roman Art and Archaeology (also CLASS 435[4735])]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2008–2009. Staff.]

**[ARKEO 520(5200) Seminar in Classical Archaeology (also CLASS 630[7750])]**

Spring. 4 credits. Next offered 2008–2009. Staff.]

**[ARKEO 629(7729) The Prehistoric Aegean (also CLASS 629[7729])]**

4 credits. Prerequisite: graduate standing; advanced undergraduates by permission of instructor. Next offered 2008–2009. J. E. Coleman.]

**CLASS 220(2700) Introduction to Art History: The Classical World**

Fall. 4 credits. Basic. K. McDonnell.  
For description, see CLASS 220.

**[CLASS 237(2607) Greek Religion and Mystery Cults (also RELST 237)]**

Spring. 3 credits. Basic. Next offered 2007–2008. K. Clinton.]

**[CLASS 240(2725) Greek Art and Archaeology]**

Spring. 3 credits. Basic. Next offered 2007–2008. J. Coleman.]

**[CLASS 322(3722) Greeks and Barbarians]**

Fall. 4 credits. Prerequisite: CLASS 220 or 221, or permission of instructor. Next offered 2007–2008. J. Coleman.]

**[CLASS 329(3729) Greek Sculpture]**

4 credits. Next offered 2008–2009. J. E. Coleman.]

**[CLASS 333(3643) Greek and Roman Mystery Cults and Early Christianity (also RELST 333)]**

Fall. 4 credits. Recommended: previous course in classics (civilization or language) or RELST 101. Next offered 2007–2008. K. Clinton.]

**ART H 322 Arts of the Roman Empire (also CLASS 350[3740])]**

Spring. 4 credits. A. Ramage.  
For description, see ART H 322.

**[LA 545(5450) The Parks and Fora of Imperial Rome]**

Spring. 3 credits. Prerequisites: advanced standing in design field, classics, or history of art, or permission of instructor. Next offered 2007–2008. K. Gleason.]

### IV. Methodology and Technology

**ARKEO 228(2727) Art and Archaeology in the Ancient Mediterranean World (also ART H 227[2227], CLASS 227[2727])]**

Fall. 4 credits. S. Manning.  
For description, see CLASS 227.

**ARKEO 256(2756) Practical Archaeology (also CLASS 256[2756])]**

Spring. 3 credits. J. Coleman.  
For description, see CLASS 256.

**ARKEO 261(2610) Urban Archaeology (also LA/CRP 261[2610])]**

Fall. 3 credits. Basic. S. Baugher.  
For description, see LA 261.

**ARKEO 262(2620) Laboratory in Landscape Archaeology (also LA 262[2620])]**

Spring. 3 credits. S. Baugher.  
For description, see LA 262.

**[BIOEE 275(2750) Human Biology and Evolution (also ANTHR 275[2750], NS 275) (PBS)]**

Fall. 3 credits. Offered alternate years. Next offered 2007–2008. J. D. Haas.]

**ARKEO 309(3090) Introduction to Dendrochronology (also ART H 309[3250], CLASS 330[3750]) # (HA)**

Spring. 4 credits. Limited to 10 students. Prerequisite: permission of instructor. Letter grades only. S. Manning.  
For description, see CLASS 330.

**[ARKEO 370(3270) Environmental Archaeology (also ARKEO 670[6270], ANTHR 370/670[3270/6270])]**

Spring. 4 credits. Next offered 2007–2008. T. P. Volman.]

**ARKEO 402(4020) Designing Archaeological Exhibits (also ARKEO 602[6020])]**

Spring. Variable credit. Letter grades only. S. Baugher.

Presenting archaeology to the public has become an educational goal for many professional archaeological societies and museums. Class discussions will focus on the theories and techniques of exhibit design. To evaluate different academic approaches to exhibiting objects, the class will visit art and historical museums. Students will then design and install an archaeological exhibit using artifacts that have been catalogued in an archaeology laboratory course, ARKEO 262. These artifacts are from archaeological excavations completed over the last two years in an archaeology field methods class, ARKEO 261. The excavation was at a 19th-century site at Robert Treman State Park.

**[ARKEO 437(4370) Geophysical Field Methods (also EAS 437[4370])]**

Fall. 3 credits. Prerequisite: PHYS 213 or 208 or permission of instructor. Next offered 2007–2008. L. D. Brown.]

**[ARKEO 458(4258) Archaeological Analysis (also ARKEO 658[6258], ANTHR 458/658[4258/6258])]**

Spring. 4 credits. Limited to 15 students. Prerequisite: archaeology course or permission of instructor. Next offered 2007–2008. J. S. Henderson.]

**[ARKEO 463(4263) Zooarchaeological Method (also ANTHR 463[4263]) (PBS Supplementary List)]**

Fall. 5 credits. Next offered 2007–2008. N. Russell.]

**[ARKEO 464(4264) Zooarchaeological Interpretation (also ANTHR 464[4264]) (PBS Supplementary List)]**

Spring. 4 credits. Prerequisites: ARKEO/ANTHR 463; permission of instructor. Next offered 2007–2008. N. Russell.]

**[ARKEO 467(4267) Origins of Agriculture (also ANTHR 467[4267])]**

Spring. 4 credits. Next offered 2008–2009. N. Russell.]



**ARKEO 600(6000) Special Topics in Archaeology**

Fall and spring. 4 credits. Staff.

**ARKEO 602(6020) Designing Archaeological Exhibits (also ARKEO 402[4020])**

Spring. Variable credit. Letter grades only. S. Baugher.

For description, see ARKEO 402.

**[ARKEO 670(6270) Environmental Archaeology (also ARKEO 370[3270], ANTHR 370/670[3270/6270])]**

Fall. 4 credits. Next offered 2007-2008. T. P. Volman.]

**[BIOEE 671(6710) Paleoanthropology of South Asia (also ANTHR 671[6371], ASIAN 620[6620])]**

Fall. 3 credits. Next offered 2008-2009. K. A. R. Kennedy.]

**V. Relevant Courses at Ithaca College**

Contact Sherene Baugher in Landscape Architecture at sbb8@cornell.edu or the Ithaca College Anthropology Department at 274-1331 for further information or visit their web site at [www.ithaca.edu/hs/anthro/](http://www.ithaca.edu/hs/anthro/).

Prehistory of South America. M. Malpass. Every other year.

New World Complex Societies. M. Malpass. Irregular offering.

Archaeological Methods and Techniques. M. Malpass. Irregular offering.

World Prehistory. J. Rossen. Every semester.

North American Prehistory. J. Rossen. Every year.

People, Plants, and Culture: Archaeobotany and Ethnobotany. J. Rossen. Every other year.

Seminar: Hunter-Gatherers. J. Rossen. Every other year.

Seminar: Origins of Agriculture. J. Rossen. Every other year.

Ethnoarchaeology. J. Rossen. Every other year.

Archaeological Field School.

**ASIAN STUDIES**

K. W. Taylor, chair (350 Rockefeller Hall, 255-5095); A. Blackburn, D. Boucher, T. Chaloeontiarana, B. de Bary, H. Diffloth, S. Divo, W. George, D. Gold, H. Huang, N. Jagacinski, Y. Katagiri, Y. Kawasaki, F. Kotas, T. LaMarre, N. Larson, J. M. Law, W. Liyanage, R. McNeal, Y. Lee-Mehta, S. Mukherjee, Y. Nakanishi-Whitman, S. Oja, J. Pandin, L. Paterson, H. Phan, B. Rusk, N. Sakai, T. Savella, K. Selden, M. Shin, M. Song, R. Sukle, K. Taylor, Q. Teng, T. Tranviet, S. Tun, D. X. Warner; Emeritus: K. Brazell, T. L. Mei, J. Wolff; Associated Faculty: A. Carlson, S. Cochran, A. Cohn, M. Hatch, R. Herring, D. Holmberg, M. Katzenstein, K. Kennedy, V. Koschmann, T. Loos, T. Lyons, K. March, S. Martin, K. McGowan, S. Mohanty, V. Munasinghe, V. Nee, A. Nussbaum, A. Pan, C. Peterson, P. Sangren, J. Siegel, J. J. Suh, E. Tagliacozzo, N. Uphoff, J. Whitman, A. Willford

The Department of Asian Studies encompasses the geographical areas of East Asia, South Asia, and Southeast Asia and offers courses in

most of the disciplines of the social sciences and the humanities. Forty-five members of the department specialize in languages, linguistics, literatures, and religions, while associated faculty throughout the university teach courses on Asia in their own disciplines, from art history and government to rural sociology. Asian Studies courses through the 400 level (ASIAN is the prefix) are taught in English and are open to all students in the university. Some of these courses may be counted toward majors in other departments; others fulfill various distribution requirements.

**The Major**

A student majoring in Asian Studies normally specializes in the language and culture of one country and often chooses an additional major in a traditional discipline.

A student majoring in Asian Studies receives thorough training in at least one Asian language and is required to complete two courses at the 200-level (minimum of 6 credits) or to demonstrate that minimal level of proficiency in one the Asian languages offered at Cornell. The major consists of at least 30 additional credits (which may include up to 6 credits of further language study) from courses numbered 200 and above selected by the student in consultation with his or her advisor from among the Asia content courses offered by the Department of Asian Studies and by Asia specialists in other departments.

The applicant for admission to the major in Asian Studies must have completed at least two Asia content courses, one of which may be a language course. Students must receive permission for admission to the major from the director of undergraduate studies. The student must have received a minimum grade of C in those courses and in all other courses counted toward the major.

**Honors**

To be eligible for honors in Asian Studies, a student must have a cumulative GPA of 3.0, and an average of 3.7 in all Asian Studies area courses, exclusive of language study only, and must successfully complete an honors essay during the senior year. Students who wish to be considered for honors should apply to the director of undergraduate studies during the second semester of their junior year. The application must include an outline of the proposed project and the endorsement of a supervisor chosen from the Asian Studies faculty. During the first semester of the senior year the student does research for the essay in conjunction with an appropriate Asian Studies course or ASIAN 401. By the end of the first semester the student must present a detailed outline of the honors essay or other appropriate written work and have it approved by the project supervisor and the director of undergraduate studies. The student is then eligible for ASIAN 402, the honors course, which entails writing the essay. At the end of the senior year, the student has an oral examination (with at least two faculty members) covering both the honors essay and the student's area of concentration.

**Concentration in East Asia Studies**

A candidate for the bachelor of arts or science degree at Cornell may take a concentration in East Asian studies by completing at least 18 credits of course work in East Asian studies.

Students normally take five courses in East Asian Studies at the 200 level or above from those East Asian courses listed (China, Japan, Korea) either under Asian Studies or Asian-related courses. Of these, two courses might be Asian language courses at the 200 level or beyond. East Asian graduate courses may also be taken for the concentration, as well as East Asia-related courses with a research paper on an East Asian topic. Appropriate courses taken through Cornell Abroad in East Asia may also be counted toward the concentration. Students concentrating in East Asian Studies should select an advisor from the East Asia Program faculty for consultation on their course of study. For more information, contact the Department of Asian Studies at 350 Rockefeller Hall, 255-5095.

**Concentration in South Asia Studies**

A candidate for the bachelor of arts or science degree at Cornell may take a concentration in South Asia Studies by completing at least 18 credits of course work (typically five courses) in South Asian Studies at the 200-level or above. These courses are selected from South Asia courses listed under the Department of Asian Studies, or from other Asia-related courses. Of these, two courses may be South Asian language courses at the 200 level or above. Appropriate South Asia graduate course work may be included in the concentration with consent of the instructor and the advisor. One South Asia-related course with a research paper on a South Asia subject may be included with the consent of the advisor and the director of undergraduate studies.

Students concentrating in South Asian Studies are considered members of the South Asia Program and will have an advisor from the program faculty. (This advisor will supervise a student's concentration and does not substitute for a student's major advisor.)

**Concentration in Southeast Asia Studies**

A candidate for the bachelor of arts or science degree at Cornell may take a concentration in Southeast Asian Studies by completing 18 credits of course work in Southeast Asian Studies. A recommended plan would include ASIAN 208 and four courses at the intermediate or advanced stage, two of which could be a Southeast Asian language. Students taking a concentration in Southeast Asian Studies are members of the Southeast Asia Program and are assigned an advisor from the program faculty. Such students are encouraged to commence work on a Southeast Asian language either at the 10-week intensive courses offered by the Southeast Asia Studies Summer Institute (SEASSI) or by studying for one semester at IKIP Malang, Indonesia; Khon Kaen University, Thailand; or Hanoi University, Vietnam. Fellowships are available for undergraduates through the Cornell Abroad Program.

**Intensive Language Program (FALCON)**

The FALCON Program offers intensive instruction in Japanese or Chinese. Aside from the exclusive language schools of some government agencies, FALCON is the only program in the world that offers a full year of intensive instruction beginning at the elementary level and continuing to the advanced level. FALCON is a full-time



program; the degree of intensity does not allow students to enroll simultaneously in other courses or to work, except perhaps on weekends. Students typically take the entire sequence of 160, 161, and 162, but they may take any other portion of the program if they have the necessary background as determined by a placement interview. Students often choose to apply only to the summer portion. The spring semester of the Chinese program is expected to be offered in Beijing.

Students must formally apply to the program. To guarantee course availability, applications must be received by March 1. After that, applicants are reviewed on a rolling basis and acceptance is contingent on the availability of spaces. Applications are available in 388 Rockefeller Hall or on the FALCON web site at <http://lrc.cornell.edu/falcon>.

## Study Abroad

There are many strong options for study abroad in Asia. Cornell Abroad helps students plan a year or semester abroad as part of their Cornell undergraduate degree. Cornell has affiliations with several programs and institutions in Asia and sends students to those and others.

Cornell is affiliated with IUP, the Inter-University Program for Chinese Language Studies in Beijing (at Tsinghua University) and is a member of CIEE and IES, organizations sponsoring study abroad programs offering Chinese language instruction at several levels as well as courses in Chinese studies in the humanities and social sciences. Students may also study at other programs in China, Hong Kong, and Taiwan. The Chinese FALCON program includes a spring semester in Beijing.

Cornell is a member of the consortium of the Kyoto Center for Japanese Studies, an undergraduate semester or year program in Japanese language and Japanese studies. An agreement with International Christian University (ICU), outside Tokyo, permits Cornell students to attend that institution. Cornell students have attended CIEE and IES programs as well as other programs and institutions in Japan.

Cornell is a member of the American Association of Indian Studies, which offers fellowships for intensive study in India or Hindi, Bengali, and Tamil. There are study abroad options in universities or other organizations in various regions of India.

In cooperation with Tribhuvan National University of Nepal, Cornell organizes the Cornell-Nepal Study Program for undergraduate and graduate students wishing to spend a semester or year studying and conducting research in Nepal.

Students may spend a semester or year in Mongolia, Korea, Vietnam, Indonesia, Thailand, Singapore, or the Philippines or choose to study about Asia at the School of Oriental and African Studies in London, or the Faculty of Asian Studies at the Australian National University. Undergraduates should consult Cornell Abroad; graduate students should inquire at the East Asia Program, Southeast Asia Program, or South Asia Program offices.

Students may apply up to 15 credits from abroad to the major.

## First-Year Writing Seminars

See John S. Knight Institute brochure for times, instructor, and descriptions.

## General Education Courses

### ASIAN 191(1191) Introduction to Modern Asian History (also HIST 191[1910]) @ (HA)

Fall. 4 credits. D. Ghosh and E. Tagliacozzo.

For description, see HIST 191.

### ASIAN 192(1192) Introduction to World Music: Asia (also MUSIC 104[1302]) @ (CA)

Fall. 3 credits. M. Hatch.

For description, see MUSIC 104.

### [ASIAN 201(2201) SSP: Buddhist Felicities @ (CA)

Spring. 4 credits. Next offered 2007–2008.

A. Blackburn.]

### [ASIAN 206(2206) SSP: The Occidental Tourist: Travel Writing and Orientalism in Southeast Asia (also HIST 207/507[2070/5070]) @

Fall. 4 credits. Next offered 2007–2008.

T. Loos.]

### ASIAN 208(2208) Introduction to Southeast Asia @ (CA)

Fall. 3 credits. T. Chaloeintiarana.

For anyone curious about the most diverse part of Asia; defines Southeast Asia both as the nation-states that have emerged since 1945 (Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam) and as a larger cultural world extending from southern China to Madagascar and Polynesia. Students find a serious, organized introduction to a variety of disciplinary and topical approaches to this region, including geography, linguistics, history, religion and ideology, anthropology, marriage and family systems, music, literacy and literature, art and architecture, agriculture, industrialization and urbanization, politics and government, warfare and diplomacy, ecological and human degradation, and business and marketing. The course teaches both basic information and different ways of interpreting that information.

### ASIAN 211(2211) Introduction to Japan: Japanese Texts in History @ # (HA)

Fall. 3 credits. T. LaMarre.

Introduction to Japanese studies for nonmajors. Takes up diverse cultural artifacts and demonstrates how the meanings and readings generated by these artifacts have changed over time. Considers the eighth-century *Kojiki*, the courtly narrative *Tale of Genji*, puppet theater, Ainu autobiography, and films and comic books dealing with themes of nuclear warfare.

### ASIAN 212(2212) Introduction to China @ # (CA)

Spring. 3 credits. B. Rusk.

Interdisciplinary introduction to Chinese culture especially designed for students not majoring in Asian Studies. Explores literature, history, religion, art and archaeology, and other aspects of China's rich and diverse heritage, from earliest times to the present.

### [ASIAN 215(2215) Introduction to South Asian Civilization @ (HA)

Spring. 3 credits. Next offered 2007–2008.

A. Blackburn.]

### ASIAN 218(2218) Introduction to Korea (also HIST 218[2800]) @ (CA)

Fall. 3 credits. Staff.

Multidisciplinary introduction to Korean history, society, and culture. The first part of the course examines sources of Korean tradition in their historical contexts. The second part, on the transition to a modern society, covers the mid-19th century to the Korean War. The last part is devoted to contemporary society.

## Asia—Literature and Religion Courses

The following courses are taught entirely in English and are open to any Cornell student.

### [ASIAN 219(2219) Women in South Asia (also HIST/FGSS 219[2190]) @ (HA)

Fall. 4 credits. Next offered 2008–2009.

D. Ghosh.]

### ASIAN 225 Literature, Politics, and Genocide in Cambodia @ (CA)

Summer. 3 credits. G. Chigas.

Will examine various literary and political responses to the Cambodian genocide. The course posits the following: in the aftermath of genocide or mass destruction, there are two means by which survivors and bystanders attempt to confirm the even, identify the victims and the perpetrators and thereby restore a sense of justice. One of these is personal accounts or literary testimony. The other is government sanctioned legal proceedings. The course will consider how the literary and political responses to the Cambodian genocide have paralleled, complimented, and opposed each other. The course will also ask whether their overall effect contributes to or detracts from the servings of justice and process of healing for our survivors. To pursue these questions, we will read selections from novels and poetry written by Cambodian survivors side by side with accounts of political activities of the Cambodian government and the international community to bring the perpetrators of genocide to justice.

### ASIAN 226(2226) Society and Religion in China (also HIST 226[2261]) @ # (HA)

Fall. T. Hinrichs.

For description, see HIST 226.

### [ASIAN 228(2228) The Indian Ocean World (also HIST 228[2280]) @ (HA)

Spring. 4 credits. Limited to 15 students.

Next offered 2008–2009. E. Tagliacozzo.]

### [ASIAN 236(2236) Crimes Against Humanity (also HIST 231[2310]) (HA)

Fall. 3 credits. Next offered 2008–2009.

V. Koschmann.

For description, see HIST 231.]

### [ASIAN 241(2241) China's Literary Heritage: An Introduction in Translation @ # (LA)

Spring. 3 credits. Next offered 2007–2008.

D. X. Warner.]

### ASIAN 245(2245) Gamelan in Indonesian History and Cultures (also MUSIC 245[1341]) @ (LA)

Fall or spring. 3 credits. Permission of instructor. M. Hatch.

For description, see MUSIC 245.

**ASIAN 250(2250) Introduction to Asian Religions (also RELST 250[2250]) @ # (HA)**

Spring. 3 credits. J. M. Law.  
Explores religious traditions in South Asia (Pakistan, India, and Sri Lanka) and East Asia (China and Japan) including Hinduism, Buddhism (South Asian and East Asian), Sikhism, Confucianism, Daoism, and Shinto. Encounters a wide range of religious expressions as well, including myth, ritual, pilgrimage, mysticism, meditation, and other spiritual technologies.

**ASIAN 257(2257) China Encounters the World (also HIST 257[2571]) @ (HA)**

Fall. 3 credits. J. Chen.  
For description, see HIST 257.

**ASIAN 277(2277) Meditation in Indian Culture (also RELST 277[2277]) @ # (CA)**

Spring. 3 credits. D. Gold.  
Probes the truths behind traditional claims of the priority of internal practice in Indian traditions. Students are expected to experiment with some basic meditation practices and situate them within larger South Asian worldviews as suggested by doctrines, rituals, iconic forms, and literary texts. Grades are based on short papers.

**ASIAN 279(2279) Chinese Mythology @ # (LA)**

Fall. 3 credits. R. McNeal.  
Students will study Chinese myths from the earliest times down to the late imperial era. Focus will be on understanding the form Chinese myths take, how they are related to religion, literature, historical accounts and intellectual trends.

**[ASIAN 282(2282) Japanese Animation and New Media @ (CA)**

Fall. 3 credits. Next offered 2007–2008.  
T. LaMarre.]

**ASIAN 294(2294) History of China in Modern Times (also HIST 294[2940]) @ (HA)**

Spring. 4 credits. Staff.  
For description, see HIST 294.

**[ASIAN 298(2298) The U.S.–Vietnam War (also HIST 289[2890]) @ (HA)**

Fall. 3 credits. Next offered 2007–2008.  
K. Taylor and F. Logevall.]

**[ASIAN 301(3301) Schools of Thought—Ancient China @ # (HA)**

Fall. 4 credits. Next offered 2008–2009.  
R. McNeal.]

**[ASIAN 302(3302) Art of War in Ancient China @ # (HA)**

Fall. 4 credits. Next offered 2008–2009.  
R. McNeal.]

**ASIAN 306(3306) Zen Buddhism @ # (KCM)**

Spring. 4 credits. Limited to 15 students.  
Prerequisites: any university-level course in Buddhism or ASIAN/RELST 250, or permission of instructor. Graduate students can take this course for credit and sign up for an additional credit hour for an extra session. J. M. Law.

**[ASIAN 312(3312) Intellectuals in Early Modern Korea @ # (HA)**

Spring. 4 credits. Prerequisite: one course on modern Japan or Korea. Next offered 2007–2008. M. Shin.]

**[ASIAN 328(3328) Construction of Modern Japan (also HIST 328[3280]) @ # (HA)**

Spring. 4 credits. Next offered 2007–2008.  
J. V. Koschmann.]

**ASIAN 335(3335) Japan from War to Prosperity @ (HA)**

Fall. 3 credits.\*V. Koschmann.  
For description, see HIST 330.

**[ASIAN 342(3342) History of Modern South Asia 1700 to 1947 (also HIST 342[3420]) @ # (HA)**

Fall. 4 credits. Next offered 2008–2009.  
D. Ghosh.]

**[ASIAN 346(3346) Modern Japanese Politics (also GOVT 346[3463]) @ (SBA)**

Spring. 4 credits. R. Weiner.]

**[ASIAN 347(3347) Tantric Traditions (also RELST 349[3349]) @ # (CA)**

Fall. 4 credits. Next offered 2007–2008.  
D. Gold.]

**[ASIAN 348(3348) Indian Devotional Poetry (also RELST 348[3348]) @ # (LA)**

Spring. 4 credits. Next offered 2007–2008.  
D. Gold.]

**[ASIAN 351(3351) Indian Religious Worlds (also RELST 351[3351]) @ (CA)**

Fall. 4 credits. D. Gold.  
A study of religious traditions as lived today in the Indian subcontinent. Alongside some underlying similarities, attention will be paid to differences in piety and practice within alternative environments: urban and rural, male and female, more and less orthodox. In addition to several Hindu traditions, Sikh, Jain, Buddhist, and Muslim traditions may also be treated. Readings will include ethnologies and perhaps a novel.

**[ASIAN 354(3354) Indian Buddhism (also ASIAN 654[6654], RELST 354/654[3354/6654]) @ # (HA)**

Fall. 4 credits. Next offered 2007–2008.  
D. Boucher.]

**ASIAN 355(3355) Japanese Religions (also RELST 355[3355]) @ (CA)**

Fall. 4 credits. J. M. Law.  
Addresses the complexity of religion in Japanese history through a focus on the dominant ideological system commonly referred to as Shinto. Focuses on methodological issues surrounding tradition formation, invention, continuity, change, and revision and explores the Shinto tradition as follows: (1) how a central corpus of values, tastes, practices, beliefs, and concerns were formulated and how this system interacts with other religious systems; (2) the academic sources contributing to this identity; (3) views of this religious system from those actively shaping its discourse; (4) views of this religious system from those peripheralized by its ideologies; (5) personal cultivation and aesthetic taste; and (6) the relationship between this religious system and imperialism, war, and historical revisionism.

**[ASIAN 359(3359) Japanese Buddhism: Texts in Context (also RELST 359[3359]) @ # (HA)**

Spring. 4 credits. Next offered 2007–2008.  
J. M. Law.]

**ASIAN 373(3373) 20th-Century Chinese Literature @ (LA)**

Fall. 4 credits. E. Gunn.  
A survey of the principal works in English translation, the course introduces fiction, drama, essays, and poetry of China beginning with the Republican era and continuing up to the present in the People's Republic and Taiwan, with attention to social and political issues and literary theory.

**ASIAN 374(3374) Chinese Narrative Literature @ # (LA)**

Spring. 4 credits. E. Gunn.  
Selected works in classical Chinese fiction are read in translation. Major novels, such as *The Dream of the Red Chamber* and *Water Margin*, are emphasized.

**ASIAN 379(3379) Southeast Asian Literature in Translation @ (LA)**

Fall. 4 credits. L. Paterson.  
An introduction to modern Southeast Asian literature in translation, concentrating on short stories and novels from the mainland. We will begin by briefly exploring some "traditional" literary precursors, before concentrating on literature from the second half of the twentieth century. Themes include: decolonization, modernization, and the urban-rural split.

**ASIAN 380(3380) Vietnamese Literature in Translation @ # (LA)**

Fall. 4 credits. L. Paterson.  
An introduction to Vietnamese literature in translation, concentrating on modern short stories and novels. After reading some traditional Vietnamese texts, we will examine some of the literary legacies of the Vietnam Wars, as well as themes such as the role of nationalism, changing gender roles, representations of the urban-rural divide and the effects of censorship.

**ASIAN 385(3385) History of Vietnam (also HIST 388/688[3880/6880]) @ # (HA)**

Fall. 4 credits. Meets concurrently with ASIAN 685. Graduate students may enroll and attend a seminar sec. K. Taylor.  
Survey of Vietnamese history and culture from earliest times to the present.

**ASIAN 386(3386) Southeast Asia through Film @ (CA)**

Spring. 4 credits. L. Paterson.  
In Western films, Southeast Asia has been portrayed as an exotic locale of romance, haunting landscapes, and "inscrutable" smiling natives. This class will explore how the countries of Southeast Asia have been portrayed in Western cinema, in juxtaposition with films produced in the countries themselves. No background in film studies or Southeast Asia is required.

**[ASIAN 387(3387) Literature and Film of South Asia (also COM L 386[3860], VISST 387[3870]) @ (CA)**

Fall. 4 credits. Next offered 2007–2008.  
A. Banerjee.]

**[ASIAN 388(3388) Theorizing Gender and Race in Asian Histories and Literatures (also ASIAN 688[6688], FGSS 658[6580]) @ (CA)**

Fall. 4 credits. Next offered 2007–2008.  
N. Sakai.]

**ASIAN 391(3391) East Asian Martial Arts and Society and Religion (also HIST 319[3190]) @ (HA)**

Fall. 4 credits. T. Hinrichs.  
For description, see HIST 319.

**ASIAN 392(3392) Divination Sciences in Antiquity @ # (HA)**

Fall. 4 credits. C. Minkowski.

**ASIAN 395(3395) Classical Indian Philosophical Systems @ # (KCM)**

Spring. 4 credits. Prerequisite: some background in philosophy or in classical culture. C. Minkowski.

**ASIAN 396(3396) Southeast Asian History from the 18th Century (also HIST 396[3960]) @ (HA)**

Spring. 4 credits. E. Tagliacozzo.

For description, see HIST 396.

**[ASIAN 397(3397) Premodern Southeast Asia (also HIST 395[3950]) @ # (HA)**

Fall. 4 credits. Next offered 2007–2008.

E. Tagliacozzo.]

**[ASIAN 409(4409) Archipelago: The Worlds of Indonesia (also HIST 410[4100]) @ (HA)**

Spring. 4 credits. Next offered 2007–2008.

E. Tagliacozzo.]

**ASIAN 410(4410) Chinese Film @ (LA)**

Spring. 4 credits. E. Gunn.

Additional film viewing hours TBA. The course surveys Chinese films from the 1920s to the present and various responses to them. Films from mainland China, Hong Kong, and Taiwan are included, together with critical studies employing a variety of different critical methods.

**ASIAN 411(4411) History of the Japanese Language (also LING 411[4411], JAPAN 410[4410]) @ # (HA)**

Fall. 4 credits. J. Whitman.

For description, see LING 411.

**ASIAN 412(4412) Linguistic Structure of Japanese (also LING 412[4412]) (KCM)**

Spring. 4 credits. J. Whitman.

For description, see LING 412.

**ASIAN 413(4413) Religion and Politics in Southeast Asia (also ANTHR 413[4413]) @ (CA)**

Spring. 4 credits. A. Willford.

For description, see ANTHR 413.

**[ASIAN 416(4416) Gender and Sexuality in Southeast Asian History (also HIST/FGSS 416[4160]) @ (CA)**

Spring. 4 credits. Next offered 2008–2009.

T. Loos.]

**[ASIAN 421(4421) Religious Reflections on the Human Body (also RELST 421[4421]) (KCM)**

Spring. 4 credits. Prerequisites: one religious studies course or permission of instructor. Next offered 2008–2009.

J. M. Law.]

**ASIAN 424(4424) Scars and Bars: Asian Trauma Memoirs @ (CA)**

Spring. 4 credits. L. Paterson.

From the Chinese Cultural Revolution to Khmer Rouge Cambodia, social upheaval in Asia has given rise to a genre of trauma memoir. In this course, we will discuss how periods of societal terror are represented and remembered within these personal narratives. Through reading such accounts in conjunction with secondary scholarship, students examine various issues of representation such as intended audience, construction of memory, and framing of individual experience.

**[ASIAN 425(4425) Theories of Civilization (also HIST 494[4940]) @ # (HA)**

Spring. 4 credits. Next offered 2007–2008.

K. Taylor.]

**[ASIAN 430(4430) Structure of Korean (also LING/KOREA 430[4430]) (KCM)**

Spring. 4 credits. Next offered 2008–2009.

J. Whitman.

For description, see LING 430.]

**ASIAN 436(4436) Topics in Indian Film @ (LA)**

Spring. 4 credits. No knowledge of an Indian language required. D. Gold.

Treats various aspects of Indian film, with focal topics to vary from year to year. These topics include religion in Indian film, Indian art films, and the golden age of Indian film. All topics are discussed in relation to the conventions of mainstream Bollywood cinema and their social and cultural significances. Attendance at weekly screenings is required.

**[ASIAN 438(4438) Monks, Texts, and Relics: Transnational Buddhism in Asia (also ASIAN 638[6638]) (CA)**

Fall. 4 credits. Prerequisites: one 300-

level or above course in ASIAN or RELST or permission of instructor. Next offered 2007–2008. A. Blackburn.]

**[ASIAN 439(4439) Japanese Politics (also GOVT 439[4439]) @ (SBA)**

Fall. 4 credits. Next offered 2007–2008.

R. Weiner.]

**[ASIAN 441(4441) Mahayana Buddhism (also RELST 441[4441]) @ # (CA)**

Spring. 4 credits. Next offered 2007–2008.

D. Boucher.]

**ASIAN 449(4449) History and Methods of the Academic Study of Religion (also RELST 449[4449]) @ (KCM)**

Spring. 4 credits. Prerequisite: one course satisfying religious studies major.

D. Boucher.

Provides advanced students in religious studies or the humanities familiarity with important methodological issues in the academic study of religion. Following a brief historical outline, major approaches to the academic study of religion currently used and discussed in religious studies are examined. Students read works from the following approaches to the study of religion: anthropology, philosophical hermeneutics, phenomenology, history of religions, the sociology of religion and critical ideological studies. In the final segment, the course focuses on recent developments in the field of religious studies.

**ASIAN 452(4452) Global Martial Arts Film and Literature (also S HUM 408, COM L 408[4080])**

Fall. 4 credits. Limited to 15 students.

P. Liu.

For description, see S HUM 408.

**ASIAN 454(4454) Animal Philosophy and Animation (also COM L 431[4310]) (CA)**

Spring. 4 credits. T. LaMarre.

**ASIAN 460(4460) Indian Meditation Texts (also RELST 460[4460]) @ # (KCM)**

Fall. 4 credits. No knowledge of Indian languages required. D. Gold.

Draws on approaches from literary criticism, anthropology, and religious studies to explore texts that record religious experience. Readings are drawn from classical meditation

manuals of Hinduism and Buddhism and later yogic and devotional texts.

**[ASIAN 462(4462) Religion, Colonialism, and Nationalism in South and Southeast Asia (also ASIAN 662[6662]) (CA)**

Spring. 4 credits. Prerequisites: one course in ASIAN, RELST, HIST, ANTHR at 300 level or above or permission of instructor. Next offered 2008–2009 A. Blackburn.]

**ASIAN 468(4468) Arendt, Morisaki, Weil (also ASIAN 668[6668], COM L 438[4380], COM L 624[6240])**

Fall. 4 credits. Limited to 20 students.

B. deBary.

Examines contributions to 20th-century philosophy of three women—Hannah Arendt, Morisaki Kazue, and Simone Weil. Writing from sites that spanned Paris, Berlin, New York, and Fukuoka, Japan, the three formulated ethical and political responses to twentieth century issues that were global in scope: the rise of fascism, the emergence of anti-colonial movements, communism, and the situation of stateless persons, refugees, and those abducted for forced labor. Seeks to expand our understanding of the range of twentieth century philosophical writings across linguistic, national, and gender boundaries. Students able to read Weil in French and Morisaki in Japanese are particularly welcome.

**ASIAN 469(4469) Medicine and Healing in China (also HIST 496[S&TS/B&SOC[4961]) @ # (HA)**

Fall. 4 credits. T. Hinrichs.

For description, see HIST 496.

**ASIAN 481(4481) Translation and Identities (also COM L 470[4700]) @ (KCM)**

Fall. 4 credits. N. Sakai.

Problems concerning translation are explored. Although there are many different models of translation, we tend to be confined to the very narrow conception of translation as a transnational transfer of significance between two national or ethnic languages. Will survey theories of translation with a special emphasis on relationships between trans-national translation and transnational transference. Translation establishes a division of two spheres and thereby marks the limit of what can be expressed in one medium. Broadly understood, translation can take place not only between two national languages but also at a variety of boundaries within a single society. Will investigate different economics of translation by which different social and cultural identities are constructed, emphasizing the disappearance of multi-lingualism in modern nation-state and mutation of translation economies which has given rise to new ways of imagining organicist unity of the society. Historical transformation of translation and accompanying genesis of linguistic and cultural identity will be examined in reference to historical materials

**[ASIAN 483(4483) Internationalism, Nationalism, and Modern Japanese Discursive Space @ (KCM)**

Spring. 3 credits. Next offered 2007–2008. N. Sakai.]

**ASIAN 487(4487) Vedanta Among the Shastras @ # (HA)**

Spring. 4 credits. Prerequisite: primarily for seniors/majors and graduate students; background in subject; permission of instructor. C. Minkowski.

**ASIAN 489(4489) Religion and Sustainability: Traditionalist Discourses in the Twenty-First Century (also RELST 489[4489])**

Fall. 4 credits. Prerequisite: permission of the instructor. J. M. Law.

The natural world and the relationship of human beings and animals to it and within it is a central component of cosmogonic myths and religious ideologies in most major religious traditions. In this course, we explore how mythological, textual, ritual and ideological understandings of the relationship between human beings and the natural world inform understandings of the contemporary environmental crisis and the responsibility of human beings to address it. We will focus on cases from Hindu, Buddhist, Jain, Jewish, Christian and Muslim discourses on the natural world. We explore a variety of models of formulating the human/natural relationship: dominion, stewardship, illusion, primary sacrality and alienation. We challenge the view that grounding environmental activism in religious discourse is an effective way for environmental work to proceed and look at concrete case studies of religious communities working for, or against, environmental sustainability. Readings from primary sources in translation in the major religious traditions, and secondary sources relating to case studies.

**[ASIAN 493(4493) Problems in Modern Chinese History (also HIST 493/693[4930/6930]) @ (HA)]**

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. S. Cochran.]

**ASIAN 496(4496) Tokugawa Literature and Thought @ # (HA)**

Spring. 4 credits. N. Sakai.

Introduction (in English translation) to literary, theatrical, and intellectual works of the Tokugawa period (1600-1868). Examines the characteristics of the literary and theatrical works of the Tokugawa Japan. Students read the philosophical and philological works on the classics by writers such as Ogyu Sorai and Motoori Norinaga to discuss the issues of literary modernity.

**[ASIAN 499(4499) Problems in Modern Chinese History (also HIST 499/694[4990/6940]) @ (HA)]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. Cochran.]

**[ASIAN 507(5507) The Occidental Tourist (also HIST 207/507[2070/5070], ASIAN 206[2206])]**

Fall. 4 credits. Next offered 2007-2008. T. Loos.]

**Asia—Graduate Seminars**

For complete descriptions of courses numbered 600 or above, consult the director of graduate studies.

**ASIAN 602(6602) Southeast Asia Seminar: Contemporary Thailand**

Spring. 4 credits. T. Chaloeontiarana.

**ASIAN 603(6603) Southeast Asia Field Seminar**

Fall. 4 credits. T. Chaloeontiarana.

**ASIAN 604(6604) Southeast Asia Topical Seminar**

Spring. 3-4 credits. T. Chaloeontiarana.

**ASIAN 610(6610) SLA and the Asian Languages (also LING 609[6609])**

Fall. 4 credits. Y. Shirai.

**ASIAN 612(6612) Japanese Bibliography and Methodology**

Fall. 1 credit. Requirement for honors students and M.A. candidates. Prerequisite: permission of instructor. F. Kotas.

**ASIAN 613(6613) Southeast Asian Bibliography and Methodology**

Fall. 1 credit. Requirement for honors students and M.A. candidates. Prerequisite: permission of instructor. Recommended: reading knowledge of at least one Southeast Asian language or other Asian language (especially Chinese or Japanese) and a major European language (especially French, Spanish, or Dutch). Staff.

Designed to instruct students in methods of identifying and locating resources for the study of Southeast Asia. Emphasis is on the practical aspects of using various types of bibliographical tools to identify both primary and secondary sources in Southeast Asian and Western languages. Electronic databases and online services as well as traditional printed resources are covered. Relevant arcana of library science is explained as necessary.

**ASIAN 615(6615) Histories of Tokugawa Japan (also HIST 615[6150])**

Fall. 4 credits. K. Hirano.

For description, see HIST 615.

**[ASIAN 618(6618) Gender and Sexuality in Southeast Asian History (also ASIAN 416[4416], HIST 416/616[4160/6160])]**

Spring. 4 credits. Prerequisite: graduate standing. Next offered 2008-2009. T. Loos.]

**ASIAN 619(6619) Graduate Seminar: Translation in Theory (also VISST 619[6619])**

Spring. 4 credits. B. de Bary.

The study of translation, often figured as invisible, brings hidden histories to light. Translation may be a practice of power, or its undoing; it may consolidate hegemonies, or decenter them. Translation is a prominent motif in philosophy and art. The course introduces theories of translation significant for post-modern, post-colonial, and visual studies.

**[ASIAN 626(6626) The 18th Century and the Emergence of Literary Modernity]**

Spring. 4 credits. Next offered 2007-2008. N. Sakai.]

**[ASIAN 634(6634) Buddhist Studies Seminar]**

Spring. 4 credits. Prepares graduate students studying Asian religions for A examination; other graduate students may enroll with permission of instructor. Next offered 2007-2008. A. Blackburn.]

**[ASIAN 638(6638) Monks, Texts, and Relics: Transnational Buddhism in Asia]**

Fall. 4 credits. Prerequisites: one 300-level or above course in ASIAN or RELST or permission of instructor. Next offered 2007-2008. A. Blackburn.]

**[ASIAN 650(6650) Seminar in Asian Religions (also RELST 650[6650])]**

Fall. 4 credits. Limited to 10 students. Prerequisite: graduate standing. Recommended: reading knowledge of modern Japanese. Next offered 2007-2008. J. M. Law.]

**[ASIAN 654(6654) Indian Buddhism (also ASIAN 354[3354], RELST 354/654[3354/6654])]**

Fall. 4 credits. Graduate students attend ASIAN 354 and arrange additional meetings with instructor. Next offered 2007-2008. D. Boucher.]

**[ASIAN 662(6662) Religion, Colonialism, and Nationalism in South and Southeast Asia]**

Fall. 4 credits. Prerequisites: one course in ASIAN, RELST, HIST, ANTHR at 300 level or above or permission of instructor. Next offered 2008-2009. A. Blackburn.]

**ASIAN 667(6667) Commerce Late Imperial China (also ASIAN 467[4467])**

Spring. 4 credits. B. Rusk.

Graduate seminar (open to undergraduates by permission of instructor) focusing on the relationship between commercialization and culture from Song to Qing (10th to 19th centuries). Was there a commercial revolution in premodern China (or more than one)? Was there capitalism? Can Chinese culture be said to help or hinder commerce, or to have been changed by it? Should art and literature be interpreted through the lens of economic relations? These questions have been raised by Western scholars since Hegel and Marx, but were of concern to Late Imperial observers as well. Through readings in English and in English translation, this seminar traces the development of such arguments in various genres and fields of study.

**ASIAN 668(6668) Arendt, Morisaki, Weil (also ASIAN 468[4468], COM L 438[4380], COM L 624[6240])**

Fall. 4 credits. B. deBary.

For description, see ASIAN 468.

**[ASIAN 671(6671) Paleoanthropology of South Asia (also BIOEE 671[6710], ANTHR 671[6371])]**

Fall. 3 credits. Limited to 15 students. Next offered 2008-2009. K. A. R. Kennedy.]

**[ASIAN 676(6676) Southeast Asia Reading Seminar: The Early Thai Novels]**

Fall. 4 credits. Next offered 2007-2008. T. Chaloeontiarana.]

**ASIAN 680(6680) Vietnamese Literature in Translation (also ASIAN 380 [3380])**

Fall. 4 credits. L. Paterson.

For description, see ASIAN 380.

**ASIAN 685(6685) History of Vietnam (also HIST 388/688[3880/6880] and ASIAN 385[3385])**

Fall. 4 credits. K. Taylor.

For description, see ASIAN 385.

**[ASIAN 688(6688) Theorizing Gender and Race in Asian Histories and Literature (also ASIAN 388[3388], FGSS 358/658[3580/6580])]**

Fall. 4 credits. Prerequisite: reading knowledge of Japanese. Next offered 2007-2008. N. Sakai.]

**[ASIAN 693(6693) Problems in Modern Chinese History (also HIST 493/693[4930/6930])]**

Fall. 4 credits. Next offered 2007-2008. S. Cochran.]

**[ASIAN 694(6694) Problems in Modern Chinese History (also HIST 499/694(4990/6940))]**

Spring. 4 credits. Next offered 2007–2008. S. Cochran.]

**ASIAN 696(6696) Modern Southeast Asia: Graduate Proseminar (also HIST 396/696(3960/6960))**

Spring. 4 credits. E. Tagliocozzo. For description, see HIST 396.

**[ASIAN 698(6698) Seminar in Japanese Thought (also HIST 698(6980))]**

Fall. 4 credits. Limited to 15 graduate students. Prerequisite: reading knowledge of Japanese. V. Koschmann.]

**ASIAN 701-702(7701-7702) Seminar in East Asian Literature**

701, fall; 702, spring. 1–4 credits. Staff.

**ASIAN 703-704(7703-7704) Directed Research**

703, fall or spring; 704, fall or spring. 1–4 credits. Staff.

**ASIAN 899(8899) Master's Thesis Research**

Fall, spring. 2–4 credits. Staff.

**ASIAN 999(9999) Doctoral Dissertation Research**

Fall, spring. 2–4 credits. Staff.

## Honors Courses

**ASIAN 401(4401) Asian Studies Honors Course**

Fall or spring. 4 credits. Prerequisite: senior standing; admission to honors program. Staff.

Supervised reading and research on the problem selected for honors work.

**ASIAN 402(4402) Asian Studies Honors: Senior Essay**

Fall or spring. 4 credits. Prerequisite: admission to honors program. Staff.

The student, under faculty direction, prepares an honors essay.

**ASIAN 403-404(4403-4404) Asian Studies Supervised Reading**

Fall, spring, or both. 1–4 credits. Prerequisite: permission of instructor; majors and other qualified students.

Intensive reading under the direction of a member of the staff.

## Bengali

**BENGL 121-122(1121-1122) Elementary Bengali**

121, fall; 122, spring. 4 credits each semester. Prerequisite: for BENGL 122, BENGL 121 or examination. S. Mukherjee.

Enables students to read and comprehend basic Bengali texts as well as speak and write in the language. The introduction of the Bengali script is complemented by detailed instruction in grammar.

**BENGL 201-202(2201-2202) Intermediate Reading and Conversation @**

201, fall; 202, spring. 4 credits each semester. *BENGL 201 satisfies Option 1.* Prerequisites: for BENGL 201, BENGL 122 or examination; for BENGL 202, BENGL 201 or examination. S. Mukherjee.

Building on skills mastered at the elementary level and continuing grammar instruction, this course is designed to advance students' oral competence and enhance comprehension

skills through reading and listening. Its aim is to enable students to interact productively when immersed in the environment and/or to carry out research in primary material in the language.

**BENGL 203-204(2203-2204) Intermediate Bengali Composition and Conversation**

203, fall; 204, spring. 2 credits each semester. Prerequisites: for BENGL 203, BENGL 122 or examination; for BENGL 204, BENGL 203 or examination. S. Mukherjee.

Complements the verbal skills developed in BENGL 201–202 by improving writing skills.

**BENGL 300(3000) Directed Studies**

Fall or spring. 1–4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. S. Mukherjee.

Taught on a specialized basis to address particular student needs.

**BENGL 303-304(3303-3304) Bengali Literature I, II @**

303, fall; 304, spring. 4 credits each semester. Prerequisites: BENGL 203–204 or equivalent. *BENGL 303 satisfies Option 1.* S. Mukherjee.

Designed in consultation with students to address their specific needs. Through reading literary texts organized around social and cultural theme-clusters, the course aims to refine the students' breadth of understanding and develop literary/critical skills.

## Burmese

**Note:** Contact S. Tun in 405 Morrill Hall before classes begin for placement or other testing and organizational information.

**BURM 103-104(1103-1104) Burmese Conversation Practice**

103, fall; 104, spring. 2 credits each semester. Prerequisites: for BURM 104, BURM 103 and 121. May not be taken alone; must be taken simultaneously with BURM 121–122. S. Tun.

Additional drills, practice, and extension of materials covered in BURM 121 and 122. These courses are designed to be attended simultaneously with BURM 121–122 respectively, allowing students to obtain qualification within a year.

**BURM 121-122(1121-1122) Elementary Burmese**

121, fall; 122, spring. 4 credits each semester. Prerequisites: for BURM 122, BURM 121. May be taken alone or simultaneously with BURM 103–104. S. Tun.

A thorough grounding is given in all language skills: listening, speaking, reading, and writing.

**BURM 123(1123) Continuing Burmese**

Fall. 4 credits. Prerequisite: BURM 122. S. Tun.

Continuing instruction in conversational and reading skills to prepare students for 200-level courses.

**BURM 201-202(2201-2202) Intermediate Burmese Reading @**

201, fall or spring; 202, fall or spring. 3 credits each semester. *BURM 201 satisfies Option 1.* Prerequisites: for BURM 201, BURM 123; for BURM 202, BURM 201. S. Tun.

Continuing instruction in Burmese, with emphasis on consolidating and extending

conversational skills, and on extending reading ability.

**BURM 300(3000) Directed Studies**

Fall or spring. 1–4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. S. Tun.

Taught on a specialized basis to address particular student needs.

**BURM 301-302(3301-3302) Advanced Burmese @**

301, fall or spring; 302, fall or spring. 3 credits each semester. Prerequisites: for BURM 301, BURM 202 or permission of instructor; for BURM 302, BURM 301.

*BURM 301 satisfies Option 1.* S. Tun.

Continuing instruction on conversational and literary skills, but with special emphasis on reading. Students encounter various genres and styles of written Burmese. Readings include articles on current events, and either several short stories or a novel. Focus is on developing reading skills, particularly on vocabulary development, consolidating and expanding grammar, and appreciating stylistic and cultural differences.

**BURM 303-304(3303-3304) Advanced Burmese II @**

303, fall or spring; 304, fall or spring. 3 credits each semester. Prerequisite: for BURM 303, BURM 202 or permission of instructor; for BURM 304, BURM 303.

*BURM 303 satisfies Option 1.* S. Tun.

For students who have good conversational ability in Burmese and some familiarity with Burmese culture, but who need to strengthen reading skills and further enrich their vocabulary. Students, in consultation with the instructor, are able to select reading materials. There is also an opportunity for those who need it, to strengthen listening skills, through the study of current films, TV, and radio programs in Burmese.

**BURM 401-402(4401-4402) Directed Individual Study**

401, fall; 402, spring. 2–4 credits, variable, each semester. Prerequisite: permission of instructor. S. Tun.

Designed to accommodate the needs of advanced or specialized students, and faculty interests. Topics of reading and discussion are selected on the basis of student need.

## Cambodian

See "Khmer."

## Chinese

**Note:** Testing for placement, except for those with near-native abilities (particularly those schooled in a Chinese setting up until the age of about 12), takes place in registration week, before classes begin. Time and place will be posted at <http://Lrc.cornell.edu/asian/> programs/placement and on the bulletin board outside 350 Rockefeller Hall. Students with some Chinese schooling who want to obtain 3 credits for their proficiency will be tested at the beginning of the second week of classes. Again, the time and place will be announced.



**CHIN 101-102(1101-1102) Elementary Standard Chinese (Mandarin)**

101, fall; 102, spring, 6 credits each semester. Limited to 10-12 students per sec. Prerequisite: for CHIN 102, CHIN 101 or permission of instructor. Students must enroll in lec and one sec. Because of limited sec size, students missing first two class meetings without university excuse are dropped so others may register. No students added after second week of classes. Letter grades assigned unless student receives exceptional permission from course coordinator for S-U. S. Divo and staff.

For beginners only, providing a thorough grounding in conversational and reading skills. Students with some facility in the spoken language (because Chinese is spoken at home) but who do not read characters should take 109-110. Students who read Chinese, but who speak "dialects," such as Cantonese or Amoy, should enroll in CHIN 215.

**CHIN 109-110(1109-1110) Beginning Reading and Writing (Standard Chinese)**

109, fall; 110, spring, 4 credits each semester. Prerequisite: permission of instructor. Students who complete CHIN 110 normally continue with CHIN 209 and 210. Because of high demand, students missing first two meetings without university excuse are dropped so others may register. Y. Lee Mehta.

Intended primarily for students who speak some Chinese (e.g., at home), but who have had little or no formal training. The focus is on characters, reading comprehension, basic composition, standard grammar, and reading aloud with standard Chinese (Mandarin) pronunciation.

**CHIN 111-112(1111-1112) Elementary Cantonese I and II**

111, fall; 112, spring, 4 credits each semester. Prerequisite: for CHIN 111, permission of instructor; for CHIN 112, CHIN 111 or equivalent. Students with Mandarin background should enroll in CHIN 112. H. Huang.

CHIN 111 is for beginners with no or very limited Chinese/Cantonese language background from heritage or previous formal training. CHIN 111/112 gives comprehensive training in oral/aural reading/writing in Cantonese spoken and used in Canton and Hong Kong. CHIN 111 focuses more on oral and aural skills training than on reading and writing Cantonese characters. CHIN 112 covers more training on reading and writing Cantonese characters than does CHIN 111. For more details, see <http://lrc.cornell.edu/asian/courses/ch/chin111>.

**CHIN 201-202(2201-2202) Intermediate Standard Chinese (Mandarin) @**

201, fall or summer; 202, spring or summer, 4 credits each semester. *CHIN 201 satisfies Option 1.* Prerequisites: for CHIN 201, CHIN 102 with grade of C+ or above or equivalent; for CHIN 202, CHIN 201 or equivalent. Q. Teng and staff.

Continuing instruction in written and spoken Chinese with particular emphasis on consolidating basic conversational skills and improving reading confidence and ability.

**CHIN 209-210(2209-2210) Intermediate Reading and Writing @**

209, fall; 210, spring, 4 credits each semester. *CHIN 209 satisfies Option 1.* Prerequisites: for CHIN 209, CHIN 110 or equivalent; CHIN 210, CHIN 209. After completing 210, students may take only 400-level courses in Chinese. Staff.

Continuing focus on reading and writing for students with spoken background in standard Chinese; introduction of personal letter writing and other types of composition.

**CHIN 211-212(2211-2212) Intermediate Cantonese I and II @**

211, fall; 212, spring, 4 credits each semester. *CHIN 211 satisfies Option 1.* Prerequisites: for 211, permission of instructor and completion of CHIN 112 or elementary conversational skills in Cantonese from heritage but very limited formal training in Cantonese character reading and writing. For 212, CHIN 211 or equivalent. H. Huang.

Gives comprehensive training in oral and written Cantonese at a higher level than CHIN 111-112. Oral training covers conversational Cantonese expression on daily life topics. Written training includes reading aloud and writing Cantonese characters as well as simple composition writing skills in Chinese characters. For more details, see <http://lrc.cornell.edu/asian/courses/ch/chin211>.

**CHIN 213-214(2213-2214) High Intermediate Cantonese I and II @**

213, fall; 214, spring, 4 credits each semester. *CHIN 213 satisfies Option 1.* Prerequisite: for 213, basic oral/aural skill in Cantonese and intention to continue the learning of Cantonese reading and writing, or completion of CHIN 212; Prerequisite for 214: 213 or equivalent. H. Huang.

CHIN 213: A course primarily for students who have acquired basic oral/aural skill in Cantonese and have the interest to start or continue learning Cantonese reading and writing. Focuses more on basic training in sentences, paragraphs or short essays, and writing in Cantonese; CHIN 214: A course primarily for students who have the interest to raise their written Cantonese to a higher level. Enlarges the range of training in Cantonese reading and writing to essay and research writing.

**CHIN 215(2215) Mandarin for Cantonese Speakers @**

Fall, 4 credits. *Satisfies Option 1.* Limited to 15 students. Prerequisite: advanced Cantonese with native-like reading and writing ability. Staff.

Works on standard Chinese pronunciation and differences in vocabulary and grammar between Cantonese and Mandarin.

**CHIN 300(3000) Directed Studies**

Fall or spring, 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

**CHIN 301-302(3301-3302) High Intermediate Chinese @**

301, fall; 302, spring, 4 credits each semester. *CHIN 301 satisfies Option 1.* Prerequisites: for CHIN 301, CHIN 202 or equivalent; for CHIN 302, CHIN 301. Y. Lee-Mehta.

Continuing instruction in spoken Chinese and in various genres and styles of written Chinese.

**CHIN 304(3304) Advanced Mandarin Conversation**

Spring, 1 credit. Limited to 10 students. Prerequisite: CHIN 202, 215, 301, or permission of instructor. Staff.

Offers a wonderful speaking and listening opportunity to students who wish to maintain/increase their language proficiency by engaging in guided discussions of various topics.

**CHIN 309/310 (3309/3310) Business Chinese in Cultural Context (also CHIN 509/510)**

Fall, spring, 4 credits each semester.

*CHIN 309 satisfies Option 1.* Prerequisite: permission of instructor only. Z. Chen.

A two-semester sequence for those who have studied Mandarin to the advanced level (or equivalent). Aims to enhance students' language skills in the business context and to promote understanding of the macro and micro business environment and culture in China. An emphasis on case study is adopted along with task-based language teaching. Based on 10 real cases from real companies. Six are multinational companies that have successfully operated in China by adapting their strategies to the special needs of the Chinese market; four are Chinese companies that have pursued a larger presence in domestic and global markets. Goals are to equip students with language skills, cultural awareness, and software literacy necessary to do business in China. Class will be conducted in Chinese.

**CHIN 411-412(4411-4412) Advanced Chinese: Fiction, Reportage, Current Events @**

411, fall; 412, spring, 4 credits each semester. Prerequisites: for CHIN 411, CHIN 302 or equivalent; for CHIN 412, CHIN 411 and permission of instructor. Q. Teng.

Reading, discussion, and composition at advanced levels.

**CHIN 425(4425) Special Topics: Historical Documents on Modern China (also HIST 465/665, CHIN 625)@**

Fall, 4 credits. Prerequisite: permission of instructor. Z. Chen.

**CHIN 509/510(5509/5510) Business Chinese in Cultural Context**

Fall, spring, 4 credits each semester. Z. Chen.

For description, see CHIN 309/310.

**CHIN 625(6625) Special Topics: Historical Documents on Modern China (also CHIN 425, HIST 465/665)**

Fall, 4 credits. Prerequisite: permission of instructor. Z. Chen.

For description, see CHIN 425.

**Chinese FALCON (Full-year Asian Language CONcentration)**

For full information, brochures, etc., see the FALCON Program coordinator in 388 Rockefeller Hall or e-mail: [falcon@cornell.edu](mailto:falcon@cornell.edu) or <http://lrc.cornell.edu/falcon>

FALCON is designed to help students develop "copability" in Chinese by bringing them to the level where they can make progress on their own even with no further instruction.

The full-year program provides over 1,800 hours of language exposure—which exceeds even the exposure that students living in China typically receive. This allows students to develop levels of fluency, accuracy, and control that are not achieved in other academic settings. By taking the entire full-year sequence, students can complete as much Chinese in one calendar year as they would complete in three or more years of regular study at most academic institutions. The full-year sequence is Chinese 160 (summer), 161 (fall), and 162 (spring). Students typically take the entire sequence, but they may take any other portion of the program if they have the necessary background as determined by a placement interview. Students often choose to apply only to the summer portion. The spring semester of the Chinese program is expected to be offered in Beijing at Tsinghua University. In the summer and fall, three small interactive classes per day are conducted entirely in Chinese, and one lecture is conducted in both Chinese in English. In the spring semester, all four classes are conducted entirely in Chinese. In the summer and fall, students are also required to spend two one-hour sessions per day in the language lab. Additional preparation time in the language lab of up to three hours is necessary in the evenings.

Students must formally apply to the program. To guarantee course availability, applications must be received by March 1. After that, applicants are reviewed on a rolling basis and acceptance is contingent on the availability of spaces. Applications are available in 388 Rockefeller Hall or at <http://lrc.cornell.edu/falcon>.

#### **CHIN 160(160) Introductory Intensive Mandarin**

Summer only. 8 credits. Students who complete this course with grade of at least B are normally eligible to enroll in CHIN 201. S. Divo and staff.

Introduction to spoken and written Mandarin. Lectures on linguistic and cultural matters, intensive practice with native speakers, and laboratory work.

#### **CHIN 161-162(161-162) Intensive Mandarin @**

161, fall; 162, spring. 16 credits each semester. *CHIN 161 satisfies Option 1.* Prerequisites: for CHIN 161, CHIN 160 or equivalent or permission of instructor; for CHIN 162, CHIN 161 or placement by FALCON staff before beginning of spring semester. Students must apply formally to program; open to all Cornell students and students from other institutions. S. Divo and staff.

Work on spoken and written Chinese from an intermediate to an advanced level. This is a full-time program and full academic load; the demands of the program do not normally permit students to take other courses simultaneously. With a sequence of 160, 161, and 162, in only one calendar year a student can complete as much Chinese as would be gained in three or more years of regular study at most academic institutions. This course sequence also serves to fulfill the language requirement for the M.A. in Asian Studies and the joint M.B.A./M.A. in Asian Studies. CHIN 162 is scheduled to be held in Beijing, People's Republic of China. For more information and application forms, please contact the FALCON Program office.

### **Literature in Chinese**

#### **CHLIT 213-214(2213-2214) Introduction to Classical Chinese @ # (LA)**

213, fall; 214, spring. 3 credits each semester. *CHLIT 213-214 does NOT satisfy Option 1.* Prerequisite: for 213, qualification in Chinese or permission of instructor; for 214, 213 or permission of instructor. May be taken concurrently with CHIN 101-102, 201-202, 301-302. Open to students who have studied at least two years of any language that employs Chinese writing system (e.g., Mandarin, Cantonese, Japanese). Staff.

Two-part introductory course. Students learn the fundamental grammar and vocabulary of classical Chinese by analyzing and translating short passages.

#### **CHLIT 300(3300) Reading from the Early Masters @ # (HA)**

Fall. 4 credits. Prerequisites: CHLIT 213-214 or permission of instructor. R. McNeal. Students read and discuss several passages from early classical texts, including the Confucian Analects, the Mozi, the Guanzi, and others. Attention is paid to grammar, historical context, and methodology.

#### **CHLIT 307(3307) Readings in Classical Chinese Literature @ # (LA)**

Spring. 4 credits. Prerequisite: CHLIT 214 or permission of instructor. D. X. Warner and B. Rusk.

This course surveys selected texts—primarily in prose—from the ancient and medieval periods. Through close reading, students expand their knowledge of the diction, syntax, and various genres, themes, and literary styles that were foundational for the later Chinese literary tradition.

#### **ASIAN 352(3352) Technologies of Knowledge**

Fall. 3 credits. B. Rusk. Undergraduate seminar on the role of information technologies in the history of culture and society, using Chinese and Western examples as points of comparison and the writing, print and electronic communications as tests of hypotheses about the significance of technology in cultural history. Readings, all in English, from anthropology, archeology, history, sociology, linguistics and law.

#### **CHLIT 420(4420) Tang Poetry: Themes and Contexts (also CHLIT 620[6620]) @ # (LA)**

Fall. 4 credits. Prerequisite: minimum three years of Chinese and/or one year of Classical Chinese or permission of instructor. D. X. Warner. A guided reading in Chinese of selected works on shared themes written by selected poets of the Tang dynasty (618-907). Focuses on developing the essential skills for reading Tang poems while giving attention to their social, cultural, and historical contexts.

#### **CHLIT 421-422(4421-4422) Directed Study**

Fall or spring. 2-4 credits each semester. Prerequisite: permission of instructor. Staff. Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop course content.

#### **CHLIT 423(4423) Readings in Chinese History @**

Spring. 4 credits. *Satisfies Option 1.* Staff.

#### **[CHLIT 435(4435) Chinese Buddhist Texts @ # (LA)]**

Fall. 4 credits. Prerequisite: one year of classical Chinese or permission of instructor. Open to students in any area of East Asia with an interest in developing skills in Buddhist texts. Next offered 2007-2008. D. Boucher.]

#### **[CHLIT 497(4497) Disjuncture: Text and Exegesis @ # (LA)]**

Spring. 4 credits. Prerequisite: permission of instructor; completion of equivalent of CHLIT 214 and any CHLIT course at 300 level. Next offered 2007-2008. R. McNeal.]

#### **[CHLIT 603(6603) Seminar in Chinese Fiction and Drama]**

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. E. Gunn.]

#### **[CHLIT 605(6605) Seminar in Chinese Fiction and Drama]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. Staff.]

#### **[CHLIT 610(6610) Chinese Cultural Criticism]**

Spring. 4 credits. Not offered Next offered 2007-2008. E. Gunn.]

#### **CHLIT 615(6615) Seminar: Ideas and Literature of Medieval China**

Spring. 4 credits. D. X. Warner. Offers study of the language and genres of Medieval Chinese literature in the context of Medieval Chinese intellectual history. Students read from a range of primary works—including poetry, prose, literature treatises, philosophical essays, and historical writings—from the Later Han to the Sui and early Tang, in addition to a selection of modern scholarly essays in the field. Topic varies from year to year. The primary aim is to re-examine the interrelationship between the history of ideas and the formation of a medieval poetics during the period of Chinese literary history.

#### **[CHLIT 618(6618) Seminar on Ancient China]**

Fall. 4 credits. Also fulfills Humanities requirement. Prerequisite: CHLIT 213-214 or permission of instructor. Next offered 2007-2008. R. McNeal.]

#### **CHLIT 621-622(6621-6622) Advanced Directed Reading: Chinese Historical Syntax**

621, fall; 622, spring. 2-4 credits. Prerequisite: permission of instructor. Staff. Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

#### **[CHLIT 697(6697) Disjuncture: Text and Exegesis]**

Spring. 4 credits. Prerequisite: permission of instructor; completion of equivalent of CHLIT 214 and any CHLIT course at 300 level. Next offered 2007-2008. R. McNeal.]

## Hindi

### **HINDI 101-102(1101-1102) Elementary Hindi-Urdu (also NES 105-106[1310-1311])**

101, fall; 102, spring. 6 credits each semester. Prerequisite: for HINDI 102, HINDI 101 or equivalent. S. Singh and Staff.

For those students who have had very little or no exposure to Hindi-Urdu. Designed to enable such students to read, write, and converse in the language with confidence and enjoyment. Hindi and Urdu are sister languages and share an identical grammar and elementary vocabulary. The language presented is colloquial. The Hindi script is taught first and the Urdu script is taught as an additional course in the spring semester. Students who have some experience of Hindi-Urdu or a closely related language are suited for HINDI 109-110 and should check with the instructor.

### **HINDI 109-110(1109-1110) Accelerated Elementary Hindi-Urdu**

109, fall; 110, spring. 3 credits each semester. Prerequisite: for HINDI 110, HINDI 109 or equivalent. Completion of this sequence, including satisfactory performance on exam given at end of HINDI 110, constitutes level of performance equal to 101-102 sequence and is thus considered to fulfill qualification for language requirement plus eligibility for 200-level Hindi-Urdu courses. Check with instructor regarding placement. S. Singh and Staff.

Entry-level sequence for students with some prior exposure to Hindi-Urdu or a closely related language. Provides a thorough grounding in all the language skills: listening, speaking, reading, and writing.

### **HINDI 201-202(2201-2202) Intermediate Hindi Reading @**

201, fall; 202, spring. 3 credits each semester. *HINDI 201 satisfies Option 1.* Prerequisites: for HINDI 201, HINDI 102; for HINDI 202, HINDI 201 or permission of instructor. S. Singh and staff.

### **HINDI 203-204(2203-2204) Intermediate Composition and Conversation @**

203, fall; 204, spring. 3 credits each semester. *HINDI 203 satisfies Option 1.* Prerequisites: for HINDI 203, HINDI 102; for HINDI 204, HINDI 203 or permission of instructor. S. Singh and staff.

### **HINDI 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

### **HINDI 301-302(3301-3302) Advanced Readings in Hindi Literature @**

301, fall; 302, spring. 4 credits each semester. *HINDI 301 satisfies Option 1.* Prerequisites: for HINDI 301, HINDI 202; for HINDI 302, HINDI 301 or equivalent. S. Singh and staff.

Selected readings in modern Hindi literature.

## Indonesian

Students who have completed INDO 121-122-123 or its equivalent have the option of taking a one-semester program in Malang, East Java, during the junior year. The program combines

a variety of cultural and artistic options with area course work and advanced language study. Complete information is available through Cornell Abroad.

Students who have completed a minimum of 18 credits or the equivalent are eligible to apply for a summer program in the Advanced Indonesian Abroad Program. Further information is available from the Southeast Asia Program (180 Uris Hall, 255-2378).

### **INDO 121-122(1121-1122) Elementary Indonesian**

121, fall; 122, spring. 4 credits each semester. Prerequisite: for INDO 122, INDO 121. J. Pandin.

Gives a thorough grounding in basic speaking and listening skills with an introduction to reading.

### **INDO 123(1123) Continuing Indonesian**

Fall. 4 credits. Prerequisite: INDO 122 or equivalent. J. Pandin.

Improves speaking skills, such as fluency and pronunciation, focusing on verbal communication skills; offers a wide range of readings and sharpens listening skills.

### **INDO 203-204(2203-2204) Intermediate Composition and Conversation @**

203, fall; 204, spring. 3 credits each semester. *INDO 203 satisfies Option 1.* Prerequisites: for INDO 203, INDO 123; for INDO 204, INDO 203 or permission of instructor. J. Pandin.

### **INDO 205-206(2205-2206) Intermediate Indonesian @**

205, fall; 206, spring. 3 credits each semester. *INDO 205 satisfies Option 1.* Prerequisites: for INDO 205, INDO 123 or equivalent; for INDO 206, INDO 205 or equivalent. J. Pandin.

Develops all four skills: reading, writing, speaking, and comprehension.

### **INDO 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. J. Pandin.

### **INDO 305-306(3305-3306) Directed Individual Study**

305, fall; 306, spring. 2-4 credits. Prerequisites: INDO 301-302 and 303-304 or equivalent knowledge of Indonesian or Malay. J. Pandin.

Practical language course on an advanced level in which the students read materials in their own field of interest, write reports, and meet with the instructor for two hours a week for 2 credits and twice a week for 4 credits.

## Japanese

### **JAPAN 101-102(1101-1102) Elementary Japanese**

101, fall; 102, spring. 6 credits each semester. Prerequisite for 102: JAPAN 101 or placement by instructor during registration period. Intended for beginners or those who have been placed in the course by examination. Students must enroll in one lec and one sec. Undergraduates may not enroll for S-U grade option. Graduate students must enroll for a letter grade and may change to S-U by permission of instructor. R. Sukle, Y. Nakanishi, and staff.

Gives a thorough grounding in all four language skills—speaking, listening, reading, and writing—at the beginning level but with

a special emphasis on oral communication and use of the language in social contexts. Homework is largely work on the skill aspects through practice on the Internet, with CDs, or with tapes. The lecture provides explanation, analysis, and cultural background necessary for successful interaction with Japanese people. Sections are conducted entirely in Japanese. Materials covered are *not* the same as for JAPAN 141-142.

### **JAPAN 141-142(1141-1142) Beginning Japanese at a Moderate Pace**

141, fall; 142, spring. 4 credits each semester. Prerequisite: for JAPAN 142, JAPAN 141 or placement by instructor during registration. Y. Nakanishi and staff.

Beginning-level training in listening, speaking, reading, and writing, with more emphasis on written skills than JAPAN 101-102. Classroom activities focus on oral communication skills. Homework for the course is largely written exercises. Fewer credits and fewer class contact hours than JAPAN 101-102; the course meets five hours per week (M T W R F). Materials covered are *not* the same as for JAPAN 101-102.

### **JAPAN 201-202(2201-2202) Intermediate Japanese Conversation @**

201, fall and summer; 202, spring and summer. 4 credits each semester. *JAPAN 201 satisfies Option 1.* Prerequisites: for JAPAN 201, JAPAN 102 or placement by instructor during registration; for JAPAN 202, JAPAN 201 or placement by instructor during registration. Students must enroll in lec and one sec. Y. Katagiri.

For students with an elementary level of Japanese to continue study of the language and acquire widely applicable oral proficiency. Sections are conducted entirely in Japanese to develop listening comprehension and speaking ability through practical situational practices. Lectures give versatile knowledge of essential structural patterns systematically, with audiovisual aids (e.g., Japanese TV) to demonstrate use in actual situations.

### **JAPAN 203-204(2202-2204) Intermediate Japanese Reading I**

203, fall; 204, spring. 2 or 3 credits each semester. *3-credit version of JAPAN 203 satisfies Option 1@.* Prerequisites: for JAPAN 203, JAPAN 102 or 142, or placement by instructor during registration; for JAPAN 204, JAPAN 203 or 241, or placement by instructor during registration. Y. Kawasaki.

Reading of intermediate texts emphasizing practical materials, with development of writing skills.

### **JAPAN 241-242(2241-2242) Intermediate Japanese at a Moderate Pace @**

241, fall; 242, spring. 4 credits each semester. *JAPAN 241 satisfies Option 1.* Prerequisites: for JAPAN 241, JAPAN 142 or placement by instructor during registration period; for JAPAN 242, JAPAN 241 or placement by instructor. N. Larson.

Training in listening, speaking, reading, and writing for those students who have acquired a basic beginning-level command.

### **JAPAN 300(3000) Directed Studies**

Fall or spring. 1-4 credits variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

**JAPAN 301-302 Communicative Competence @**

301, fall; 302, spring. 3 credits each semester. *JAPAN 301 satisfies Option 1.* Prerequisites: for JAPAN 301, JAPAN 202 or 242 and placement by instructor during registration; for JAPAN 302, JAPAN 301 or placement by instructor during registration. Y. Kawasaki and staff.

For students who have learned basic Japanese grammar and oral skills and would like to use the language for natural conversation and effective oral communication. The course is intended to (1) expand vocabulary for daily life use; (2) brush up on knowledge of basic grammar for fluency; and (3) develop communicative skills for varied situations.

**JAPAN 303-304(3303-3304) Intermediate Japanese Reading II @**

303, fall; 304, spring. 4 credits each semester. *JAPAN 303 satisfies Option 1.* Prerequisites: for JAPAN 303, JAPAN 202 or placement by instructor during registration; for JAPAN 304, JAPAN 303 or placement by instructor during registration. K. Selden.

Reading of selected modern texts, including excerpts and brief complete pieces by outstanding writers of Japanese prose.

**JAPAN 401-402(4401-4402) Oral Narration and Public Speaking**

401, fall; 402, spring. 2 credits each semester. Prerequisites: for JAPAN 401, JAPAN 302 or placement by instructor during registration; for JAPAN 402, JAPAN 401 or placement by instructor during registration. Conducted entirely in Japanese, using Japanese audiovisual and written materials. Y. Katagiri.

Advanced course to develop skills in oral delivery in formal settings. Students increase vocabulary and patterns used in public occasions, e.g., class presentations, speeches, discussions, interviews and debates. Fluency and listening comprehension are emphasized. Also for those interested in academic settings, e.g., research students or conference participants.

**JAPAN 403-404(4403-4404) Advanced Japanese Reading @**

403, fall; 404, spring. 4 credits each semester. *Satisfies Option 1.* Prerequisite: JAPAN 304 or permission of instructor.

**Section I:** Area of humanities. May not be used for distribution. Reading of selected modern texts, including newspaper columns and writings by representative authors and critics. K. Selden.

**Section II:** Area of economics and social science. May not be used for distribution. Y. Kawasaki. Reading of selected modern texts with emphasis on expository style.

**JAPAN 410(4410) History of the Japanese Language (also LING/ASIAN 411[4411]) @ # (HA)**

Fall. 4 credits. Prerequisite: permission of instructor. J. Whitman.

For description, see LING 411.

**JAPAN 421-422(4421-4422) Directed Readings**

421, fall; 422, spring. 1-4 credits. Prerequisite: advanced students; placement by instructor during registration. Selected texts from modern and contemporary short stories. K. Selden.

**Japanese FALCON (Full-year Asian Language Concentration)**

Web site: <http://arc.cornell.edu/falcon>.

Director: R. Sukle, 388 Rockefeller Hall, 255-0734 or [rjs19@cornell.edu](mailto:rjs19@cornell.edu).

Program coordinator: 388 Rockefeller Hall, 255-6457 or [falcon@cornell.edu](mailto:falcon@cornell.edu).

FALCON is designed to develop "copability" in students by bringing them to the level where they can make further progress on their own even with no further instruction.

The full-year program provides over 1,800 hours of language exposure—which exceeds even the exposure that students living in Japan typically receive. This intensive work in Japanese allows students to develop levels of fluency, accuracy, and control of the language that is not achieved in any other type of academic setting. The full-year FALCON sequence is Japanese 160 (summer), 161 (fall), and 162 (spring). By taking this entire sequence, students can complete as much Japanese in one calendar year as they would complete in three or more years of regular study at most academic institutions. Because of FALCON's intensive nature, graduate students can complete their language work in minimal time. Undergraduates, including freshmen, achieve levels of competency that far exceed what is normally achieved in a four-year program, provided that they continue studying Japanese after FALCON. Three small interactive classes per day are conducted entirely in Japanese, and one lecture is conducted in both Japanese and English. The interactive classes are conducted by experienced and highly trained teachers, and the lecture is taught by an expert in the structure of the Japanese language. In addition to time spent in these classes, students also are required to spend two one-hour sessions per day in the language lab. Additional preparation time in the language lab of up to three hours is necessary in the evenings.

**JAPAN 160(1160) Introductory Intensive Japanese (FALCON)**

Summer only. 8 credits. R. Sukle and staff. Formal application to FALCON is required. Admission is open to all students, not just those planning to take the full year. Students from other institutions are also welcome to apply. Applications must be received by March 1. After the deadline, applications are considered provided that space is available. This is the first semester of FALCON. It is a full-time, intensive, nine-week course that meets Monday through Friday from 8:30 A.M. to 4:30 P.M.; 160 starts at the absolute beginning level, in terms of speaking, listening, and rudimentary reading and writing. Students who complete this course and plan to continue at Cornell may take the fall and spring FALCON courses (JAPAN 161 and 162). Students interested in other options for continuing after FALCON should consult the FALCON director, Robert Sukle, at [rjs19@cornell.edu](mailto:rjs19@cornell.edu) or 255-0734.

**JAPAN 161-162(1161-1162) Intensive Japanese (FALCON) @**

161, fall; 162, spring. 16 credits each semester. *JAPAN 161 satisfies Option 1.* Prerequisites for 161: JAPAN 160, JAPAN 102 at Cornell, or placement by FALCON staff before beginning of fall semester; for 162, JAPAN 161 or placement by FALCON staff before beginning of spring semester. R. Sukle and staff.

Formal application to FALCON is required. Admission is open to all students, including those from other institutions. Applications must be received by March 1. After the deadline, applications are considered provided that space is available. Work on spoken and written Japanese from an intermediate level to an advanced level. This is a full-time program and a full academic load. The schedule is Monday through Friday, approximately 9:00 A.M. to 4:30 P.M. The demands of the program do not permit students to take other courses simultaneously. The 160-161-162 sequence fulfills the language requirement for the M.A. in Asian Studies and the joint M.B.A./M.A. in Asian Studies.

**Literature in Japanese****JPLIT 406(4406) Introduction to Classical Japanese @ #**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisite: permission of instructor. K. Selden.

Introduction to the fundamental grammar and vocabulary of classical Japanese.

**JPLIT 408(4408) Readings in Classical Japanese @ #**

Spring. 4 credits. *Satisfies Option 1.*

Intended for students who have completed JAPAN 403/404 sequence or equivalent.

Prerequisite: JPLIT 406 or permission of instructor. K. Selden.

Readings of excerpts and complete brief pieces from representative premodern Japanese literature mostly with the use of standard modern annotated editions. Different selections and themes are introduced each year.

**JPLIT 421-422(4421-4422) Directed Readings**

421, fall; 422, spring. 2-4 credits.

Prerequisite: for JPLIT 421, JAPAN 404 or equivalent; for JPLIT 422, JAPAN 421 or equivalent. Staff.

Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

**[JPLIT 456(4456) Heian Narrative @ (LA)]**

Fall. 4 credits. Recommended: some knowledge of classical Japanese. Next offered 2007-2008. T. LaMarre.]

**JPLIT 617(6617) Modern Japanese Philosophy**

Fall. 4 credits. N. Sakai.

Seminar on modern Japanese philosophy. Students are expected to read texts in Japanese and discuss epistemic, historical, and practical issues involved in them. Supplementary reading of European and U.S. philosophical texts is also required.

**JPLIT 618(6618) Japanese Philosophical Discourse II**

Spring. 4 credits. Prerequisite: reading knowledge of Japanese. N. Sakai.

This seminar is designed to offer students an opportunity to read, analyze, and evaluate the philosophical discourse of modern Japan in conjunction with contemporary European and American developments. The main concern of this course is in fact the operation of "comparison." At the seminar which will be organized neither as a search for the national (or oriental) character of Japanese philosophy nor as a project of explaining philosophical arguments in terms of the traits of the



national culture, but rather as an attempt to comprehend how philosophy participates in the construction and transformation of given social formations, we will read excerpts from philosophical works in Japanese and English. In order to enroll in this course, students are required to have a reading knowledge of Japanese.

**JPLIT 624(6624) Advanced Readings in Modern Japanese Literature**

Fall. 4 credits. Prerequisite: permission of instructor. T. LaMarre.

**JPLIT 625(6625) Directed Readings**

Fall or spring. 4 credits. Staff. Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

**Khmer (Cambodian)**

**KHMER 121-122-123(1121-1122-1123) Elementary Khmer**

121, fall; 122, spring; 123, fall. 4 credits each semester. Prerequisite: for KHMER 122, KHMER 121; for KHMER 123, 122; for beginners or those placed in course by examination. H. Phan.

Gives a thorough grounding in speaking and reading.

**KHMER 201-202(2201-2202)**

**Intermediate Khmer Reading @**

201, fall; 202, spring. 3 credits each semester. *KHMER 201 satisfies Option 1.* Prerequisites: for KHMER 201, KHMER 102; for KHMER 202, 201. H. Phan. Continuing instruction in spoken and written Khmer.

**[KHMER 203-204(2203-2204)]**

**Intermediate Composition and Conversation @**

203, fall; 204, spring. 3 credits each semester. *KHMER 203 satisfies Option 1.* Prerequisites: for KHMER 203, KHMER 102; for KHMER 204, 203. H. Phan.

**KHMER 300(3000) Directed Studies**

Fall or spring. 1-4 credits variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff. Taught on a specialized basis to address particular student needs.

**KHMER 301-302(3301-3302) Advanced Khmer @**

301, 302, fall. 4 credits each semester. *KHMER 301 satisfies Option 1.* Prerequisites: for KHMER 301, KHMER 202 or equivalent; for KHMER 302, 301. H. Phan.

Continuing instruction in spoken and written Khmer; emphasis on enlarging vocabulary, increasing reading speed, and reading various genres and styles of prose.

**KHMER 401-402(4401-4402) Directed Individual Study**

401, fall; 402, spring. 2-4 credits each semester. Prerequisite: advanced students; permission of instructor. H. Phan.

**Korean**

**KOREA 101-102(1101-1102) Elementary Korean**

101, fall; 102, spring. 6 credits each semester. H. Diffloth and staff. Covers basics of speaking, reading, and writing. Introduces Hangul writing system and grammar.

**KOREA 109-110(1109-1110) Elementary Reading**

109, fall; 110, spring. 3 credits each semester. Prerequisite: permission of instructor. H. Diffloth and staff. For students who have spoken some Korean in the home, but whose reading and writing skills are limited or nonexistent. If in doubt about eligibility, see instructor.

**KOREA 201-202(2201-2202) Intermediate Korean @**

201, fall; 202, spring. 4 credits each semester. *KOREA 201 satisfies Option 1.* Prerequisites: for KOREA 201, KOREA 102 or permission of instructor; for KOREA 202, 201. H. Diffloth and staff. Covers the basics of speaking, reading, and writing at the intermediate level.

**KOREA 209-210(2209-2210) Intermediate Reading @**

209, fall; 210, spring. 4 credits each semester. *KOREA 209 satisfies Option 1.* Prerequisites: for KOREA 209, KOREA 110 or permission of instructor; for KOREA 210, 209 or permission of instructor. If in doubt about eligibility, see instructor. M. Song.

Intermediate level of reading comprehension and writing course for students who have acquired basic oral proficiency. Introduces some reading and writing with Chinese characters.

**KOREA 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. H. Diffloth. Taught on a specialized basis to address particular student needs.

**KOREA 301-302(3301-3302) Advanced Korean @**

301, fall; 302, spring. 4 credits each semester. *KOREA 301 satisfies Option 1.* Prerequisites: for KOREA 301, KOREA 202 or placement by instructor; for KOREA 302, 301 or placement by instructor. H. Diffloth and staff.

Reading of advanced texts, including newspapers and Chinese character material, together with advanced use of the spoken language.

**[KOREA 430(4430) Structure of Korean (also LING/ASIAN 430(4430)) (KCM)]**

Spring. 4 credits. Next offered 2008-2009. J. Whitman. For description, see LING 430.]

**Literature in Korean**

**KRLIT 405(4405) Readings in Korean Literature @ (LA)**

Fall. 4 credits. Prerequisite: three years of Korean language study or permission of instructor. Staff. Readings of 20th-century Korean literature in the original. Short stories and novels are selected to provide a mixture of canonical and contemporary authors. Students also read some academic works of literary history and criticism.

**KRLIT 432(4432) Middle Korean (also LING 432(4432)) @ # (LA)**

Spring. 4 credits. Prerequisite: KOREA 301 or equivalent. J. Whitman. For description, see LING 432.

**[KRLIT 615(6615) Development of Literary Modernity in Korea]**

Fall. 4 credits. Prerequisite: graduate standing; fluency in Korean. Next offered 2008-2009.]

**[KRLIT 617(6617) Colonial Modernity in Korea]**

Spring. 4 credits. Prerequisites: fluency in Korean and permission of instructor. Next offered 2007-2008. M. Shin.]

**Nepali**

**The Cornell Nepal Study Program**

Cornell and the central campus of Tribhuvan National University (in Kirtipur, Kathmandu) cosponsor a semester or year in Nepal at the Cornell Nepal Study Program for both undergraduate and graduate students. North American students live and study with Nepali students at the Cornell program houses near the university, taking courses taught in English by faculty from Tribhuvan University. After an intensive orientation, semester courses include intensive spoken and written Nepali language, Contemporary Issues in Nepal, and Research Design and Methods in a wide variety of fields in the social and natural sciences and the humanities. (Language instruction in Tibetan and Newari may also be arranged.) There is a 10-day study tour and field trip during the semester, and students execute their research proposal during four weeks of guided field research, writing up their findings for presentation at the end of the semester.

Juniors, seniors, and graduate students from any field may apply. Students should have a desire to participate in a program featuring relatively intense cultural immersion and to undertake rigorous field research. Instruction is in English, but prior study of Nepali language is strongly recommended for Cornell students. Those interested in the program should consult Cornell Abroad (cuabroad@cornell.edu).

**NEPAL 101-102(1101-1102) Elementary Nepali**

101, fall; 102, spring; 101-102, summer. 6 credits each semester. Prerequisite: for NEPAL 102, NEPAL 101 or examination. S. Oja.

Intended for beginners. The emphasis is on basic grammar, speaking, and comprehension skills, using culturally appropriate materials and texts. Devanagari script for reading and writing is also introduced.

**NEPAL 201-202(2201-2202) Intermediate Nepali Conversation @**

201, fall; 202, spring; 201-202, summer. 3 credits each semester. *NEPAL 201 satisfies Option 1.* Prerequisites: for NEPAL 201, NEPAL 102 or examination; for NEPAL 202, 201 or examination. S. Oja.

Intermediate instruction in spoken grammar and verbal comprehension skills, with special attention to developing technical vocabularies and other verbal skills appropriate to students' professional fields.



**NEPAL 203-204(2203-2204) Intermediate Nepali Composition @**

203, fall; 204, spring; 203-204, summer. 3 credits each semester. *NEPAL 203 satisfies Option 1.* Prerequisites: for NEPAL 203, NEPAL 102 or examination; for NEPAL 204, 203 or examination. S. Oja.

Systematic review of written grammar and reading comprehension, with special attention to the technical vocabularies, necessary writing skills, and published materials typical of advanced students' professional fields.

**NEPAL 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. S. Oja.

Taught on a specialized basis to address particular student needs.

**NEPAL 301-302(3301-3302) Advanced Nepali @**

301, fall; 302, spring; 301-302, summer. 3 credits each semester. *NEPAL 301 satisfies Option 1.* Prerequisite: NEPAL 204 or permission of instructor. S. Oja.

Reading of advanced texts, together with advanced drill on the spoken language.

**Pali****[PALI 131-132(1131-1132) Elementary Pali**

131, fall; 132, spring. 3 credits each semester. This language series may not be used to satisfy language requirement. Next offered 2007-2008. Staff.]

**[PALI 151(1151) Accelerated Elementary Pali**

Spring. 3 credits. Prerequisite: background in Sanskrit or permission of instructor. Next offered 2007-2008. A. Blackburn.]

**PALI 300(3000) Directed Studies**

Spring. 1-4 credits, variable. Prerequisite: PALI 132, 151, or two years of Sanskrit. Times TBA with instructor. D. Boucher.

Taught on a specialized basis to prepare students for research and teaching.

**Sanskrit****[SANSK 131-132(1131-1132) Elementary Sanskrit (also CLASS 191-192[1331-1332], LING 131-132[1131-1132])**

131, fall; 132, spring. 4 credits each semester. Offered alternate years; next offered 2007-2008. Staff.]

**SANSK 251-252(2251-2252) Intermediate Sanskrit (also CLASS 291-292[2351-2352], LING 251-252[2251-2252]) @ #**

251, fall; 252, spring. 3 credits each semester. *SANSK 251 satisfies Option 1.* Prerequisite: SANSK 132 or equivalent. Offered alternate years. Staff.

**SANSK 323(3323) Buddhist Hybrid Sanskrit**

Fall. 4 credits. D. Boucher.

An introduction to Buddhist Hybrid Sanskrit, the idiom of a number of (particularly Mahayana) Buddhist texts composed from roughly second century BCE through (and possibly beyond) the fourth century CE. The aim will be to familiarize students with Middle Indo-Aryan phonology and its appearance in disguised form in BHS texts. Students will also be introduced to reading Buddhist texts in manuscripts, especially with texts which have been preserved in independent recensions,

so as to explore the problems of redactional criticism.

**Literature in Sanskrit****SNLIT 467-468(4467-4468) Reading in Sanskrit Literature: The Vedas @ #**

Spring. 3 credits. Prerequisite: permission of instructor. C. Minkowski.

**Sinhala (Sinhalese)****SINHA 101-102(1101-1102) Elementary Sinhala**

101, fall; 102, spring. 6 credits each semester. Prerequisite: for SINHA 102, SINHA 101 or equivalent. W. Liyanage.

Semi-intensive course for beginners. A thorough grounding is given in all the language skills; listening, speaking, reading, and writing.

**SINHA 201-202(2201-2202) Intermediate Sinhala Reading @**

201, fall; 202, spring. 3 credits each semester. *SINHA 201 satisfies Option 1.* Prerequisites: for SINHA 201, SINHA 102; for SINHA 202, 201 or equivalent. W. Liyanage.

**[SINHA 203-204(2203-2204) Intermediate Composition and Conversation @**

203, fall; 204, spring. 3 credits each semester. *SINHA 203 satisfies Option 1.* Prerequisites: for SINHA 203, SINHA 102 or permission of instructor; for SINHA 204, 203 or equivalent. W. Liyanage.

**SINHA 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

**Tagalog****TAG 121-122(1121-1122) Elementary Tagalog**

121, fall; 122, spring. 4 credits each semester. Prerequisite: for TAG 122, TAG 121. T. Savella.

Gives a thorough grounding in basic speaking and listening skills with an introduction to reading.

**TAG 123(1123) Continuing Tagalog**

Fall. 4 credits. Prerequisite: TAG 122 or equivalent. T. Savella.

Improves speaking skills, such as fluency and pronunciation, focusing on verbal communication skills; offers a wide range of readings; and sharpens listening skills.

**TAG 205-206(2205-2206) Intermediate Tagalog @**

205, fall; 206, spring. 3 credits each semester. *TAG 205 satisfies Option 1.* Prerequisites: for TAG 205, TAG 123 or equivalent; for TAG 206, 205 or equivalent. T. Savella.

Develops all four skills: reading, writing, speaking, and comprehension.

**TAG 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. T. Savella.

Taught on a specialized basis to address particular student needs.

**TAG 301-302(3301-3302) Advanced Tagalog @**

301, fall; 302, spring. 3 credits each semester. *TAG 301 satisfies Option 1.* Prerequisite: TAG 206 or equivalent. T. Savella.

Continuing instruction on conversational skills but with emphasis on reading and writing. Selected core readings in contemporary Tagalog literature are used, but students, in consultation with the instructor, may select some of the reading materials.

**Thai****THAI 101-102(1101-1102) Elementary Thai**

101, fall; 102, spring. 6 credits each semester. Prerequisite: for THAI 102, THAI 101 or equivalent. Intended for beginners or students placed by examination. N. Jagacinski.

Gives a thorough grounding in all the language skills: listening, speaking, reading, and writing.

**THAI 201-202(2201-2202) Intermediate Thai Reading @**

201, fall; 202, spring. 3 credits each semester. *THAI 201 satisfies Option 1.* Prerequisites: for THAI 201, THAI 102; for THAI 202, 201 or equivalent. N. Jagacinski.

Continuing instruction in spoken and written Thai.

**THAI 203-204(2203-2204) Intermediate Composition and Conversation @**

203, fall; 204, spring. 3 credits each semester. *THAI 203 satisfies Option 1.* Prerequisites: for THAI 203, THAI 102; for THAI 204, 203. N. Jagacinski.

Intermediate instruction in spoken and written grammar and reading comprehension.

**THAI 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. N. Jagacinski.

Taught on a specialized basis to address particular student needs.

**THAI 301-302(3301-3302) Advanced Thai @**

301, fall; 302, spring. 4 credits each semester. *THAI 301 satisfies Option 1.* Prerequisite: THAI 202 or equivalent. N. Jagacinski.

Selected readings in Thai writings in various fields.

**THAI 303-304(3303-3304) Thai Literature @**

303, fall; 304, spring. 4 credits each semester. *THAI 303 satisfies Option 1.* Prerequisite: THAI 302 or equivalent. N. Jagacinski.

Reading of significant novels, short stories, and poetry written since 1850.

**THAI 401-402(4401-4402) Directed Individual Study**

401, fall; 402, spring. 4 credits each semester. For advanced students or students with special problems or interests. Prerequisite: permission of instructor. N. Jagacinski.

**Urdu****URDU 125(1125) Introduction to the Urdu Script (also NES 107[1312])**

Spring. 1 credit. Prerequisite: HINDI 101 or permission of instructor. S. Singh.  
Provides instruction in the basics of the Urdu script. Intended primarily for students who have had some exposure to Hindi or Urdu but who have had little or no formal training in the script. The course focuses on mastering the script and pronunciation. It does not provide instruction in grammar.

**URDU 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable.  
Prerequisite: permission of instructor.  
Times TBA with instructor. S. Singh.  
Taught on a specialized basis to address particular student needs.

**Vietnamese****VIET 101-102(1101-1102) Elementary Vietnamese**

101, fall; 102, spring. 6 credits each semester. Prerequisite: for VIET 102, VIET 101 or equivalent. Intended for beginners or students placed by examination.  
T. Tranviet.

Gives a thorough grounding in all language skills: listening, speaking, reading, and writing.

**VIET 201-202(2201-2202) Intermediate Vietnamese @**

201, fall; 202, spring. 3 credits each semester. *VIET 201 satisfies Option 1.*  
Prerequisites: for VIET 201, VIET 102 or equivalent; for VIET 202, 201. T. Tranviet.  
Continuing instruction in spoken and written Vietnamese.

**VIET 203-204(2203-2204) Intermediate Vietnamese Composition and Reading @**

203, fall; 204, spring. 3 credits each semester. *VIET 203 satisfies Option 1.*  
Prerequisite: permission of instructor.  
T. Tranviet.

Designed for students and "native" speakers of Vietnamese whose speaking and listening are at the advanced level, but who still need to improve writing and reading skills.

**VIET 300(3000) Directed Studies**

Fall or spring. 1-4 credits variable.  
Prerequisite: permission of instructor.  
Times TBA with instructor. T. Tranviet.  
Taught on a specialized basis to address particular student needs.

**VIET 301-302(3301-3302) Advanced Vietnamese @**

301, fall or spring; 302, fall or spring. 3 credits each semester. *VIET 301 satisfies Option 1.* Prerequisites: for VIET 301, VIET 202 or permission of instructor; for VIET 302, 301. T. Tranviet.

Continuing instruction in spoken and written Vietnamese; emphasis on enlarging vocabulary, increasing reading speed, and reading various genres and styles of prose.

**VIET 401-402(4401-4402) Directed Individual Study**

401, fall; 402, spring. 2-4 credits, variable, each semester. Prerequisite: permission of instructor. Intended for advanced students.  
T. Tranviet.

Various topics according to need.

**Vietnamese Literature****VTLIT 222-223(2222-2223) Introduction to Classical Vietnamese @ #**

222, fall; 223, spring. 3 credits. *VTLIT 222 satisfies Option 1.* Prerequisite: qualification in Vietnamese or permission of instructor. K. Taylor.

VTLIT 222 is the first semester of a two-semester sequence of courses introducing students to Han (classical Chinese as used in the Vietnamese language) and Nom (vernacular Vietnamese character writing). Students learn to read Han and Nom texts, from the 17th through 19th centuries, including historical records, prose writings, and poetry. VTLIT 223 is the second semester of a two-semester sequence of courses.

**Related Courses in Other Departments and Colleges**

Check the primary department section for the offering status of the following courses. Courses in other colleges will count as College of Arts and Sciences credit only for Asian Studies majors.

**Asia/General Courses**

ANTHRO 374 Human Palaeontology

AEM 464 Economics of Agricultural Development (also ECON 464)

AEM 667 Topics in Economic Development (also ECON 770)

COMM 424/624 Communication in the Developing Nations

ECON 473 Economics of Export-Led Development

[ART H 280 Introduction to Art History: Approaches to Asian Art]

ILRIC 637 Labor Relations in Asia

D SOC 205 Rural Sociology and International Development

**China—Area Courses**

ANTHR 655 East Asia: Readings in Specific Problems

ECON 469 Economy of China

ECON 772 Economics of Development

GOVT 645 Chinese Politics

HIST 294 China in Modern Times

[HIST 493/693 Problems in Modern Chinese History]

[ART H 380 Introduction to the Arts of China]

[ART H 481 The Arts in Modern China]

**Japan—Area Courses**

ANTHR 655 East Asia: Readings in Specific Problems

ARCH 339 Elements, Principles, and Theories in Japanese Architecture

[HIST 230 Japan and the Pacific War]

[HIST 328 State, Society, and Culture in Modern Japan]

ILRHR 656 International Human Resource Management

**South Asia—Area Courses**

[ANTHR 275 Human Biology and Evolution (also BIOES/NS 275)]

ANTHR 321 Sex and Gender

[ANTHR 339 Peoples and Cultures of the Himalayas]

[ANTHR 406 Culture of Lives]

[ANTHR 621 Sex and Gender]

ANTHR 641 South Asia: Readings in Specific Problems

[ANTHR 673 Human Evolution: History, Concepts, and Theory (also BIOES 673)]

ARCH 342 Architecture as a Cultural System

ARCH 441-442 Special Topics in Architectural Culture and Society

ARCH 445 Architecture and the Mythic Imagination

ARCH 446 Topics in Architecture, Culture, and Society

ARCH 447 Architectural Design and the Utopian Tradition

ARCH 647-648 Architecture in Its Cultural Context I and II

ARCH 649 Graduate Investigations in Architecture, Culture, and Society

CRP 671 Seminar in International Planning

[ECON 475 Economic Problems of India]

HD 436 Language Development (also PSYCH/LING 436)

HD 633 Seminar on Language Development

**Southeast Asia—Area Courses**

ANTHR 420 Development of Anthropology Thought

[ANTHR 424 Anthropology Amongst Disciplines]

[ANTHR 619 Anthropology Approaches to Study of Buddhism(s) in Asia]

ANTHR 628 Political Anthropology: Indonesia

ANTHR 634-635 Southeast Asia: Readings in Special Problems

GOVT 642 Comparative Political Economy: East and Southeast Asia

HIST 244 History of Siam and Thailand

[HIST 395 Southeast Asian History from the 18th Century]

[HIST 695 Early Southeast Asia: Graduate Proseminar]

HIST 696 Modern Southeast Asia: Graduate Proseminar

ART H 490 Art and Collecting: East and West

MUSIC 245 Gamelan in Indonesian History and Cultures

MUSIC 445-446 Cornell Gamelan Ensemble

MUSIC 604 Ethnomusicology

**ASIAN AMERICAN STUDIES PROGRAM**

The Asian American Studies Program is a university-wide academic program housed administratively within the College of Arts and Sciences. Its aim is to promote teaching, research, and educational activities related to Asians in the Americas and to serve as a resource to the campus and regional communities. The program's undergraduate

courses, offered within the program and cross-listed with departments in various colleges, meet distribution requirements and count toward a concentration in Asian American Studies. The program does not offer a graduate course of study, but students can undertake graduate work in Asian American Studies within selected disciplines of the university.

### Undergraduate Concentration

The program's undergraduate concentration affords students an opportunity to develop a multidisciplinary approach to the study of Asians in the hemispheric Americas. The course of study stresses developments within the United States, but also underscores the transnational and comparative contexts of Asian America and the field's connections with African American, American Indian, Latino, and Women's Studies. Students must work with a faculty advisor from among the program's affiliated faculty and must complete at least 15 units of credits as follows: (1) AAS 110 and two additional courses in Asian American Studies; (2) one course in African American, American Indian, U.S. Latino Studies, or Feminist, Gender, & Sexuality Studies\*; and (3) one course in East Asian, South Asian, or Southeast Asian Studies.\* (\*These courses must be approved by the student's faculty advisor, and they should address issues of race, gender, or the histories and cultures of Asian peoples.) Students must file an application for the concentration with the Asian American Studies Program.

### Resource Center

The program's Asian American Studies Resource Center, located in 420 Rockefeller Hall, provides meeting space for the more than 40 undergraduate student organizations of the Cornell Asian Pacific Student Union and the graduate student Asian Pacific American Graduate Association. It also holds a modest print collection of books, periodicals, and newspapers; a current news clipping file; a comprehensive database of publications on Asian Americans since 1977; and a sizable collection of videotapes as well as music CDs on the Asian American experience.

### Research

The program encourages faculty and student research on Asian Americans by sponsoring guest lectures, conferences, film festivals, readings, and exhibits. It also funds research projects and student travel to conferences and research sites. The Asian American Studies Workshop is the program's principal research initiative, engaging Cornell's faculty and students with invited faculty from other universities in a year-long intensive study of selected themes.

### Core Faculty

D. Chang, C. Lai, V. Munasinghe, T. Tu, S. Wong

### Courses

#### AAS 110(1100) Introduction to Asian American Studies (CA)

Spring. 3 credits. Can be used to satisfy either social science or humanities distribution requirement. T. Tu.

The purpose of this course is fourfold: (1) to introduce students to the multifaceted experiences of Asians in the United States; (2)

to examine how a diverse group of people came to be identified as "Asian Americans"; (3) to understand the role of difference—gender, class, ethnic—in the formation of "Asian American" identities; and (4) to link historical experiences with contemporary issues.

#### AAS 111(1110) Introduction to American Studies: New Approaches to Understanding American Diversity, the 20th Century (also AM ST 110[1110]) (HA)

Fall. 4 credits. Next offered 2007–2008. D. Chang and M. C. Garcia.]

#### AAS 209(2090) SSP: The Immigrant Imagination (also ART H 209[2190], AM ST 227[2091]) (HA)

Spring. 4 credits. Limited to 15 students. T. Tu.

For description, see ART H 209. This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. These seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

#### AAS 210(2110) SSP: South Asian Diasporic Locations (also ANTHR 210[2110]) (CA)

Spring. 4 credits. Next offered 2008–2009. V. Munasinghe.]

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. These seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.]

#### AAS 211(2110) SSP: Race and the American City: Reading San Francisco and New York (LA)

Fall. 4 credits. Next offered 2007–2008. S. Wong.]

#### AAS 262(2620) Asian American Literature (also AM ST/ENGL 262[2620])

Fall. 4 credits. S. Wong.

For description, see ENGL 262.

#### AAS 303(3030) Asians in the Americas: A Comparative Perspective (also ANTHR 303[3703]) (CA)

Spring. 4 credits. V. Munasinghe.

For description, see ANTHR 303.

#### AAS 347(3470) Asian American Women's History (also HIST 347/FGSS 347/AM ST 351/AM ST 351[3470])

Spring. 4 credits. D. Chang.

For description, see HIST 347.

#### AAS 380(3800) Asian American Urban Experience (also CRP 395 sec 9 and CRP 629)

Fall. 3 credits. C. Lai.

For description, see CRP 395.9.

#### [AAS 413(4130) Race, Technology, and Visuality (also ART H 413[4113]) (CA)

Fall. 4 credits. Next offered 2007–2008. T. Tu.

Examines how new information and communication technologies have altered the ways we visualize and perform racial identities. Questions the popular assumption that the "information revolution" has made it possible and even desirable to transcend racial differences by exploring the following: how racial hierarchies have informed debates around techno-literacy, creativity, ownership, and agency; how race is embodied (through visual and linguistic cues) in the ostensibly disembodied domains of virtual media; and how the emergence of interactive, online, electronic entertainment, and mobile technologies have allowed artists to generate new images of and ideas about racial and ethnic identities.]

#### AAS 414(4140) Popular Culture in Asian America (also ART H 414[4114]) (CA)

Spring. 4 credits. Prerequisite: permission of instructor. T. Tu.

For description, see ART H 414.

#### [AAS 424(4240) Asian American Communities (also HIST/AM ST 420[4220]) (HA)

Fall. 4 credits. Next offered 2008–2009. D. Chang.]

#### AAS 430(4301) Topics in American Studies: The Rabinovitch Seminar (also AM ST 430.5[4301], ENGL 430[4030], HIST 448[4480])

Fall. 4 credits. S. Wong.

For description, see AM ST 430.5.

#### [AAS 453(4530) 20th-Century American Women Writers of Color (also ENGL 453[4530]) (LA)

Fall. 4 credits. Next offered 2007–2008. S. Wong.]

#### [AAS 479(4790) Ethnicity and Identity Politics: An Anthropological Perspective (also ANTHR 479[4749]) (SBA)

Spring. 4 credits. Next offered 2007–2008. V. Munasinghe.]

#### AAS 495(4950) Independent Study

Fall or spring. 1–4 credits. Topic and credit hours TBA arranged between faculty and student. Independent study forms must be approved by Asian American Studies Program office. Staff.

#### [AAS 497(4970) Jim Crow and Exclusion-Era America (also HIST 497/697) (HA)

Spring. 4 credits. Limited to 15 students. Next offered 2007–2008. D. Chang.

Seminar examining America during the overlapping eras of segregation and immigration exclusion. Beginning with contests over the meaning of freedom during reconstruction and running through the institution of Jim Crow legislation and immigration exclusion, the course ends with an evaluation of mid-20th century movements for civil rights and equality. Themes include the links between racial and economic oppression, legal and de facto restriction, everyday resistance, and struggles for equality.]

## ASTRONOMY

J. F. Veverka, chair (312 Space Sciences Bldg., 255-3507); G. J. Stacey, director of undergraduate studies (212 Space Sciences Bldg., 255-5900); R. E. Bean, J. F. Bell, J. A. Burns, D. B. Campbell, D. F. Chernoff, J. M. Cordes, E. E. Flanagan, P. J. Gierasch, R. Giovanelli, M. P. Haynes, T. L. Herter, J. R. Houck, D. Lai, J. P. Lloyd, R. V. E. Lovelace, J.-L. Margot, P. D. Nicholson, C. J. Salter, S. W. Squyres, Y. Terzian, S. A. Teukolsky, I. M. Wasserman, J. York. Emeritus: P. F. Goldsmith, T. Hagfors, M. O. Harwit, E. E. Salpeter

Cornell's Astronomy faculty, research staff, graduate, and undergraduate students are active in diverse areas of modern astronomy ranging from theoretical astrophysics and general relativity to radio and radar astronomy, infrared and optical astronomy, and the exploration of the solar system. Cornell operates two local optical observatories, the world's largest radio telescope at Arecibo, Puerto Rico, and with two other institutions, the 200-inch optical telescope at Mt. Palomar in California. With Caltech, Cornell is carrying out a design study for a large submillimeter telescope in the high Atacama desert in Chile. Several members of the department faculty are also principal investigators on major NASA space and planetary exploration missions.

The department offers a number of courses to satisfy a general interest in astronomy. These courses have few or no prerequisites and are not intended for the training of professional astronomers. Among the introductory courses, several choices are available, depending on background and on the requirements to be fulfilled. The 100-level courses are designed primarily for nonscience majors. The alternative introductory sequence ASTRO 211-212 is geared toward sophomore physical science and engineering majors and requires co-registration in beginning calculus. ASTRO 201 and 202 are intended for students with an interest in astronomy but no scientific background; they are topical rather than survey-oriented. ASTRO 332 is designed for physical science and engineering majors as an introduction to astrophysics. Other courses at the 200 and 300 levels may appeal to students of various backgrounds and interests, as indicated in the individual course descriptions.

Courses numbered above 400 are intended for students who have had two to three years of college physics and at least two years of college mathematics. ASTRO 440 Independent Study permits students to engage in individual research projects under the guidance of a faculty member.

Interested students are encouraged to become members of the undergraduate Cornell Astronomy Club. The club has access to the Fuentres Observatory on campus and conducts regular observing and astrophotography sessions. All students are invited to visit the Space Sciences Building, see the exhibits on display there, and consult faculty members about career plans or choice of courses.

### The Major

The purpose of the major in Astronomy is to provide in-depth knowledge and education about the nature of the universe. Astronomy relies heavily on preparation in physics and mathematics. Consequently, many courses in these fields are included as prerequisites. In

preparation for the major, students normally elect the introductory physics sequence PHYS 112-213-214 or 116-217-218 and the complementary pathway in mathematics, MATH 111-122-221-222 or 191-192-293-294 (or equivalent). Students who anticipate undertaking graduate study are urged to elect the honors physics sequence PHYS 116-217-218-318-327 if possible. The sophomore seminar ASTRO 233 Topics in Astronomy and Astrophysics provides an introduction to current research in astronomy and astrophysics for prospective majors, but is not required of students who elect to major in Astronomy after the sophomore year. Students are also urged to acquire computer literacy. ASTRO 334 is designed to give students hands-on experience with the methods of analysis, visualization, and simulation needed in astrophysical research. Acceptance to the major is first considered after completion of three semesters of introductory physics and mathematics and in general requires a GPA of 3.2 in physics and mathematics courses.

The major requirements stress the importance of building a strong preparation in physical science. The following upper-level courses are normally required:

PHYS 314 or 318, 316, 323 or 327, 341 and 443  
A&EP 321-322 (or equivalent, e.g., MATH 420 and 422)

ASTRO 410, 431, and 432.

With permission of the major advisor, students interested in planetary studies may substitute appropriate advanced courses or may pursue an independent major under the program in the Science of Earth Systems. Majors are encouraged to supplement the above courses with any astronomy, physics, or other appropriate courses at or above the 300 level. Advanced seniors can enroll in astronomy graduate courses with the permission of the instructor. Students are also encouraged to work with faculty members on independent study projects under the course ASTRO 440 or to apply to a variety of programs at Cornell, Arecibo, and elsewhere that offer undergraduates summer employment as research assistants. Nearly all undergraduate majors and concentrators become involved in research projects in the junior and senior years.

Students whose interest in astronomy is sparked somewhat late in their undergraduate career are encouraged to discuss possible paths with the director of undergraduate studies in Astronomy.

**Honors.** A student may be granted honors in Astronomy upon the recommendation of the Astronomy Advisors Committee of the Astronomy faculty.

**Double majors.** A double major in Astronomy and another subject is possible in many circumstances. However, the set of courses used to fulfill the requirements for each major must be completely independent.

**Concentration.** The concentration in Astronomy for other majors normally requires 12 credits, at least eight of which must be at the 300 level or above. ASTRO 233 is recommended for sophomores planning to concentrate in Astronomy.

### Distribution Requirement

All courses in astronomy, except ASTRO 233, may be used to fulfill the science distribution

requirement in the College of Arts and Sciences.

## Courses

### ASTRO 101(1101) The Nature of the Universe (PBS)

Fall. 3 credits. Limited to 30 students per disc. T. Herter.

Introduces students to the cosmos. The birth, evolution, and death of stars, the formation of the chemical elements, and the nature of white dwarfs, neutron stars, and black holes are discussed. An introduction to the theories of special relativity and general relativity is given. The course covers the search for other worlds outside the solar system and the possible existence of life and intelligence elsewhere in the universe. Modern theories of cosmology are presented, and the origin, structure, and fate of the universe are discussed. Most of the course notes as well as sample exams and simulations are made available on the web.

### ASTRO 102(1102) Our Solar System (PBS)

Spring. 3 credits. Limited to 30 students per disc. S. Squyres and J.-L. Margot; labs: P. Nicholson and staff.

The past few decades have seen incredible advances in the exploration of our solar system. In this course students learn about the current state and past evolution of the Sun and its family of planets, moons, asteroids, and comets. The course emphasizes images and other data obtained from current and past NASA space missions and how these data provide insights about the important processes that have shaped the evolution of solar system objects. General astronomical concepts relevant to the study of the solar system are also discussed. Critical focus is on developing an understanding of the Earth as a planetary body and discovering how studies of other planets and satellites influence models of the climatic, geologic, and biologic history of our home world. Other topics include impact hazards, the search for life in the solar system, and future missions.

### ASTRO 103(1103) The Nature of the Universe (PBS)

Fall. 4 credits. Limited to 22 students per lab, 30 students per disc sec. T. Herter, labs: P. Nicholson, and staff.

Identical to ASTRO 101 except for addition of the laboratory.

### ASTRO 104(1104) Our Solar System (PBS)

Spring. 4 credits. Limited to 22 students per lab, 30 students per disc sec. J.-L. Margot and S. Squyres.

Identical to ASTRO 102 except for addition of the laboratory.

### ASTRO 105(1105) An Introduction to the Universe (PBS)

Summer. 3 credits. Recommended: high school physics. D. Kornreich.

How do we measure the size of our galaxy and the size of the universe? Is the universe round or flat? How are the stars born, why do they shine, and how do they die? What are the chemical elements, and how were they formed in stars? What are quasars, pulsars, and black holes? How was the solar system formed? What are the environments of other planets like? What is the basic structure of Earth and the other planets? Will we catastrophically alter the earth? Does life exist

elsewhere in the universe? How can we find out? Each student has an opportunity to make observations with small telescopes.

**ASTRO 106(1106) Essential Ideas in Relativity and Cosmology (PBS)**

Summer. 3 credits. Prerequisites: high school algebra and trigonometry.

T. Nikona and F. Martinache.

Explanation of Einstein's theories of special and general relativity, which brought about a fundamental change in our conceptual understanding of space and time. Correspondence to, and conflicts with, common sense. Applications to various areas in special relativity (space travel, the equivalence of mass and energy, nuclear fission and fusion, and thermonuclear processes in the sun) and in general relativity (motion of light and particles in curved space-time, cosmological models, and the question of whether the universe is open or closed).

**ASTRO 107(1107) An Introduction to the Universe (PBS)**

Summer. 4 credits. D. Kornreich.

Identical to ASTRO 105 except for the addition of the afternoon laboratory that emphasizes mathematical problem-solving. This option is recommended for potential majors in science and engineering.

**ASTRO 195(1195) Observational Astronomy (PBS)**

Fall. 3 credits. Limited to 24 students.

Prerequisite: permission of instructor required (forms available in SS610).

J. Lloyd.

Provides a "hands-on" introduction to observational astronomy intended for liberal arts students at the freshman and sophomore level. High school mathematics is assumed, but otherwise there are no formal prerequisites. The course objective is to teach how we know what we know about the universe. The course is set up with two lectures and one evening laboratory per week. Not all of the evening sessions are used. Planned exercises include five or six observational labs (star gazing with binoculars and small telescopes, telescopic observations and CCD imaging of star clusters, nebulae, and the planets, solar observations, radio observations of the Milky Way Galaxy), plus a selection of exercises from the following: experiments in navigating by the stars; construction and use of simple instruments such as optical spectrometers and sun dials; laboratory spectroscopy; experiments in planetary cratering; collection and study of micrometeorites; computer simulations of the orbits of planets and their satellites; and cosmological explorations using data from the Hubble Space Telescope available on the web.

**ASTRO 201(2201) Our Home in the Universe (PBS)**

Fall. 3 credits. Prerequisite: freshman or sophomore standing. No scientific background assumed. R. Giovanelli.

General discussion of our relation to the physical universe and how our view of the universe has changed from ancient to modern times. Several main themes are covered over the course of the semester: the evolution of our view of the sky from that of ancient cultures to that of space telescopes; the death of stars and the formation of black holes; dark matter and the structure of galaxies; and the origin, evolution, and fate of the universe. Presents a nonmathematical introduction to

these subjects and discuss uncertainties and unresolved issues in our understanding.

**ASTRO 202(2202) Our Home in the Solar System (PBS)**

Spring. 3 credits. Prerequisite: freshman or sophomore standing; some background in science. J. Veverka.

Writing course designed to develop an understanding of our home planet as a member of a diverse family of objects in our solar system. Discussion centers on how studies of other planets and satellites have broadened our knowledge and perspective of Earth, and vice versa. We study, debate, and learn to write critically about important issues in science and public policy that benefit from this perspective. Topics discussed include global warming, the impact threat, the searches for extrasolar planets and extraterrestrial intelligence, and the exploration of Mars.

**ASTRO 211(2211) Astronomy: Stars, Galaxies, and Cosmology (PBS)**

Fall. 4 credits. Intended for first- and second-year engineering and physical sciences students. Prerequisite: introductory calculus or co-registration in MATH 111 or 191 or permission of instructor. R. Bean.

Topics discussed include: the formation and evolution of normal and extreme stars, the structure and evolution of galaxies, and cosmology.

**ASTRO 212(2212) The Solar System: Planets, Satellites, and Rings (PBS)**

Spring. 4 credits. Intended for first- and second-year engineering and physical sciences students. Prerequisite: introductory calculus or co-registration in MATH 111 or 191; some knowledge of classical physics (mechanics and thermodynamics). P. Nicholson.

Introduction to the solar system, with emphasis on the application of simple physical principles. Topics include: the Sun, nucleosynthesis of the elements, radioactive dating, seismology and planetary interiors, planetary surfaces and atmospheres including greenhouse models, orbital mechanics and resonances, interrelations between meteorites, asteroids and comets, the Jovian planets, icy moons and ring systems, and the search for extra-solar planets.

**ASTRO 233(2233) SSP: Topics in Astronomy and Astrophysics**

Fall. 2 credits. Limited to 15 students. Intended for sophomores planning to major in Astronomy or related fields. Prerequisites: PHYS 112 or 116 and 213 or 217, MATH 112, 122 or 192 or permission of instructor. Home page: [www.astro.cornell.edu/academics/courses/astro233](http://www.astro.cornell.edu/academics/courses/astro233). M. Haynes.

The course theme may change yearly. The fall 2006 course will be offered as a Knight sophomore seminar and will explore the theme "Star Formation: From the Early Universe to the Solar Neighborhood." We will explore how star formation in different locations within the Milky Way and other galaxies has varied throughout cosmic time, how local environment may play a role in the formation of multiple star and/or planetary systems, and the connections between stellar birth and stellar death in supernovae. We will also look at starbursting systems such as infrared luminous galaxies and quasars and

the relationship of star, galaxy, and black hole formation in the early universe.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**ASTRO 280(2280) Space Exploration (PBS)**

Fall. 3 credits. No special background in physical sciences, math, or engineering assumed. S. Squyres.

Provides an overview of space science, with particular emphasis on the solar system, and a detailed examination of a few selected objects, including the planet Mars, the satellites in the outer solar system, and comets. The focus is on methods of collecting information and especially on spacecraft and space missions. Topics include the design and limitations of instruments. Ethical and political questions associated with space exploration are discussed. Intended for students with an interest in science, technology, and associated policy issues.

**ASTRO 290(2290) Relativity and Astrophysics (PBS)**

Spring. 4 credits. Prerequisites: freshman physics, calculus, and geometry. I. Wasserman.

Provides a geometrically based introduction to special and general relativity, followed by consideration of astrophysical applications. Includes discussion of tests of Einstein's theory of space, time, and gravitation; the physics of white dwarfs, neutron stars, and black holes; an introduction to modern cosmology.

**ASTRO 299(2299) Search for Life in the Universe (PBS)**

Spring. 4 credits. Prerequisites: two courses in any physical science subject or permission of instructors. J. Cordes and Y. Terzian.

Surveys the contents of the universe. Reviews theories of cosmic and stellar evolution, and of the formation and evolution of planetary systems, planetary atmospheres, and surfaces. Questions regarding the evolution of life and the development of technology are discussed. Methods to detect extraterrestrial life with emphasis on radio telescopes and associated instrumentation are presented. Hypothetical communication systems are developed and discussed.

**[ASTRO 310(3310) Planetary Imaging Processing (PBS)]**

Fall. 3 credits. Intended for sophomores or juniors majoring or concentrating in Astronomy or related fields. Prerequisites: two semesters of introductory physics and some experience with computer programming; permission of instructor required (form available in SS610). Next offered 2007–2008. J. Bell.

Reviews basic techniques employed in the collection and processing of spacecraft images of solar system objects. See [www.astro.cornell.edu/courses/astro310/main.html](http://www.astro.cornell.edu/courses/astro310/main.html) for course details.]



**ASTRO 331(3331) Climate Dynamics (also EAS 305[3050]) (PBS)**

Fall. 4 credits. Prerequisite: MATH 112 or 192 or equivalent or permission of instructor. K. Cook.

Processes that determine climate and contribute to its change are discussed, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Contemporary climate change issues are investigated and discussed in the context of natural variability of the system.

**ASTRO 332(3332) Elements of Astrophysics (PBS)**

Spring. 4 credits. Prerequisites: MATH 112, 122, 192, or equivalent; PHYS 213 or 217. J. Houck.

Introduction to astronomy, with emphasis on the application of physics to the study of the universe. Covers: physical laws of radiation; distance, size, mass, and age of stars, galaxies, and the universe; stellar evolution and nucleosynthesis; supernovae and black holes; galaxies and quasars. Introduction to cosmology. Mainly intended for students of science, engineering, and science education interested in astronomy and astrophysics.

**ASTRO 334(3334) Modern Astrophysical Techniques (PBS)**

Spring. 3 credits. Intended for sophomores majoring or concentrating in Astronomy or related fields. Prerequisites: two semesters of introductory physics and two semesters of calculus. Recommended: ASTRO 233. J. Lloyd.

The course reviews the basic techniques employed in astrophysical research, both observational and theoretical, to explore the universe. Basic methods and strategies of data acquisition and image and signal processing are discussed. Students gain hands-on experience with visualization techniques and methods of error analysis, data fitting, and numerical simulation. Exercises address the processes by which astrophysicists piece together observations made with today's foremost astronomical instruments to solve questions concerning the origin of planets, stars, galaxies, and the universe itself.

**ASTRO 342(3342) Atmospheric Dynamics (also EAS 342[3420]) (PBS)**

Spring. 3 credits. Prerequisites: one year each of calculus and physics. K. H. Cook. For description, see EAS 342.

**ASTRO 410(4410) Experimental Astronomy (PBS)**

Fall. 4 credits. Prerequisites: PHYS 214/218 (or 310 or 360), PHYS 323/327 (or co-registration) and permission of instructor required (form available in S8610). J. Bell, J. Cordes, and J. Houck.

Observational astrophysics. Major experiments involve techniques in CCD (charge-coupled-device) imaging, optical photometry, optical spectroscopy, radiometry, radio spectroscopy and radio astronomy. The experiments involve use of the Hartung-Boothroyd Observatory's 24-inch telescope, a laboratory two-element radio interferometer, and a radio telescope mounted on top of the Space Sciences Building. The laboratory covers the fundamentals of using astronomical instrumentation and data analysis as applied to celestial phenomena: asteroids, normal stars, supernova remnants, globular clusters, planetary nebulae, the interstellar medium, OH masers, and galaxies.

**ASTRO 431(4431) Introduction to Astrophysics and Space Sciences (PBS)**

Fall. 4 credits. Prerequisites: mathematics above 200 level and physics above 300 level. Recommended: PHYS 443. I. Wasserman.

Overview of modern astrophysical concepts for physical science majors. Major topics include stellar formation, structure, and evolution; stellar atmospheres; compact objects (white dwarf, neutron star, and black holes); planets; and brown dwarfs. Current research problems in these areas are introduced along the way. The emphasis is on using fundamental principles of physics to explain astronomical phenomena. A variety of physics, including elements of atomic and molecular physics, solid state physics and fluid mechanics, are introduced or reviewed in a quick, practical fashion to be put to use in solving astrophysics puzzles.

**ASTRO 432(4432) Introduction to Astrophysics and Space Sciences II (PBS)**

Spring. 4 credits. Prerequisite: ASTRO 431 or permission of instructor. D. Chernoff and R. Bean.

Covers two broad topics: the astrophysics of the interstellar medium and cosmology. The interstellar medium section covers thermal equilibrium and radiative transport in HII regions, atomic gas regions, and molecular clouds. The cosmology section includes expansion of the universe, metrics, Friedmann equations, dark matter, cosmological tests, the early universe, and the cosmological production of the elements.

**ASTRO 440(4940) Independent Study in Astronomy**

Fall or spring. 2-4 credits. Prerequisite: permission of instructor; to register: obtain an independent study form in department office, 610 Space Sciences Bldg. Recommended: familiarity with topics covered in ASTRO 332, 431, or 434.

Individuals work on selected topics. A program of study is devised by the student and instructor.

**ASTRO 445(4445) Introduction to General Relativity (also PHYS 445[4445]) (PBS)**

Fall. 4 credits. E. Flanagan. For description, see PHYS 445.

**ASTRO 490(4490) Senior Seminar Critical Thinking (PBS)**

Fall. 3 credits. Prerequisites: none. Open to all students. Y. Terzian.

Critical thinking in scientific and nonscientific contexts with selections from the history of astronomy. Topics include elements of classical logic, including standards of evidence. Case studies include examples of competing hypotheses in the history of science, as well as examples from borderline sciences. Stress is put on creative generation of alternative hypotheses and their winnowing by critical scrutiny. Topics include the nature and history of the universe, the nature of time, the nature of reality, the possibilities of life on other planets, and artificial intelligence. Fallacies, illusions, and paradoxes will also be discussed. The course includes debates by the students on controversial topics such as: Can machines think? Is science and technology to be blamed for Hiroshima and 9/11? Should the genome be improved? Is the future determined?

**ASTRO 509(6509) General Relativity (also PHYS 553[6553])**

Fall. 4 credits. Prerequisite: knowledge of special relativity and methods of dynamics at level of *Classical Mechanics* by Goldstein. J. York.

Systematic introduction to Einstein's theory using both modern and classical methods of computation. Topics include review of special relativity, differential geometry, foundations of general relativity (GR), laws of physics in the presence of gravitational fields, GR as a dynamical theory, experimental tests of GR. The level of the course will be comparable to that in the text *Gravitation* by Misner, Thorne, and Wheeler. This text is required: it will be used for reading, reference, and problem assignments. Robert Wald's book *General Relativity* is also suggested but not required.

**ASTRO 510(6510) Applications to General Relativity (also PHYS 554[6554])**

Spring. 4 credits. Prerequisite: ASTRO 509. J. York.

Continuation of ASTRO 509 that emphasizes applications to astrophysics and cosmology. Topics include relativistic stars, gravitational collapse and black holes, gravitational waves and cosmology, use of dynamics to formulate astrophysical and cosmological computations in the flourishing field of numerical relativity.

**ASTRO 511(6511) Physics of Black Holes, White Dwarfs, and Neutron Stars (also PHYS 525[6525])**

Spring. 4 credits. Prerequisites: all of physics at upper-division undergraduate level. D. Lai.

Compact objects (neutron stars, black holes, and white dwarfs) are the endpoints of stellar evolution. They are responsible for some of the most exotic phenomena in the universe, including supernova explosion, radio pulsars, bright X-ray binaries, magnetars, and gamma-ray bursts. Supermassive black holes also lie at the heart of the violent processes in active galactic nuclei and quasars. The study of compact objects allows one to probe physics under extreme conditions (high densities, strong magnetic fields, and gravity). This course surveys the astrophysics of compact stars and related subjects. Emphasis is on the application of diverse theoretical physics tools to various observations of compact stars. There are no astronomy or general relativity prerequisites. At the level of *Physics of Black Holes, White Dwarfs, and Neutron Stars* by Shapiro and Teukolsky.

**[ASTRO 516(6516) Galactic Structure and Stellar Dynamics**

Fall. 4 credits. Next offered 2007-2008. D. Chernoff.

Introduction to the study of the structure of galaxies via the laws of modern physics. Topics include the observed kinematics and spatial distribution of stars in the vicinity of the Sun, shapes and properties of stellar orbits, the gravitational N-body problem, collisional relaxation in stellar systems, spiral structure, galaxy classification and evolution, and cosmological results in galaxy formation.]

**[ASTRO 520(6520) Radio Astronomy**

Fall. 4 credits. Next offered 2007-2008. J. Cordes and D. Campbell.

Covers radio astronomy telescopes and electronics; antenna theory; observing procedures and data analysis; concepts of interferometry and aperture synthesis.]

**ASTRO 523(6523) Signal Modeling, Statistical Inference, and Data Mining in Astronomy**

Fall. 4 credits. J. Cordes.

Aims to provide tools for modeling and detection of various kinds of signals encountered in the physical sciences and engineering. Data mining and statistical inference from large and diverse databases are also covered. Experimental design is to be discussed. Basic topics include probability theory; Fourier analysis of continuous and discrete signals; digital filtering; matched filtering and pattern recognition; spectral analysis; Karhunen-Loeve analysis; wavelets; parameter estimation; optimization techniques; Bayesian statistical inference; deterministic, chaotic, and stochastic processes; image formation and analysis; maximum entropy techniques. Specific applications are chosen from current areas of interest in astronomy, where large-scale surveys throughout the electromagnetic spectrum and using non-electromagnetic signals (e.g., neutrinos and gravitational waves) are ongoing and anticipated. Applications are also chosen from topics in geophysics, plasma physics, electronics, artificial intelligence, expert systems, and genetic programming. The course is self-contained and is intended for students with thorough backgrounds in the physical sciences or engineering.

**ASTRO 525(6525) Techniques of Optical/Infrared and Submillimeter Astronomy**

Spring. 4 credits. T. Herter and G. Stacey.

Optical/infrared and submillimeter telescopes and instrumentation are discussed and related to current research in these fields. Includes telescope design and general optical design (ray tracing). CCD, photoconductor, photovoltaic, bolometer, impurity band conduction, and heterodyne detection systems are presented. The instrumentation discussion includes general instrument design and specific applications to cameras, spectrographs, and interferometers. Detection limits of various systems, cryogenic techniques, and astronomical data analysis techniques are also discussed. Special topics include speckle interferometry and adaptive optics.

**[ASTRO 530(6530) Astrophysical Processes**

Spring. 4 credits. Next offered 2007–2008.

Fundamentals of radiative transfer, bremsstrahlung, synchrotron radiation, Compton scattering, spectral line transfer, gas heating and cooling and topics in atomic and molecular spectroscopy topics are discussed within the framework of astrophysical sources and problems.]

**ASTRO 560(6560) Theory of Stellar Structure and Evolution (also PHYS 667[7667])**

Fall. 4 credits. D. Chernoff.

Intended to provide a systematic development of stellar astrophysics, both theory and observations. Topics include hydrostatic equilibrium; equation of state; radiation transfer and atmospheres; convection and stellar turbulence; nuclear burning and nucleosynthesis; solar neutrinos; star formation; pre-main sequence stars; brown dwarfs; end states of stellar evolution (white dwarfs, neutron stars, and black holes); supernovae; interacting binary stars; stellar rotation and magnetic fields; stellar pulsations; winds and outflows. The prerequisites for the

course are all undergraduate-level physics. Though helpful, no astronomy background is required.]

**[ASTRO 570(6570) Physics of the Planets**

Fall. 4 credits. Next offered 2007–2008.

P. Nicholson.

Introductory survey of planetary science with an emphasis on the application of physical principles. Planetary dynamics, including satellite orbits, tidal interactions, resonances, and ring dynamics. An introduction to the theory of planetary interiors, gravitational fields, heat sources, and rotational mechanics. An introductory survey of planetary science with an emphasis on the application of physical principles. Planetary dynamics, including satellite orbits, tidal interactions, resonances, and ring dynamics. An introduction to the theory of planetary interiors, gravitational fields, heat sources, and rotational mechanics. Intended for graduate students and seniors in astronomy, physics, and engineering. Intended for graduate students and seniors in astronomy, physics, and engineering.]

**[ASTRO 571(6571) Mechanics of the Solar System (also T&AM 673[6730])**

Spring. 3 credits. Next offered 2008–2009.

J. Burns.

For description, see T&amp;AM 673.]

**ASTRO 575(6575) Planetary Atmospheres (also EAS 575[5750])**

Fall. 4 credits. Offered every other year.

P. Gierasch.

Introduction to radiative transfer in emitting and scattering atmospheres. Radiative energy balance and radiative equilibrium. Structures of the atmospheres in the solar system. Introduction to motions in atmospheres. Planetary examples of balanced flows. Mesoscale waves, wave absorption and wave accelerations. Planetary waves. The influence of wave accelerations on thermal structure and composition. Introduction to atmospheric chemistry. Dynamical transports. Observations. At the level of Andrews, *Atmospheric Physics*.

**ASTRO 577(6577) Planetary Surface Processes (also EAS 577[5770])**

Spring; 3 or 4 credits (3 credits for course only; 4 credits if registered for the lab trip—see course description below).

J. Bell.

Survey of processes involved in the formation and evolution of the surfaces of solar system bodies. Surface morphology and landforms of terrestrial planets, planetary satellites, asteroids, and comets. Fundamentals of impact cratering, volcanism, tectonism, and erosion as applied to planetary surfaces, with significant emphasis on terrestrial field examples as analogs and study sites. Basic introduction to physical, geochemical, and “space” weathering of planetary surfaces. Basic introduction to field methods and remote sensing techniques and data sets (terrestrial, spacecraft). Students enrolled in the course can participate in an optional field trip over Spring Break to a “classic” planetary surface process analog field site (e.g., Meteor Crater, Amboy, Hawaii, Grand Canyon, Death Valley) for 1 additional credit. Grading based on participation in discussions, critical literature reviews, and final project/presentation.

**ASTRO 578(6578) Planet Formation and Energy (also EAS 578[5780])**

Fall. 4 credits. J.-L. Margot and M. Pritchard.

Survey of chemical and physical processes important to the origin and evolution of planetary systems. The first part of the course will cover the formation of planets including the astronomical context, nucleosynthesis, meteoritics, condensation sequence, accretion, dynamical evolution, and observational constraints (disks, exoplanets, major planets, satellites, and small bodies). The second part of the course will cover planetary internal structure and evolution including melting, differentiation, core formation, convection, thermal evolution, and magnetic fields.

**[ASTRO 579(6579) Celestial Mechanics (also T&AM 672[6720])**

Spring. 3 credits. Next offered 2007–2008.

J. Burns.

For description, see T&amp;AM 672.]

**ASTRO 590(6590) Galaxies and the Universe**

Fall. 4 credits. R. Giovanelli and

M. Haynes.

The universe, its constituents, its large-scale structure, and its history in the light of the major thrusts of extragalactic research. The morphology, photometry, dynamics, and kinematics of galaxies and their subsystems. Determination of masses, mass-to-light ratios, and the “missing mass.” Activity in Seyferts, radio galaxies, and quasars. Binaries, groups, clusters, and superclusters. The extragalactic distance scale. Galaxy formation and evolution. Confrontation of cosmological theories with observational results.

**[ASTRO 599(6599) Cosmology (also PHYS 599[6599])**

Spring. 4 credits. Prerequisites: statistical physics, quantum mechanics, and electromagnetic theory courses. Next offered 2007–2008. R. Bean.

Intended to provide a detailed theoretical development of current ideas in cosmology. Topics include observational overview; growth of irregularities, galaxy formation, and clustering; big bang cosmology, recombination, nucleosynthesis; very early universe, symmetry breaking, inflationary scenarios. At the level of *Principles of Physical Cosmology* by Peebles.]

**ASTRO 620(7620) Seminar: Advanced Radio Astronomy**

Spring. 2 credits. Prerequisites: for advanced undergraduates, by permission of instructor. Recommended: some background in astronomical spectroscopy.

R. Giovanelli, M. Haynes, and J. Houck.

“Dwarf Galaxies: The View from 1 Meter to 1 Micron.” CDM theory describes the growth of structure through the merger of small halos formed in large numbers early-on, and while these small halos serve as the building blocks of galaxies and clusters, many low mass objects are nonetheless expected to survive to the present epoch. In this seminar, we will explore our current understanding of dwarf galaxies, their impact on hierarchical structure development and the clues about galaxy formation and evolution they carry with them especially as viewed using today’s long wavelength forefront instruments Spitzer, ALFA and the VLA and, in the future, ALMA and CCAT.

**[ASTRO 621(7621) Seminar: Planetary Radar Astronomy]**

Spring. 3 credits. Prerequisites: upper-level undergraduates and graduate students in Astronomy, engineering, and geology; good background in undergraduate mathematics and physics. Next offered 2007-2008. D. Campbell and J.-L. Margot. Discussion of radar techniques and the results from the application of these techniques to the study of solar system bodies including the Earth.]

**ASTRO 640(6940) Advanced Study and Research**

Fall or spring. Credit TBA. Guided reading and seminars on topics not currently covered in regular courses.

**[ASTRO 652(7652) Advanced Atmospheric Dynamics (also EAS 652(6520))]**

Spring. 3 credits. Next offered 2007-2008. S. Colucci and P. Gierasch.]

**[ASTRO 660(7660) Cosmic Electrodynamics (also A&EP 608(6080))]**

Spring. 2 credits. Next offered 2007-2008. R. Lovelace.

Selected topics discussed in detail: the solar wind, stellar winds, Bondi accretion, Bondi-Hoyle accretion, accretion disks with B fields, magneto-rotational instability, magneto-centrifugal winds and jets from disks, Poynting jets, funnel flows, the propeller stage of accretion, advection and convection dominated accretion flows, fast dynamo processes in astrophysics.]

**ASTRO 671(7671) Seminar: Planetary Science**

Fall. 3 credits. Next offered 2007-2008. Focuses on the astrophysics of star formation and reviews observational data about young stars and their connection with the interstellar medium from which they form. Students consider the physical processes in molecular clouds, including stability, formation of dense cores, and protostars. The impact of young stars on their surroundings—an important part of the overall process of star formation—is considered for both low- and high-mass stars. Students review the evolution of pre-main-sequence stars and examine star formation on both galactic and extragalactic scales. The class is conducted in a seminar format: students make presentations on selected topics and write and deliver a research paper.]

**[ASTRO 671(7671) Seminar: Planetary Science]**

Spring. 3 credits. Next offered 2007-2008. J. Houck, T. Herter, J. Lloyd, and G. Stacey.

Covers topics of current interest in infrared and submillimeter astrophysics, including extrasolar planets; star formation in the galaxy; nearby dwarf, starburst, and ultraluminous galaxies; and distant "proto"-galaxies. Recent results obtained with Spitzer Space Telescope and ground-based facilities are covered. The seminar includes lectures from faculty and staff and also student presentations from the readings during the course.]

**[ASTRO 673(7673) Seminar: Planetary Atmospheres]**

Spring. 2 credits. Next offered 2007-2008. P. Gierasch.

Deals with motions in planetary atmospheres. Among the topics discussed are the Venus general circulation, dust and water transports

on Mars, alternating jets on the outer planets, and compositional layering in the outer planets.]

**ASTRO 690(7690) Seminar: Computational Physics (also PHYS 480/680[4480/7680])**

Spring. 3 credits. Prerequisite: working knowledge of FORTRAN. Staff. For description, see PHYS 480/680.

**ASTRO 699(7699) Seminar: Problems in Theoretical Astrophysics (also PHYS 665(7665))**

Fall. 2 credits. D. Lai. For Fall 2006, ASTRO 699/PHYS 665 will focus on astrophysical gas dynamics. A knowledge of gas dynamics is important for understanding many of the most interesting problems in astrophysics: e.g. star and planet formation, compact objects, active galaxies, galaxy formation (the baryonic components). This course will review hydrodynamics and magnetohydrodynamics in an astrophysics context. It is intended for both theory and observational/experimental students. No previous exposure to gas dynamics is required.

**BIOLOGICAL SCIENCES**

The biological sciences ("biology") major is distinguished from other life sciences majors by its focus on basic, as opposed to applied, aspects of biology. All biology majors take courses in genetics, evolutionary biology, and biochemistry—subjects fundamental to understanding questions spanning the full spectrum of biology in the age of genomics.

In addition to taking these core courses, each student completes a Program of Study ("concentration") that affords the opportunity for acquiring a more detailed knowledge of particular subject areas: Animal Physiology, Biochemistry, Computational Biology, Ecology and Evolutionary Biology, Genetics and Development, Insect Biology, Molecular and Cell Biology, Microbiology, Neurobiology and Behavior, Nutrition, Plant Biology, and Systematics and Biotic Diversity. Alternatively, students may choose to explore three or more of these areas in the General Biology Program of Study.

The continuing rapid advances in biology are built on an ever-greater integration with the physical sciences and mathematics. Thus, the biology major is designed to provide students with a strong foundation not only in core areas of modern biology, but also in chemistry, organic chemistry, physics, and mathematics.

Students work with faculty, staff, and student advisors in selecting their Program of Study and in choosing the course options that each offers. The Office of Undergraduate Biology (OUB) in 216 Stimson Hall oversees advising for biology majors, and also coordinates the extensive program undergraduate biology research, including the biology research honors program.

The biology major is very popular among students of both the College of Agriculture and Life Sciences and the College of Arts and Sciences. It provides excellent preparation not only for advanced degrees, but also for health careers, because so many of its requirements are also requirements for medical, dental, or

veterinary programs. For more details about the biology major and minor see the section in this catalog on biological sciences or visit [www.biology.cornell.edu](http://www.biology.cornell.edu).

**BIOLOGY & SOCIETY MAJOR**

B. Chabot, director of undergraduate studies, College of Arts and Sciences; N. Breen, advising coordinator, College of Human Ecology; B. Chabot, advising coordinator, College of Agriculture and Life Sciences; E. Adkins-Regan, D. Bates, B. Bedford, W. Bemis, K. Berggren, R. Boyd, J. T. Brenna, D. Brown, R. Calvo, R. Canfield, S. Ceci, B. Chabot, C. C. Chu, W. Crepet, J. Davis, P. Dear, R. Depue, G. W. Feigenson, J. Fortune, C. Geisler, W. Ghiorse, C. Goodale, C. Greene, D. Gurak, J. Haas, A. Hajek, L. Harrington, A. Hedge, S. Hilgartner, H. C. Howland, G. Hudler, B. Johnson, B. Knuth, A. Lemley, C. Leuenberger, D. Levitsky, B. Lewenstein, B. A. Lewis, M. Lynch, S. McCouch, I. Merwin, A. Netravali, N. Noy, S. K. Obendorf, P. Parra, A. Parrot, D. Pelletier, M. Pfeffer, T. Pinch, A. G. Power, R. Prentice, W. Provine, J. V. Reppey, S. Robertson, E. Rodriguez, M. Rossiter, J. Shanahan, R. Stoltzfus, J. Tantiilo, V. Utermohlen, K. Vogel, R. Wayne, E. Wethington, T. Whitlow, S. Wolf. Emeritus: U. Bronfenbrenner, C. Eberhard, K. A. R. Kennedy, J. Fessenden MacDonald, J. Mueller, D. Pimentel, J. M. Stycos

The Biology & Society major is suited for students who wish to combine training in biology with perspectives from the social sciences and humanities on the social, political, and ethical aspects of modern biology. In addition to providing a foundation in biology, Biology & Society students gain a background in the social dimensions of modern biology and in the biological dimensions of contemporary social issues.

The Biology & Society major, which involves faculty from throughout the university, is offered by the Department of Science and Technology Studies. Students in the College of Arts and Sciences, the College of Human Ecology, and the College of Agriculture and Life Sciences are eligible for the major. The major is coordinated for students in all colleges through the Biology & Society Office. Students can get information, specific course requirements, and application procedures for the major from the Biology & Society office in 306 Rockefeller Hall, 255-6047.

Because the major is multidisciplinary, students must attain a basic understanding of the several disciplines it comprises. The curriculum includes courses in ethics; statistics; history, philosophy, and social studies of science and biology; and basic biology (e.g., genetics and development; biochemistry and molecular-cell biology; ecology; evolutionary biology), as well as integrative courses offered through Biology & Society. Majors are required to take a core course and must develop a theme, an intellectually coherent grouping of courses representative of their special interest in Biology & Society. Recommended themes in the Biology & Society major include biology, behavior, and society; biology and human population; biology and public policy; environment and society; and health and society. Students may also develop their own individually tailored themes (which in

recent years have included topics such as biotechnology and society and agriculture, environment, and society). In consultation with their faculty advisor, students select courses that meet the foundation and core course requirements so as to build a coherent theme. Sample curricula for the recommended themes and for several student-developed themes are available in the Biology & Society office.

Faculty members are available (according to posted office hours or by appointment) in the Biology & Society offices, 306 Rockefeller Hall, to answer questions and to provide assistance.

## Admission to the Major

All students should have completed a year of college-level biology before submitting an application during their sophomore year. Juniors are considered on a case-by-case basis. Upper-division applicants should realize the difficulties of completing the major requirements in fewer than two years. Freshmen admitted to the Colleges of Agriculture and Life Sciences and Human Ecology as Biology & Society majors are considered to have been admitted to the major on a provisional basis, contingent on successful completion of the course sequence in introductory biology and submission of the application to the university major. The application includes (1) a one-page statement explaining the student's intellectual interests in the Biology & Society major and why the major is consistent with the student's academic goals and interests; (2) the theme the student wishes to pursue in the major; (3) a tentative plan of courses fulfilling Biology & Society requirements, including courses already taken and those the student plans to take; and (4) a transcript of work completed at Cornell University (and elsewhere, if applicable), current as of the date of application.

Acceptance into the major requires completion of the course sequence in introductory biology. Sophomores in the process of completing this prerequisite may be admitted to the major on a *provisional* basis. It is the student's responsibility to assure that final acceptance is granted upon satisfactory completion of the introductory biology sequence. Although only introductory biological science is a prerequisite for acceptance, students find it useful to have completed some of the other requirements (listed below) by the end of their sophomore year, preferably by the end of the first semester. Students who are considering the major may also find it beneficial to take S&TS 201, What Is Science?, in their freshman or sophomore year. Human Ecology students should also consult the current Human Ecology guide and meet with the college advising coordinator, Nancy Breen, 205 Martha Van Rensselaer Hall, 255-1928.

## Major Requirements

No single course may satisfy more than one major requirement. All courses must be taken for a letter grade.

### 1. Basic courses

- BIO G 101–104 or 105–106 or 107–108 (prerequisite for admission to Biology & Society).
- College calculus (one course):\* MATH 106, 111, 112 or any higher-level calculus.

- Recommended but not required: General chemistry (one-year sequence) (prerequisite to biochemistry and other chemistry courses): CHEM 103–104, 206, 207–208, or 215–216.

### 2. Foundation Courses (should be completed by end of junior year). Foundation courses are intended to provide a broad introduction to methodology and theory in their area.

These courses must be above the 100 level, at least 3 credit hours, and taken for a letter grade.

- Ethics: one course; B&SOC 205 (also S&TS 205) or B&SOC 206 (also S&TS 206, PHIL 246).\*
- Social sciences/humanities foundation: two courses; one from any two of the following subject areas: history of science; philosophy of science; sociology of science; politics of science; and science communication.\*\*
- Biology foundation (breadth requirement): three courses; one each from three of the following subject areas: biochemistry, molecular and cell biology (BIOBM 330 or 331 or 333 or NS 320); ecology (BIOEE 261, BIOSM 364, BIOSM 375); genetics and development (BIOGD 281 or 282 or PL BR 225); evolutionary biology (BIOEE 278); animal behavior (BIONB 221, BIOSM 329); neurobiology and behavior (BIONB 222); physiology and anatomy (BIOAP 311 but *not* BIOAP 212); biological diversity (BIOPL 241 or BIOMI 290 or BIOEE 373 or 274 or 450 and 470 or 472 or 475 or 476 or ENTOM 212 or PL PA 301 or 309 or BIOSM 310 or 374 or 377 or 449); nutrition (NS 115).
- Biology foundation (Depth requirement): one biology course for which one of the above (2c) is a prerequisite.\*\*\*
- Statistics: one course selected from MATH 171, BTRY 301, AEM 210, SOC 301, PSYCH 350, ECON 319, PAM 210, ILRST 212.

### 3. Core Course\*\*: (one course). Should be completed by end of junior year.

B&SOC 301 Life Sciences and Society (also S&TS 301); or S&TS 286 Science and Human Nature (also PHIL 286).

### 4. Theme (five courses that correspond to the theme selected by the student). These courses must be above the 100-level, at least 3 credit hours, and taken for a letter grade. Choose these courses as follows:

- Natural science issues/biology elective (two courses). Select from the list of B&SOC approved natural science issues courses or choose course(s) with introductory biology as a prerequisite.
- Humanities/social sciences electives\*\* (two courses). Courses from the list of senior seminars may be used as theme electives if not used to meet another requirement, or select humanities or social sciences courses in consultation with the faculty advisor.
- Senior seminar\*\* (one course taken senior year). Courses change yearly.

- \* Students may petition to take a second statistics course (an advanced course, in sequence with the statistics course taken in the foundation) in place of the calculus requirement.

- \*\* Among the courses taken to meet the social sciences and humanities requirements (2.A, 2.B, 3, 4.B, and 4.C), a minimum of two social science courses and two humanities courses must be chosen. History of science, philosophy of science, and ethics courses may be counted toward the humanities requirement for the major.

- \*\*\* A list of approved depth courses using NS 115 as a prerequisite is available in 306 Rockefeller Hall.

## Independent Study

Projects under the direction of a Biology & Society faculty member are encouraged as part of the program of study in the student's theme area. Applications for research projects are accepted by individual faculty members. Students may enroll for 1–4 credits in B&SOC 375 Independent Study with written permission of the faculty supervisor and may elect either the letter grade or the S-U option. Applications and information on faculty research, scholarly activities, and undergraduate opportunities are available in the Biology & Society office, 306 Rockefeller Hall. Independent study credits may not be used in completion of the major requirements.

## The Honors Program

The honors program is designed to provide independent research opportunities for academically talented undergraduate students whose major is Biology & Society (B&SOC). Students who enroll in the honors program are expected, with faculty guidance, to do independent study and research dealing with issues in Biology & Society. Students participating in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career.

Biology & Society majors are considered for entry into the honors program at the end of the second semester of the junior year. Application forms for the honors program are available in the Biology & Society office, 306 Rockefeller Hall. The honors program is available to Biology & Society majors from the Colleges of Arts and Sciences and Agriculture and Life Sciences. Biology & Society majors in the College of Human Ecology must be selected by an honors committee within their college. To qualify for the Biology & Society honors program, students must have an overall Cornell cumulative grade point average (GPA) of at least 3.3, have formulated a research topic, and have found a project supervisor (with an academic appointment at Cornell) and another faculty member willing to serve as their advisors. At least one of these must be a member of the Biology & Society major. Applications will be reviewed by a committee headed by the director of undergraduate studies, who will notify students directly of the outcome. Students will be permitted to register for the honors program only by permission of the department. Students must enroll for both the fall and spring semesters. B&SOC 499 is now cross-listed with the College of Agriculture and Life Sciences as ALS 499. Students wishing



to receive CALS credit can sign up for ALS 499. They must attend the honors seminar during the fall semester. More information on the honors program is available in the Biology & Society Office, 306 Rockefeller Hall, 255-6047.

**People to contact for Biology & Society honors information:**

In Arts and Sciences: Brian Chabot, director of undergraduate studies, bfc1@cornell.edu

In Agriculture and Life Sciences: David Pimentel, faculty representative to CALS Honors Committee, dp18@cornell.edu

In Human Ecology: Nancy Breen, advising coordinator, CHE, neb5@cornell.edu

**Further Information**

Professor Brian Chabot, director of undergraduate studies and advising coordinator, College of Agriculture and Life Sciences, bfc1@cornell.edu

Dr. Nancy Breen, advising coordinator, College of Human Ecology, neb5@cornell.edu

Susan Sullivan, Biology & Society Advising Office, 306 Rockefeller Hall, 255-6047, sfc1@cornell.edu

web site: www.sts.cornell.edu

**I. First-Year Writing Seminars**

Consult the John S. Knight Institute web site for times, instructors, and descriptions. Web site: www.arts.cornell.edu/Knight\_institute/index.html.

**II. Introductory Courses**

**S&TS 101(1101) Science and Technology in the Public Arena (SBA)**

Fall. 3 credits. Recommended as introduction to field. Not required; may not be used to fulfill major requirement. S&TS 101 and 102 can be taken separately or in any order. J. Reppy.

For description, see S&TS listings, S&TS 101.

**S&TS 102(1102) Histories of the Future (CA)**

Spring. 3 credits. Recommended as an introduction to the field. Not required; may not be used to fulfill a major requirement. S&TS 101 and 102 may be taken separately or in any order. R. Prentice.

For description, see S&TS listings, S&TS 102.

**III. Foundation Courses**

**A. Ethics (one course)**

**B&SOC 205(2051) Ethical Issues in Health and Medicine (also S&TS 205[2051]) (KCM)**

Fall. 4 credits. Limited to 150 students. Not open to freshmen. S. Hilgartner.

In today's rapidly changing world of health and medicine, complex ethical issues arise in many contexts—from the private, interpersonal interactions between doctor and patient to the broad, mass-mediated controversies that make medicine into headline news. This course examines ethical problems and policy issues that arise in contemporary medicine, health care, and biomedical research. Tools for ethical analysis are applied to a variety of cases and fundamental questions in bioethics. Perspectives from social science, history, and law also inform the course. The course explores ethical questions that arise in a

number of substantive contexts, including the doctor-patient relationship, medical decision making near the end of life, human experimentation, genetics and reproductive technology, public health, and the allocation of scarce resources.

**B&SOC 206(2061) Ethics and the Environment (also S&TS 206[2061], PHIL 246[2460]) (KCM)**

Spring. 4 credits. Limited to 50 students.

Open to all undergraduates; freshmen by permission of instructor. Staff.

Aims to acquaint students with moral issues that arise in the context of the environment and environmental policy. Our concerns about the environment bring to our attention the importance of economic, epistemological, legal, political, and social issues in assessing our moral obligations to other humans and the natural world. The attempt is then to explore how different factors come into play in defining our responsibilities to the environment and to examine the grounds for our environmental policy decisions. A background in basic ecology or environmental issues or ethics is helpful.

**B. Social Sciences/Humanities Foundation (two courses, one from any two areas)**

**1. History of Science**

**HIST 315(3150) Environmental History: The U.S. and the World (also AM ST 349)**

Spring. 4 credits. A. Sachs.

For description, see HIST 315.

**NTRES 232(2320) Nature and Culture**

Spring. 3 credits. J. Tantillo.

For description, see NTRES 232.

**NTRES 336(3360) History of Environmental Sciences**

Fall. 3 credits. M. Muskett.

For description, see NTRES 336.

**S&TS 233(2331) Agriculture, History, and Society: From Squanto to Biotechnology**

Fall. 3 credits. M. Rossiter.

For description, see S&TS listings, S&TS 233.

**S&TS 282(2821) Science in Western Civilization (also HIST 282[2820])**

Spring. 4 credits. P. Dear.

For description, see HIST 282.

**S&TS 287(2871) Evolution (also BIOEE 207[2070], HIST 287[2870])**

Fall or summer. 3 credits. May not be taken for credit after BIOEE 278.

W. Provine.

For description, see BIOEE 207.

**S&TS 355(3551) Computers: From the 17th Century to the Dot.com Boom (also INFO 355[3551], COMM 355[3551])**

Fall. 4 credits. S&TS 355 and 356 may be taken separately or in any order.

K. Lambert.

For description, see S&TS listings, S&TS 355.

**[S&TS 356(3561) Computing Cultures (also COMM 356[3561], INFO 356[3561], VISS 356[3560])**

Spring. 4 credits. S&TS 355 and 356 may be taken separately or in any order. Next offered 2007-2008. P. Sengers or R. Prentice.

For description, see S&TS 356.]

**S&TS 433(4331) International History of Science**

Spring. 4 credits. M. Rossiter.

For description, see S&TS listings, S&TS 433.

**S&TS 444(4441) Historical Issues of Gender and Science (also FGSS 444[4440])**

Spring. 4 credits. M. Rossiter.

For description, see S&TS listings, S&TS 444.

**S&TS 447(4471) Seminar in the History of Biology (also BIOEE 467[4670], B&SOC 447[4471], HIST 415[4150])**

Fall or summer (six-week session). 4

credits. Limited to 18 students. S-U grades optional. W. Provine.

For description and prerequisites, see BIOEE 467.

**2. Philosophy of Science**

**S&TS 201(2011) What Is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210[2100])**

Spring. 3 credits. K. Lambert.

For description, see S&TS listings, S&TS 201.

**S&TS 286(2861) Science and Human Nature (also PHIL 286[2860])**

Spring. 4 credits. May be used to meet

philosophy of science requirement *if not* used to meet core course requirement.

R. Boyd.

For description, see PHIL 286.

**S&TS 381(3811) Philosophy of Science: Knowledge and Objectivity (also PHIL 381[3810])**

Fall. 4 credits. R. Boyd.

For description, see PHIL 381.

**3. Sociology of Science**

**B&SOC 301(3011) Life Sciences and Society (also S&TS 301[3011]) (SBA)**

Fall. 4 credits. May be used to meet sociology of science requirement *if not* used to meet core course requirement.

M. Lynch.

For description, see "Core Courses," B&SOC 301.

**[HD 452(4520) Culture and Human Development**

Fall. 3 credits. Next offered 2007-2008.

Q. Wang.

For description, see HD 452.]

**NS 245(2450) Social Science Perspectives on Food and Nutrition**

Fall. 3 credits. C. Bisogni and J. Sobal.

For description, see NS 245.

**D SOC 220(2200) Sociology of Health and Ethnic Minorities (also LSP 220[2200])**

Fall. 3 credits. P. Parra.

For description, see D SOC 220.

**S&TS 201(2011) What Is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210[2100])**

Spring. 3 credits. K. Lambert.

For description, see S&TS listings, S&TS 201.

**S&TS 311(3111) The Sociology of Medicine**

Spring. 4 credits. Not open to freshmen.

C. Leuenberger.

For description, see S&TS 311.



**S&TS 411(4111) Knowledge, Technology, and Property**

Spring. 4 credits. S. Hilgartner.  
For description, see S&TS 411.

**4. Politics of Science****B&SOC 407(4071) Law, Science, and Public Values (also S&TS 407[4071])**

Spring. 4 credits. M. Lynch.  
For description, see S&TS listings, S&TS 407.

**[CRP 380(3800) Environmental Politics**

Fall. 4 credits. R. Booth.  
For description, see CRP 380.]

**PAM 230(2300) Introduction to Policy Analysis**

Fall. 4 credits. R. Avery and J. Gerner.  
For description, see PAM 230.

**S&TS 324(3241) Environment and Society (also D SOC/SOC 324[3240])**

Fall and spring. 3 credits. C. Geisler and G. Gillespie.  
For description, see D SOC 324.

**S&TS 391(3911) Science in the American Polity: 1960 to Now (also GOVT 309[3091], AM ST 389[3891])**

Spring. 4 credits. S. Hilgartner.  
For description, see S&TS 391.

**5. Science Communication****COMM 260(2600) Scientific Writing for Public Information**

Fall and spring. 3 credits. Limited to 25 non-freshmen or graduate students per section. Not open to freshmen. S. Conroe.  
For description and prerequisites, see COMM 260.

**COMM 421(4210) Communication and the Environment**

Spring. 3 credits. May be used in Foundation only if not taken as senior seminar. Offered odd-numbered years. J. Shanahan.  
For description, see COMM 421.

**S&TS 285(2851) Communication in the Life Sciences (also COMM 285[2850])**

Spring. 3 credits. B. Lewenstein and S. Conroe.  
For description, see COMM 285.

**S&TS 352(3521) Science Writing for the Mass Media (also COMM 352[3520])**

Fall. 3 credits. B. Lewenstein and S. Conroe.  
For description and prerequisites, see COMM 352.

**S&TS 466(4661) Public Communication of Science and Technology (also COMM 466[4660])**

Spring. 3 credits. Limited to 15 students. May be used in Foundation only if not taken as senior seminar. B. Lewenstein.  
For description and prerequisites, see COMM 466.

**C. Biology foundation** (breadth requirement): Three courses: one from three of the following subject areas:

**1. Biochemistry, Molecular and Cell Biology****BIOBM 330(3300) Principles of Biochemistry, Individual Instruction**

Fall and spring. 4 credits. J. Blankenship, P. Hinkle, and staff.  
For description and prerequisites, see BIOBM 330.

**BIOBM 331(3310) Principles of Biochemistry: Proteins and Metabolism**

Fall. 3 credits. May not be taken for credit after BIOBM 330 or 333. G. Feigenson.  
For description and prerequisites, see BIOBM 331.

**BIOBM 333(3330) Principles of Biochemistry, Lectures**

Summer. 4 credits. H. Nivison.  
For description and prerequisites, see BIOBM 333.

**NS 320(3200) Introduction to Human Biochemistry**

Fall. 4 credits. P. Stover.  
For description and prerequisites, see NS 320.

**2. Ecology****BIOEE 261(2610) Ecology and the Environment**

Fall and summer. 4 credits. Not open to freshmen. Fall, A. Flecker and J. Sparks; summer, A. Vawter.  
For description and prerequisites, see BIOEE 261.

**BIOBM 364(3640) Field Marine Science**

Summer. 6 credits. Taught at the Shoals Marine Laboratory, for more information and application, contact the SML office at G14 Stimson Hall. Staff.  
For description and prerequisites, see BIOBM 364.

**BIOBM 375(3750) Field Marine Biology and Ecology**

Summer. 6 credits. Taught at the Shoals Marine Laboratory, for more information and application, contact the SML office at G14 Stimson Hall. Staff.  
For description and prerequisites, see BIOBM 375.

**3. Genetics and Development****BIOGD 281(2810) Genetics**

Fall, spring, and summer. 5 credits. Limited to 200 students. Not open to freshmen fall semester. M. Goldberg, T. Fox, R. MacIntyre, and D. Nero.  
For description and prerequisites, see BIOGD 281.

**BIOGD 282(2820) Human Genetics**

Spring. 2 or 3 credits (2 credits if taken after BIOGD 281); must be taken for 3 credits to fulfill Biology & Society requirements. Limited to 25 students per disc. M. Goldberg.  
For description and prerequisites, see BIOGD 282.

**PL BR 225(2250) Plant Genetics**

Spring. 3 credits. M. Mitschler.  
For description, see PL BR 225.

**4. Evolutionary Biology****BIOEE 278(2780) Evolutionary Biology**

Fall and spring and summer. 3 or 4 credits. Fall, I. Lovette; spring, M. Shulman.  
For description, see BIOEE 278.

**5. Animal Behavior****BIONB 221(2210) Neurobiology and Behavior I: Introduction to Behavior**

Fall. 3, 4, or 5 credits. C. Walcott.  
For description and prerequisites, see BIONB 221.

**BIOBM 329(3290) Ecology of Animal Behavior**

Summer. 4 credits. Taught at the Shoals Marine Laboratory, for more information, contact the SML office at G14 Stimson Hall. Staff.

For description and prerequisites, see BIOBM 329.

**6. Neurobiology and Behavior****BIONB 222(2220) Neurobiology and Behavior II: Introduction to Neurobiology**

Spring. 3 or 4 credits. R. Booker and staff.  
For description and prerequisites, see BIONB 222.

**7. Physiology and Anatomy****BIOAP 311(3110) Introductory Animal Physiology, Lectures (also VTBMS 346)**

Fall. 3 credits. E. Loew and staff.  
For description and prerequisites, see BIOAP 311.

**8. Biological Diversity****BIOMI 290(2900) General Microbiology Lectures**

Fall, spring, and summer. 2 or 3 credits; must be taken for 3 credits to fulfill major requirement. B. Batzing (summer) and W. Ghiorse.  
For description and prerequisites, see BIOMI 290.

**BIOPL 241(2410) Introductory Botany**

Fall. 3 credits. K. Niklas.  
For description, see BIOPL 241.

**BIOEE 274(2740) The Vertebrates: Structure, Function, and Evolution**

Spring. 4 credits. K. Zamudio.  
For description and prerequisites, see BIOEE 274.

**[BIOEE 373(3730) Biology of the Marine Invertebrates**

Fall. 5 credits. Next offered 2007–2008. D. Harvell and J. Morin.  
For description and prerequisites, see BIOEE 373.]

**BIOEE 450(4500) Mammalogy (Lecture)**

Spring. 3 credits. B. A. McGuire.  
For description and prerequisites, see BIOEE 450.

**BIOEE 470(4700) Herpetology, Lectures**

Spring. 2 credits; must be taken in conjunction with 472 to count for major credit. H. Greene.  
For description and prerequisites, see BIOEE 470.

**BIOEE 472(4720) Herpetology, Laboratory**

Spring. 2 credits; must be taken in conjunction with 470 to count for major credit. Offered alternate years. H. Greene.  
For description and prerequisites, see BIOEE 472.

**[BIOEE 475(4750) Ornithology**

Spring. 4 credits. Next offered 2007–2008. D. Winkler.  
For description and prerequisites, see BIOEE 475.]

**BIOEE 476(4760) Biology of Fishes**

Fall. 4 credits. A. McCune.  
For description and prerequisites, see BIOEE 476.

**BIOSM 310(3100) Marine Symbiosis**

Summer. 4 credits. Taught at the Shoals Marine Laboratory, for more information, contact the SML office at G14 Stimson Hall. Staff.

For description and prerequisites, see BIOSM 310.

**BIOSM 374(3740) Field Ornithology**

Summer. 4 credits. Taught at the Shoals Marine Laboratory, for more information, contact the SML office at G14 Stimson Hall. Staff.

For description and prerequisites, see BIOSM 374.

**BIOSM 377(3770) Diversity of Fishes**

Summer. 4 credits. Taught at the Shoals Marine Laboratory, for more information, contact the SML office at G14 Stimson Hall. Staff.

For description and prerequisites, see BIOSM 377.

**BIOSM 449(4490) Seaweeds, Plankton, and Seagrass: the Ecology and Systematics of Marine Plants.**

Summer. 4 credits. Taught at the Shoals Marine Laboratory, for more information, contact the SML office at G14 Stimson Hall. Staff.

For description and prerequisites, see BIOSM 449.

**ENTOM 212(2120) Insect Biology**

Fall. 4 credits. C. Gilbert.

For description and prerequisites, see ENTOM 212.

**PL PA 301(3010) Plant Disease Management**

Fall. 3 credits. M. Milgroom.

For description, see PL PA 301.

**PL PA 309(3090) Fungi**

Fall. 3 credits. K. Hodge.

For description and prerequisites, see PL PA 309.

**9. Nutrition****NS 115(1150) Nutrition, Health, and Society**

Fall. 3 credits. D. Levitsky.

For description, see NS 115.

**D. Biology foundation** (depth requirement): one course for which one of the above breadth requirement courses (2C) is a prerequisite.

**E. Statistics** (one course)**AEM 210(2100) Introductory Statistics**

Spring. 4 credits. C. VanEs.

For description and prerequisites, see AEM 210.

**BTRY 301(3010) Statistical Methods I**

Fall and summer. 4 credits. F. King and staff.

For description and prerequisites, see BTRY 301.

**ECON 319(3190) Introduction to Statistics and Probability**

Fall and spring. 4 credits. Y. Hong.

For description and prerequisites, see ECON 319.

**ILRST 212(2120) Statistical Reasoning**

Fall. 3 credits. P. Velleman.

For description, see ILRST 212.

**MATH 171(1710) Statistical Theory and Application in the Real World**

Fall and spring. 4 credits. Staff.

For description, see MATH 171.

**PAM 210(2100) Introduction to Statistics**

Fall and spring. 4 credits. K. Joyner, J. Lewis, R. Swisher, and S. Unur.

For description, see PAM 210.

**PSYCH 350(3500) Statistics and Research Design**

Fall. 4 credits. Staff.

For description, see PSYCH 350.

**SOC 301(3010) Evaluating Statistical Evidence (also D SOC 302(3020))**

Fall. 4 credits. Limited to Arts and Sciences students. Staff.

For description, see SOC 301.

**IV. Core Courses****B&SOC 301(3011) Life Sciences and Society (also S&TS 301(3011)) (SBA)**

Fall. 4 credits. Limited to 50 students.

Prerequisite: two semesters of social science or humanities and one year of introductory biology or permission of instructor. M. Lynch.

Critical thinking about the diverse influences shaping the life sciences. Topics include evolution and natural selection, heredity and genetic determinism, biotechnology, and reproductive interventions. Students interpret episodes, past and present, in biology in light of scientists' historical location, economic and political interests, use of language, and ideas about causality and responsibility. Readings, class activities, and written assignments are designed so that students develop interpretive skills and explore their own intellectual and practical responses to controversies in biology and society.

**S&TS 286(2861) Science and Human Nature (also PHIL 286(2860))**

Spring. 4 credits. R. Boyd.

For description, see PHIL 286.

**V. Themes****A. Natural Science Issues/Biology**

**Elective** (two courses). Select from the following list of B&SOC approved natural science issues courses or choose course(s) with intro biology as a prerequisite.

**B&SOC 214(2141) Biological Basis of Sex Differences (also BIOAP/FGSS 214(2140)) (PBS)**

Fall. 3 credits. J. Fortune.

For description, see BIOAP 214.

**B&SOC 347(3471) Human Growth and Development: Biological and Behavioral Interactions (also HD/NS 347(3470))**

Spring. 3 credits. Offered alternate years.

J. Haas and S. Robertson.

For description and prerequisites, see HD 347.

**[BIOEE 275(2750) Human Biology and Evolution (also ANTHR/NS 275(2750))**

Fall. 3 credits. Next offered 2007-2008.

K. Kennedy and J. Haas.

For description, see BIOEE 275.]

**[BIOEE 673(6730) Human Evolution: Concepts, History, and Theory (also ANTHR 673(6733))**

Fall. 3 credits. Next offered 2008-2009.

K. Kennedy.

For description, see BIOEE 673.]

**BIO G 305(3050) Basic Immunology**

Fall. 3 credits. J. Marsh.

For description, see BIO G 305.

**BIOPL 247(2470) Ethnobiology**

Fall. 3 credits. Offered alternate years. D. Bates.

For description, see BIOPL 247.

**[ENTOM 210(2100) Plagues and People (also B&SOC 210(2101))**

Fall. 3 credits. Next offered 2007-2008. L. Harrington.

For description, see ENTOM 210.]

**ENTOM 277(2770) Natural Enemies and Invasive Species**

Spring. 2-3 credits (Biology & Society students must take 3-credit option). A. Hajek.

For description, see ENTOM 277.

**EAS 322(3220) Biogeochemistry of the Hawaiian Islands**

Spring. 4 credits. Students must apply via Cornell Abroad for Hawaii program.

L. Derry.

For description, see EAS 322.

**EAS 351(3510) Marine Ecosystems Field Course**

Spring. 4 credits. Students must apply via Cornell Abroad for Hawaii program.

C. Greene and B. Monger.

For description, see EAS 351.

**HD 220(2220) Biological Issues in Human Development: The Human Brain and Mind**

Fall. 3 credits. E. Temple.

For description, see HD 220.

**HD 266(2660) Emotional Functions of the Brain**

Spring. 3 credits. R. Depue.

For description, see HD 266.

**HD 320(3200) Human Developmental Neuropsychology: Neurobiology of Human Diseases and Disorders**

Spring. 3 credits. E. Temple.

For description, see HD 320.

**[HD 344(3440) Infant Behavior and Development**

Fall. 3 credits. Not open to freshmen. Next offered 2007-2008. S. Robertson.

For description and prerequisites, see HD 344.]

**HD 366(3660) Psychobiology of Temperament and Personality**

Fall. 3 credits. R. DePue.

For description and prerequisites, see HD 366.

**[HD 433(4330) Developmental Cognitive Neuroscience**

Spring. 3 credits. May be used as depth course if BIONB 221 or 222 taken as breadth. Next offered 2007-2008.

E. Temple.

For description, see HD 433.]

**HD 337(3370) Language Development (also LING436(4436)/PSYCH/COGST 436(4360))**

Spring. 4 credits. B. Lust.

For description, see HD 437.

**[NS 222(2220) Maternal and Child Nutrition**

Fall. 3 credits. Limited to 25 students. Next offered 2007-2008. P. Brannon.

For description and prerequisites, see NS 222.]

**NS 331(3310) Physiological and Biochemical Bases of Human Nutrition**

Spring. 4 credits. C. McCormick.

For description and prerequisites, see NS 331.

**[NS 361(3610) Biology of Normal and Abnormal Behavior (also PSYCH 361(3610))]**

Spring. 3 credits. Prerequisite: junior or senior standing. Next offered 2007–2008. B. Strupp.

For description and prerequisites, see NS 361.]

**NS 452(4520) Molecular Epidemiology and Dietary Markers of Chronic Disease**

Spring. 3 credits. P. Cassano.

For description and prerequisites, see NS 452.

**[NS 475(4750) Mechanisms of Birth Defects]**

Spring. 3 credits. Next offered 2007–2008. P. Stover.

For description and prerequisites, see NS 475.]

**NTRES 201(2010) Environmental Conservation**

Spring. 3 credits. T. Fahey.

For description, see NTRES 201.

**NTRES 428(4280) Principles and Practices of Applied Wildlife Science**

Spring. 3 credits. M. Richmond, P. Curtis and R. Malecki.

For description, see NTRES 428.

**PSYCH 223(2230) Introduction to Biopsychology**

Fall. 3 credits. Staff.

For description, see PSYCH 223.

**PSYCH 326(3260) Evolution of Human Behavior**

Spring. 4 credits. Staff.

For description and prerequisites, see PSYCH 326.

Examples of biology electives

**AN SC 300(3000) Animal Reproduction and Development**

Spring. 3 credits. J. Parks.

For description, see AN SC 300.

**HD 366(3660) Psychobiology of Temperament and Personality**

Fall. 3 credits. R. DePue.

For description and prerequisites, see HD 366.

**NS 331(3310) Physiological and Biochemical Bases of Human Nutrition**

Spring. 4 credits. C. McCormick.

For description, see NS 331.

**B. Humanities/Social Science elective (two courses)**

Courses listed earlier as social science/humanities foundation courses (2B) are particularly appropriate as social science/humanities electives. However, a single course cannot be used to meet both requirements. Examples of recommended social science or humanities electives are listed below. A more complete list is available in 306 Rockefeller Hall.

Examples of social science electives

**AEM 464(4640) Economics of Agricultural Development (also ECON 464(4640))**

Fall. 3 credits. R. Christy.

For description, see AEM 464.

**[ANTHR 211(2411) Nature and Culture]**

Spring. 4 credits. Next offered 2008–2009. S. Sangren.

For description, see ANTHR 211.]

**B&SOC 331(3311) Environmental Governance (also S&TS 331(3311), NTRES 331(3310))**

Spring. 3 credits. S. Wolf.

For description, see NTRES 331.

**[BIOEE 671(6710) Paleoanthropology of South Asia (also ANTHR 671(6371))]**

Fall. 3 credits. Next offered 2008–2009.

K. Kennedy.

For description, see BIOEE 671.]

**CRP 451(4510) Environmental Law (also CRP 551(5510))**

Fall. 4 credits. R. Booth.

For description, see CRP 451.

**D SOC 205(2050) Rural Sociology and International Development (also SOC 206(2060))**

Spring. 3 credits. P. McMichael.

For description, see D SOC 205.

**SOC 410(4100) Health and Survival Inequalities (also D SOC 410(4100), FGSS 410(4100))**

Fall. 4 credits. A. Basu.

For description, see SOC 410.

**HD 251(2510) Social Gerontology: Aging and the Life Course**

Spring. 3 credits. Limited to 60 students.

Highly recommended: HD 250 or equivalent, to be determined by instructor. E. Wethington.

For description, see HD 251.

**[HD 336(3360) Connecting Social, Cognitive, and Emotional Development]**

Fall. 3 credits. Next offered 2007–2008.

P. Casasola.

For description and prerequisites, see HD 336.]

**[HD 362(3620) Human Bonding]**

Fall. 3 credits. Next offered 2007–2008.

C. Hazan.

For description, see HD 362.]

**HD 370(3700) Adult Psychopathology (also PSYCH 325(3250))**

Spring. 3 credits. H. Segal.

For description, see HD 370.

**[HD 457(4570) Health and Social Behavior (also SOC 457(4570))]**

Fall. 3 credits. Next offered 2007–2008.

E. Wethington.

For description, see HD 457.]

**NS 421(4210) Nutrition and Exercise**

Spring. 3 credits. Limited to nutrition majors, others by permission of the Instructor. S. Travis.

For description and prerequisites, see NS 421.

**NS 450(4500) Public Health Nutrition**

Spring. 3 credits. K. Rasmussen and D. Pelletier.

For description and prerequisites, see NS 450.

**NS 650(6500) Food and Nutrition Assessment in a Social Context**

Fall. 3 credits. D. Pelletier and G. Peltó.

For description and prerequisites, see NS 650.

**NTRES 333(3330) Environmental Issues and Indigenous People**

Spring. 3 credits. M. Muskett.

For description, see NTRES 333.

**NTRES 431(4310) Environmental Strategies**

Spring. 3 credits. S. Wolf.

For description, see NTRES 431.

**NTRES 435(4350) Tribal Governance and Environmental Policy**

Fall. 3 credits. M. Muskett.

For description, see NTRES 435.

**PAM 303(3030) Ecology and Epidemiology of Health**

Fall. 3 credits. Staff.

For description, see PAM 303.

**PAM 350(3500) Contemporary Issues in Women's Health (also FGSS 350(3500))**

Fall. 3 credits. A. Parrot.

For description, see PAM 350.

**PAM 380(3800) Human Sexuality**

Spring. 4 credits. A. Parrot.

For description, see PAM 380.

**PAM 435(4350) U.S. Health Care System**

Fall. 3 credits. R. Battistella.

For description, see PAM 435.

**PAM 437(4370) Economics of Health Policy**

Spring. 3 credits. K. Simon.

For description and prerequisites, see PAM 437.

Examples of humanities electives

**PHIL 241(2410) Ethics**

Fall. 4 credits. N. Sturgeon.

For description, see PHIL 241.

**S&TS 481(4811) Philosophy of Science (also PHIL 481/681(4810/6810))**

Spring. 4 credits. R. Boyd.

For description, see PHIL 681.]

**C. Senior Seminars****B&SOC 420(4201) The Darwinian Scientific Revolution (also S&TS 420(4201)) (HA)**

Fall. 4 credits. K. Lambert.

Looks at the emergence of Darwinism in the social and scientific context of 19th-century industrial Britain, asking how both scientists and a newly emerged mass audience viewed the controversies raised by Darwinian and non-Darwinian theories of evolution. By listening in on these conversations about class, race, sex, and religion, the class explores science as an integral part of the culture and society of the Victorian period.

**B&SOC 447(4471) Seminar in the History of Biology (also BIOEE 467(4670), HIST 415(4150), S&TS 447(4471)) (PBS)**

Summer. six-week session. 4 credits.

W. Provine.

For description, see BIOEE 467.

**B&SOC 461(4611) Environmental Policy (also BIOEE/ALS 661) (PBS)**

Fall and spring (yearlong); must be started in fall. 3 credits each semester. Limited to 12 students. D. Pimentel.

For description and prerequisites, see BIOEE 661.

**B&SOC 471(4711) The Dark Side of Biology: Biological Weapons, Bioterrorism, and Biocriminality (also S&TS 471(4711)) (SBA)**

Fall. 4 credits. Prerequisites: at least one course in S&TS and one semester of biology beyond introductory biology. K. Vogel.

Rapid advances in biotechnology, as well as changing social and political climates, have created new public fears that the malicious release of pathogens and toxins by states and/or terrorist groups is a serious threat. Debates have also emerged as to what biological research and publications should be restricted and censored to prevent misuse. The course explores the scientific, social, political, legal, and ethical discussions surrounding historical and current work on dangerous pathogens and toxins. This course also takes a look at the role that the expert and lay communities play in the shaping of popular perceptions and public policies in these threat discussions.

**B&SOC 496(4961) History of Medicine in China (also HIST 496(4960) and S&TS 496(4961))**

Spring. 4 credits. T. J. Hinrichs.  
For description, see HIST 496.

**COMM 421(4210) Communication and the Environment**

Spring. 3 credits. Offered odd-numbered years. J. Shanahan.  
For description, see COMM 421.

**CSS 410(4100) Environmental Impacts of Agricultural Biotechnology**

Spring. 3 credits. D. Buckley and P. Hobbs.  
For description, see CSS 410.

**[HD 336(3360) Connecting Social, Cognitive and Emotional Development**

Fall. 3 credits. Next offered 2007-2008. M. Casasola.  
For description, see HD 336.]

**HD 366(3660) Psychobiology of Temperament and Personality**

Fall. 3 credits. R. Depue.  
For description and prerequisites, see HD 366.

**[HD 418(4180) Aging: Contemporary Issues**

Fall. 3 credits. Next offered 2007-2008. S. Cornelius.  
For description, see HD 418.

**[HD 419(4190) Midlife Development**

Spring. 3 credits. Next offered 2008-2009. S. Cornelius.  
For description, see HD 419.]

**HD 432(4320) Cognitive, Social, and Developmental Aspects of Scientific Reasoning (also COGST 432(4320))**

FALL. 3 credits. B. Koslowski.  
For description, see HD 432.

**[HD 464(4640) Adolescent Sexuality (also FGSS 467)**

Fall. 3 credits. Next offered 2007-2008. R. Savin-Williams.  
For description, see HD 464.]

**HD 468(4680) Stress in Childhood and Adolescence**

Spring. 3 credits. J. Eckenrode.  
For description, see HD 468.

**NS 452(4520) Molecular Epidemiology and Dietary Markers of Chronic Disease**

Spring. 3 credits. P. Cassano.  
For description, see NS 452.

**NTRES 433(4330) Applied Environmental Philosophy**

Spring. 4 credits. J. Tantillo.  
For description, see NTRES 433.

**PAM 552(5520) Health Care Services: Consumer and Ethical Perspectives**

Fall. 3-4 credits; if using as senior seminar, B&SOC majors must take for 4 credits. A. Parrot.  
For description, see PAM 552.

**[PAM 556(5560) Managed Care**

Fall. 3 credits. Next offered 2007-2008. J. Kuder.  
For description, see PAM 556.]

**PAM 559(5590) Epidemiology, Clinical Medicine, and Management Interface Issues**

Spring. 3 credits. Staff.  
For description, see PAM 559.

**SOC 410(4100) Health and Survival Inequalities (also D SOC 410(4100), FGSS 410(4100))**

Spring. 3 credits. A. Basu.  
For description, see SOC 410.

**S&TS 411(4111) Knowledge, Technology, and Property**

Spring. 4 credits. S. Hilgartner.  
For description, see S&TS 411.

**S&TS 422(4221) New York Women (also FGSS 422(4220), HIST 445(4450))**

Fall. 4 credits. M. Rossiter.  
For description, see S&TS 422.

**S&TS 453(4531) Knowledge and Society (also SOC 453(4530))**

Fall. 4 credits. C. Leuenberger.  
For description, see S&TS 453.

**S&TS 431(4311) From Surgery to Simulation**

Spring. 4 credits. R. Prentice.  
For description, see S&TS 431.

**S&TS 466(4661) Public Communication of Science and Technology (also COMM 466(4660))**

Spring. 3 credits. B. Lewenstein.  
For description and prerequisites, see COMM 466.

**S&TS 468(4681) Understanding Innovation**

Fall. 4 credits. J. Reppy.  
For description, see S&TS 468.

**S&TS 474(4741) Science and Race: A History (also S HUM 404(4040))**

Fall. 4 credits. Limited to 15 students. S. Seth.  
For description, see S HUM 404.

**[S&TS 475(4751) Historical Issues of Science, Technology, Race, and Colonialism**

Fall. 4 credits. Next offered 2007-2008. S. Seth.  
For description, see S&TS 475.]

**S&TS 476(4761) Historical Issues in Science, Technology and Colonialism (also S HUM 426(4260))**

Spring. 4 credits. Limited to 15 students. S. Seth.  
For description, see S HUM 426.

**[S&TS 490(4901) Integrity of Scientific Practice**

Fall. 4 credits. Next offered 2008-2009. S. Hilgartner.]

**[S&TS 495(4951) Social Studies of the Human Sciences**

Spring. 4 credits. Next offered 2007-2008. C. Leuenberger.  
For description, see S&TS 495.]

**VI. Other Courses**

**B&SOC 375(3751) Independent Study**

Fall or spring. 1-4 credits. Prerequisite: biology and society majors; written permission of faculty supervisor. Projects under the direction of a Biology and Society faculty member are encouraged as part of the program of study within the student's concentration area. Applications for research projects are accepted by individual faculty members. Students may enroll for 1 to 4 credits in B&SOC 375 Independent Study with written permission of the faculty supervisor and may elect either the letter grade or the S-U option. Students may elect to do an independent study project as an alternative to, or in advance of, an honors project. Applications and information on faculty research, scholarly activities, and undergraduate opportunities are available in the Biology and Society Office, 306 Rockefeller Hall. *Independent study credits may not be used in completion of the major requirements.*

**B&SOC 499(4991/4992) Honors Project I and II (also ALS 499(4991/4992))**

Fall and spring (yearlong). Prerequisite: senior biology and society students by permission of department; overall GPA of 3.3. Students should apply in 306 Rockefeller Hall. Arts and Sciences students should enroll in B&SOC 499 to receive Arts and Sciences credit. CALS students should enroll in ALS 499 to receive College of Agriculture and Life Sciences credit.

Students who are admitted to the honors program are required to complete two semesters of honors project research and to write an honors thesis. The project must include substantial research, and the completed work should be of wider scope and greater originality than is normal for an upper-level course. The student must find a project supervisor and a second faculty member willing to serve as faculty reader; at least one of these must be a member of the Biology and Society faculty.

Students must register for the total credits desired for the whole project each semester (e.g., 8 credits for fall and 8 credits for spring). After the fall semester, students receive a letter grade of "R"; a letter grade for both semesters is submitted at the end of the second semester whether or not the student completes a thesis or is recommended for honors. Minimally, an honors thesis outline and bibliography should be completed during the first semester. In consultation with the advisors, the director of undergraduate studies will evaluate whether the student should continue working on an honors project. Students should note that these courses are to be taken in addition to those courses that meet the regular major requirements.

**If students do not complete the second semester of the honors project, they must change the first semester to independent study**

to clear the "R" and receive a grade. Otherwise, the "R" will remain on their record and prevent them from graduating.

## BURMESE

See "Department of Asian Studies."

## CAMBODIAN

See "Department of Asian Studies."

## CATALAN

See "Department of Romance Studies."

## CENTER FOR APPLIED MATHEMATICS

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. This program is based on a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student's program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in applied mathematics, students should contact the director of graduate studies of the Center for Applied Mathematics, 657 Frank H. T. Rhodes Hall.

There is no special undergraduate degree program in applied mathematics. Undergraduate students interested in an application-oriented program in mathematics may select an appropriate program in the Department of Mathematics, the Department of Computer Science, or some department of the College of Engineering.

A listing of selected graduate courses in applied mathematics can be found in the description of the center under "Interdisciplinary Centers, Programs, and Studies."

## CENTER FOR INTERNATIONAL STUDIES

See "Interdisciplinary Centers, Programs, and Studies."

## CHEMISTRY AND CHEMICAL BIOLOGY

H. D. Abruña, chair (122 Baker Laboratory, 255-4175); G. W. Coates, associate chair; M. A. Hines, director of undergraduate studies; H. D. Abruña, J. Almy, B. A. Baird, T. P. Begley, J. M. Burlitch, B. K. Carpenter, R. A. Cerione, G. Chan, P. J. Chirik, G. W. Coates, D. B. Collum, B. R. Crane, H. F. Davis, F. J. DiSalvo, S. E. Ealick, G. S. Ezra, R. C. Fay, J. H. Freed, B. Ganem, M. A. Hines, R. Hoffmann, P. L. Houston, S. Lee, H. Lin, R. F. Loring, J. A. Marohn, T. McCarrick, J. E. McMurry, J. Njardarson, J. Park, D. Y. Sogah, D. T. McQuade, J. Meinwald, S. Russo, D. A. Usher, B. Widom, C. F. Wilcox, P. T. Wolczanski, D. B. Zax

The Department of Chemistry and Chemical Biology offers a full range of courses in physical, organic, inorganic, analytical, theoretical, bioorganic, and biophysical chemistry. In addition to their teaching interests, chemistry and chemical biology faculty members have active research programs. The link between teaching and research is a vital one in a continuously evolving scientific subject; it ensures that students will be provided with the most advanced information and perspectives and affords opportunities for students to participate in research.

### The Major

To fit the widely varying needs of our undergraduate majors, the department offers two different tracks that both lead to the same undergraduate degree:

**Standard Major**—The standard major provides a comprehensive background in all fields of chemistry. Most students who complete the standard major go on to graduate study in chemistry or to medical school, although some students proceed directly to a position in the chemical industry. With additional independent research (which is not required), the standard chemistry major is fully accredited by the American Chemical Society.

**Alternative Major**—The alternative major offers a flexible program of study that is primarily designed for students who intend to double major in another field. For example, students majoring in biology can complete the alternative major with little additional class work. This program might also be attractive for students interested in law (especially patent law), as a double major in government or economics plus chemistry is quite feasible. This program is not suited to further graduate work in chemistry. With few exceptions, students in the alternative major are not chosen to participate in the honors program in chemistry. The alternative major is not accredited by the American Chemical Society.

Either version of the major can be completed in three years of study. Most students, however, complete all of the requirements in their first three years with the exception of CHEM 410, Inorganic Chemistry, which is usually taken in the fall semester of the senior year. The typical chemistry course sequence is:

first year: general chemistry and mathematics

second year: organic chemistry, analytical and organic laboratories, and physics

third year: physical chemistry lectures and laboratories

fourth year: inorganic chemistry

### Admission to the Major

Admission to the chemistry major requires the satisfactory completion of a number of introductory courses which, when taken together, demonstrate an ability to complete the major. These courses include (1) CHEM 215-216 or 207-208 (CHEM 211 or 206 may be substituted for 207 but this is not recommended); (2) CHEM 300; (3) PHYS 207 or 112 or 116; and (4) MATH 111 or 191. Second-semester sophomores (or beyond) who have completed all but one of these requirements may be admitted to the major provided that they have a plan for completing the major on schedule.

### The Standard Major

The following courses must be completed for the standard major:

General chemistry: CHEM 207 + 208 or CHEM 215 + 216. (CHEM 211 or 206 may be substituted for CHEM 207, but is not recommended).

Organic chemistry: CHEM 357 + 358 or CHEM 359 + 360

Physical chemistry: CHEM 389 + 390

Inorganic chemistry: CHEM 410

Laboratory chemistry: CHEM 300 + 301 + 302 + 303

Physics: (PHYS 207 or 112 or 116) + (PHYS 208 or 213).

Mathematics: MATH 111 + 112 + 213 or MATH 121 + 122 + 221 + 222 or MATH 191 + 192 + 293

Most standard majors also perform independent research at some point in their academic career, either during the semester or in the summer. Many students take advanced courses to complement this program.

### The Alternative Major

The following courses must be completed for the alternative major:

General chemistry: CHEM 207 + 208 or CHEM 215 + 216. (CHEM 211 or 206 may be substituted for CHEM 207, but is not recommended)

Organic chemistry: CHEM 257 (CHEM 357 + 358 or CHEM 359 + 360 may be substituted)

Physical chemistry: CHEM 287 (CHEM 389 + 390 may be substituted)

Inorganic chemistry: CHEM 410

Laboratory chemistry: CHEM 251 + 290 + 300 (CHEM 301 may be substituted for CHEM 251; CHEM 303 may be substituted for CHEM 290).

Physics: (PHYS 207 or 112 or 116) + (PHYS 208 or 213)

Mathematics: MATH 111 + 112 or MATH 121 + 122 or MATH 191 + 192

One additional 3- or 4- credit advanced chemistry course at the 300 level or above. (CHEM 358, 360 or 390 can be used to satisfy this requirement.)

Three additional course, of 3 or more credits each, that form a cohesive unit and are not at the introductory level. These three courses must be approved by the department committee.

The three additional courses may be in another field of study, such as biochemistry, physics, biology, materials science, economics,



government, or education. Many students who double major use courses from their second major to satisfy this requirement.

Like the standard majors, many alternative majors perform independent research, either in the chemistry department or in another department.

## Honors

Any student who completes the requirements for a standard major in chemistry with a cumulative GPA of 3.5 or higher shall be awarded a degree with honors (cum laude).

In addition, senior chemistry majors who have superior grades in chemistry and related subjects and who have had good performance in at least 8 credits of undergraduate research (or the equivalent) in chemistry or a related field (e.g., biochemistry) may be nominated for the honors program. To ensure that the nomination process runs smoothly, all students who are interested in the honors program should discuss this possibility with their advisor early in the fall semester of the senior year. Admission to the honors program is by invitation only. Students completing the alternative major are only eligible for the honors program in exceptional cases.

Students in the honors program participate in the honors seminar (CHEM 498) and write a senior thesis. The successful completion of the honors program leads to the degree of bachelor of arts with honors or high honors in chemistry.

## Program for Science Teachers

Chemistry majors who wish to become teachers will be interested to know that Cornell University offers a certification program for teachers of secondary (grades 7-12) science. Interested students apply to the program during their sophomore or junior years. If accepted, students integrate some course work in education with the rest of their undergraduate studies. All chemistry majors who enter this program will remain in the College of Arts and Sciences to complete the major.

After earning the bachelor's degree, certification students enter the graduate field of education to complete a fifth year of study at Cornell. Following this fifth year, students are eligible for a master's degree from Cornell and a teaching certificate from New York State. Additional information is available from Susie Slack, 424 Kennedy Hall, 255-9255, or Professor Deborah Trumbull, 426 Kennedy Hall, 255-3108.

## Laboratory Course Regulations

Students registered for laboratory courses who do not appear at the first meeting of the laboratory will forfeit their registration in that course.

Students and members of the teaching staff are required to wear safety goggles and lab aprons in all chemistry laboratories. Closed-toed footwear is required (no sandals). Students are reminded to take their goggles and lab aprons to the first laboratory session. Those who fail to cooperate with the safety program will be asked to leave the laboratories.

Students in organic and analytical labs are required to pay for glassware and any other items broken or missing from their laboratory desks at the close of each semester. Students

who fail to inventory their desks at the appointed time in the presence of their instructor are charged a \$20 fee in addition to charges for any breakage.

## Courses

**Note:** Class meeting times are accurate at the time of publication. If changes occur, the department will provide new information as soon as possible.

Preliminary examinations for all courses may be given in the evening.

### CHEM 105(1150) The Language of Chemistry (PBS)

Fall. 3 credits. Contributes to satisfying CALS physical science requirement of one course in chemistry. S-U or letter grades. Lec, M W F; prelims in normal class period. Next offered 2007-2008. J. Meinwald.

In his autobiography, A. Kornberg (Nobel Laureate in Medicine, 1959) wrote, "much of life can be understood in rational terms if expressed in the language of chemistry. It is an international language, a language for all time, a language that explains where we came from, what we are, and where the physical world will allow us to go." Through careful examination of a few milestone investigations of naturally occurring biologically important compounds (e.g., the antimalarial quinine, bombykol, and the sperm attractants of algae), the principles of chemistry to which Kornberg refers are developed. Methods of analyzing chemical problems are emphasized, rather than the memorization of specific results or formulas. There is an opportunity for students, working in small groups, to prepare and present short reports on topics of particular current interest at the interface between chemistry and biology.]

### CHEM 106(1160) The World of Chemistry (PBS)

Spring. 3 credits. Contributes to satisfying CALS physical science requirement of one course in chemistry. S-U or letter grades. Lec, M W F; prelims, March 6, April 5. P. Houston.

Chemistry is the art, craft, business, and science of substances and their transformations. At the microscopic level, where chemistry takes place, these substances undergoing transformation are groups of atoms called molecules. The World of Chemistry is a course that looks at the way chemistry occurring on the microscopic level affects all aspects of the everyday world and the way it interacts with culture and the economy. Students will gain a feeling for the way science is done and grasp the interplay of chemistry and biology.

### CHEM 206(1560) Introduction to General Chemistry (PBS)

Fall or summer. 4 credits. Limited enrollment. Nonrefundable lab fee (covers cost of safety goggles, lab apron, and breakage): \$20. Lec, M W F; lab, M, T, W, R, or F; prelims, Sept. 28, Nov. 9. R. Hoffmann.

A one-semester introduction to chemistry, both qualitative and quantitative. CHEM 206 prepares students for CHEM 257; CHEM 206 is not recommended for premedical or preveterinary students; however, students who have never taken a chemistry course in secondary school or who have a very weak preparation sometimes take CHEM 206 + 208.

### CHEM 207-208(2070-2080) General Chemistry (PBS)

Fall or summer (207); spring or summer (208). 4 credits each semester. CHEM 207 is a prerequisite for CHEM 208. (CHEM 206 is accepted, but not recommended.) CHEM 207 has a \$20 nonrefundable lab fee which covers cost of safety goggles, lab apron, and breakage. Exceptionally well-prepared students may receive credit for CHEM 207 by demonstrating competence in an examination given once a year before the start of fall classes. Taking CHEM 208 after 215 may be done only by permission of the Director of Undergraduate Studies. Lec, T R; lab, M T W R F; secs, M T W R F; prelims, Oct. 5, Nov. 9, Feb. 27, April 10. Fall: J. A. Marohn/R. F. Loring; spring: H. F. Davis.

Covers fundamental chemical principles, with considerable attention given to the quantitative aspects and techniques important for further work in chemistry.

### CHEM 211(2110) Chemistry for the Applied Sciences (PBS)

Fall or spring. 4 credits. Limited enrollment. Prerequisite: high school chemistry or permission of instructor. Corequisite: calculus course at level of MATH 111 or 191. Recommended for students who intend to take only one semester of chemistry. Entering students exceptionally well prepared in chemistry may receive advanced placement credit for General Chemistry by demonstrating competence in the advanced placement examination of the College Entrance Examination Board or in the departmental examination given at Cornell before classes start in the fall. Nonrefundable lab fee (covers cost of safety goggles, lab apron, and breakage): \$20. Lec, M W F; lab, M T W R F; prelims, Oct. 5, Nov. 9, Feb. 27, Mar. 15. Fall: B. R. Crane; spring: G. K. Chan.

Covers important chemical principles and facts with the objective of understanding the role of chemistry in other fields. Emphasis is on topics such as solid-state materials, periodic trends, and specific classes of compounds, such as polymers and semiconductors.

### CHEM 215-216(2150-2160) Honors General and Inorganic Chemistry (PBS)

Fall, 215; spring, 216. 4 credits each semester. Limited enrollment. Prerequisites: two years high school chemistry or permission of instructor, physics, and mathematics. Corequisite: calculus course at level of MATH 111 or 191 for students who have not taken high school calculus; for CHEM 216, CHEM 215. Recommended for students who intend to specialize in chemistry or in related fields. Taking CHEM 208 after CHEM 215 may be done only by permission of director of undergraduate studies. Nonrefundable lab fee (covers cost of safety goggles, lab apron, and breakage): \$20. Lec, M W F; lab, M T W R or F; prelims, Oct. 5, Nov. 9, Feb. 27, Apr. 5. Fall: P. J. Chirik; spring: S. Lee.

Intensive systematic study of the laws and concepts of chemistry, with considerable emphasis on quantitative aspects. First semester covers thermochemistry, kinetics, and equilibrium. Second semester includes systematics of inorganic chemistry. Laboratory work covers qualitative and quantitative

analysis, transition metal chemistry, and spectroscopic techniques.

**CHEM 251(2510) Introduction to Experimental Organic Chemistry**

Fall, spring, or summer. 2 credits. Limited enrollment. Corequisite: CHEM 257 or 357. Not recommended for chemistry majors considering graduate school in chemistry. Lec, fall, R or F; spring, R; lab, M T W R or F; prelims, fall: Nov. 14; spring: Apr. 26. S. Russo.

Introduction to the synthesis, separation, and handling of materials, including applications of different types of chromatography, simple and fractional distillation, crystallization, extraction, and others.

**CHEM 252(2520) Elementary Experimental Organic Chemistry**

Spring. 2 credits. Prerequisite: CHEM 251. Lec, T; lab, W, R; prelim, Apr. 27. S. Russo.

Continuation of CHEM 251. Focus is on structural elucidation of organic compounds and synthesis of biologically interesting organic compounds.

**CHEM 257(1570) Introduction to Organic and Biological Chemistry (PBS)**

Spring or summer. 3 credits. Prerequisite: CHEM 206 or 207. Because CHEM 257 is only a 3-credit course, it does not provide a practical route to satisfying medical school requirements. Because of duplication of materials, students who take both 257 and 357 will receive graduation credit only for CHEM 257. Lec, M W F; prelims, Feb. 15, Mar. 13, Apr. 10. D. A. Usher.

Introduction to organic chemistry with an emphasis on those structures and reactions of organic compounds having particular relevance to biological chemistry.

**CHEM 287-288(2870-2880) Introductory Physical Chemistry (PBS)**

287, fall; 288, spring. 3 credits each semester. Prerequisites: CHEM 208 or 216 and MATH 111-112 and PHYS 208, or permission of instructor; for CHEM 288, CHEM 287 or 389. Lec, M W F; 287: rec, M or W, T; 288: rec, M or W; prelims: 287: Oct. 5, Nov. 21. 288: Mar. 8 or Apr. 17. Fall: B. Widom; spring: P. Chen.

Survey of the fundamental principles of physical chemistry, focusing in the fall on thermodynamics, chemical and enzyme kinetics, and an introduction to quantum mechanics. In the spring the course is oriented to the application of physical chemistry to biological systems, including statistical mechanics, phenomena in condensed phases, transport, electrochemistry, spectroscopy. CHEM 287 satisfies the minimum requirement for physical chemistry in the alternative chemistry major.

**CHEM 290(2900) Introductory Physical Chemistry Laboratory**

Fall or spring. 2 credits each semester. Lec, fall, R; spring, R; lab: fall, M T; spring, M T R F. Fall, T. McCarrick; spring, J. H. Freed.

Survey of the methods basic to the experimental study of physical chemistry, with a focus on the areas of kinetics, equilibrium, calorimetry, and molecular spectroscopy.

**CHEM 300(3000) Quantitative Chemistry**

Fall. 2 credits. Prerequisite: CHEM 208 or 216 or advanced placement in chemistry. Lec, R; lab, M T W R; prelims, Oct. 19. D. B. Zax.

Volumetric, spectrophotometric, and potentiometric methods are emphasized. Techniques are learned by analysis of knowns, and then are used on unknowns. Lectures and problem sets stress the relationship between theory and applications.

**CHEM 301(3010) Honors Experimental Chemistry I (PBS)**

Spring. 4 credits. Prerequisites: CHEM 300 and 357 or 359. Lec, M W F; 2 labs, M W or T R. D. B. Collum.

Introduction to the techniques of synthetic organic chemistry. A representative selection of the most important classes of organic reactions is explored in the first half of the semester, augmented by lectures on the reaction chemistry and the theory of separation and characterization techniques.

**CHEM 302(3020) Honors Experimental Chemistry II (PBS)**

Fall. 4 credits. Limited enrollment; priority given to chemistry majors. Prerequisite: CHEM 301. Lec, M W F; 2 labs, M W T R. F. T. McCarrick.

Instrumental methods of analysis, including chemical microscopy, visible and infrared spectroscopies, and gas chromatography. Basic concepts of interfacing are covered.

**CHEM 303(3030) Honors Experimental Chemistry III (PBS)**

Spring. 4 credits. Limited to 10 students per lab. Prerequisites: CHEM 302, 389, 390; co-registration in latter permissible. Lec, M W F; 2 labs, M W or T R. T. McCarrick.

Introduction to experimental physical chemistry, including topics in calorimetry, spectroscopy, and kinetics. The analysis and numerical simulation of experimental data is stressed.

**CHEM 357-358(3570-3580) Organic Chemistry for the Life Sciences (PBS)**

Fall or summer, 357; spring or summer, 358. 3 credits each semester. Prerequisite: for CHEM 357, CHEM 208 or 216 or advanced placement; for CHEM 358, CHEM 357 or permission of instructor. Recommended: concurrent registration in CHEM 251 or 300. Because of duplication of material, students who take both CHEM 257 and 357 will receive graduation credit only for CHEM 257. Lec, M W F, optional rec may be offered; prelims, Sept. 21, Oct. 17, Nov. 9, Feb. 15, Mar. 13, Apr. 12. Fall: B. Ganem; spring: D. Y. Sogah.

Study of the more important classes of carbon compounds—especially those encountered in the biological sciences. Emphasizes their three-dimensional structures, mechanisms of their characteristic reactions, their synthesis in nature and the laboratory, methods of identifying them, and their role in modern science and technology.

**CHEM 359-360(3590-3600) Honors Organic Chemistry I and II (PBS)**

359, fall; 360, spring. 4 credits each semester. Limited enrollment. Prerequisites: CHEM 216 with grade of B or better, CHEM 208 with grade of A or better, or permission of instructor; for CHEM 360, CHEM 359. Recommended: co-registration in CHEM 300-301-302. Recommended for students who intend to specialize in

chemistry or closely related fields. Lec, M W F; disc, W; prelims, Sept. 21, Oct. 17, Nov. 9, Spring: Feb. 15, Mar. 13, Apr. 12. Fall: J. Nardarson; spring, T. P. Begley.

Rigorous and systematic study of organic compounds, their structures, the mechanisms of their reactions, and the ways they are synthesized in nature and in the laboratory.

**CHEM 389-390(3890-3900) Honors Physical Chemistry I and II (PBS)**

Fall, 389; spring, 390. 4 credits each semester. Prerequisites: MATH 213 or, ideally, 221-222; PHYS 208; CHEM 208 or 216 or permission of instructor; for CHEM 390, CHEM 389. Lec, 389: M W F; rec, M or W or T. Lec, 390: M W F; prelims: 389, Sept. 26, Oct. 24, Nov. 21; 390, Feb. 15, Mar. 13, Apr. 12. Fall, M. A. Hines; spring, 390: G. S. Ezra.

Studies the principles of physical chemistry from the standpoint of the laws of thermodynamics, kinetic theory, statistical mechanics, and quantum chemistry.

**CHEM 404(4040) Entrepreneurship in Chemical Enterprise**

Spring. 1 credit. Lec, T. B. Ganem.

Designed to acquaint students with the problems of planning, starting, and managing a new scientifically oriented business venture, the course consists of six weekly 90-minute meetings focusing on case studies and assigned reading, as well as outside lectures by entrepreneurs in the chemical, pharmaceutical, and biotechnology industries. Topics include new technology evaluation and assessment, business formation, resource allocation, management development, as well as manufacturing and sales issues.

**CHEM 410(4100) Inorganic Chemistry (PBS)**

Fall. 4 credits. Prerequisites: CHEM 358 or 360, and 287 or 390. Lec, M W F; prelims, Sept. 19, Oct. 19, Nov. 14. R. C. Fay.

Systematic study of the synthesis, structure, bonding, reactivity, and uses of inorganic, organometallic, and solid-state compounds.

**CHEM 421(4210) Introduction to Inorganic Chemistry Research**

Fall or spring. 2-4 credits. Prerequisites: CHEM 303 and 389-390, or 287-288, and 289-290 with average of B- or better, or permission of instructor. Selected faculty.

Research in inorganic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

**CHEM 433(4330) Introduction to Analytical Chemistry Research**

Fall or spring. 2-4 credits. Prerequisites: CHEM 303 and 390 with average of B- or better or permission of instructor. Selected faculty.

Research in analytical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

**[CHEM 440(4400) Bio-Inorganic Chemistry (PBS)]**

Spring. 3 credits. Prerequisites: CHEM 215-216 or 207-208, 357-358, 359-360 or equivalent. Lec, W F. Next offered 2007-2008. B. R. Crane.

Addresses important aspects of inorganic chemistry in biological systems. Topics include: (1) the distribution and properties of metals in biology; (2) coordination chemistry of biological metals; (3) properties of metal-containing macromolecules; (4) redox processes and long-range electron transfer; (5)

metallocofactors and metal clusters; (6) Lewis acid catalysis; (7) metal-oxygen reactions in biology; and (8) metal trafficking and metalloprotein assembly.]

**CHEM 450(4550) Principles of Chemical Biology (I) (PBS)**

Fall. 3 credits. Prerequisites: CHEM 357-358, 359-360 or equivalent. Lec, T R. T. Begley.

Covers topics at the interface of chemistry and biology with a focus on problems where organic chemistry has made a particularly strong contribution to understanding the mechanism of the biological system. Topics include the organic chemistry of carbohydrates, proteins and nucleic acids, strategies for identifying the cellular target of physiologically active natural products, combinatorial chemistry, and chemical aspects of signal transduction, cell division and development.

**CHEM 461(4610) Introduction to Organic Chemistry Research**

Fall or spring. 2-4 credits. Prerequisites: CHEM 302 and 358 or 360 with grade of B- or better or permission of instructor. Selected faculty.

Research in organic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

**CHEM 477(4770) Introduction to Physical Chemistry Research**

Fall or spring. 2-4 credits. Prerequisite: CHEM 390 with average of B- or better or permission of instructor. Selected faculty.

Research in physical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

**CHEM 498(4980) Honors Seminar**

Spring. 0 credits. Admission only by department invitation. Additional pre- or corequisites: outstanding performance in two coherent 4-credit units of research in course such as CHEM 421, 433, 461, 477; or equivalent amount of research in another context. Lec W. D. T. McQuade.

We will cover two topics in CHEM 498, writing and oral presentation. The goal is to prepare graduate seniors to communicate well in a competitive scientific world. Students will present their research in writing and through oral presentation.

**CHEM 600-601(6000-6010) General Chemistry Colloquium**

600, fall; 601, spring. 0 credits. R. Staff.

Series of talks representative of all fields of current research interest in chemistry given by distinguished visitors and faculty members.

**CHEM 602(6020) Information Literacy for the Physical Scientist**

Spring. 1 credit. Primarily for graduate students and undergraduate chemistry majors doing research. Lec, T. L. Solla.

Introduction to physical science information research methods, with hands-on exploration of print and electronic resources. Much important information can be missed and valuable time wasted without efficient information research strategies. Topics include finding chemical and physical properties, reaction and analytical information; patents, web resources; using specialized resources in chemistry, physics, biochemistry, and materials science; and managing citations.

**CHEM 605(6050) Advanced Inorganic Chemistry I: Symmetry, Structure, and Reactivity**

Fall. 4 credits. Prerequisite: CHEM 389-390 or equivalent or permission of instructor. Lec, M W F. P. Wolczanski.

Introduction to chemical bonding and applications of group theory, including valence bond theory, and spectroscopy as applied to main group and transition-metal coordination compounds. An introduction to reactivity covers substitution, electron transfer, and related reactions. Readings are at the level of Bishop's *Group Theory and Chemistry* and Jordan's *Reaction Mechanisms of Inorganic and Organometallic Systems*.

**[CHEM 606(6060) Advanced Inorganic Chemistry II: Synthesis, Structure, and Reactivity of Coordination Compounds, and Bioinorganic Chemistry]**

Spring. 4 credits. Prerequisite: CHEM 605 or equivalent or permission of instructor. Lec, M W F. Next offered 2007-2008. P. T. Wolczanski.

Synthesis, structure, and reactivity of main group and modern coordination compounds and bioinorganic systems. The mechanisms of transition-metal reactions are emphasized, and evaluation of the current literature are stressed. Background readings are at the level of *Reaction Mechanisms of Inorganic and Organometallic Systems* by Jordan.]

**CHEM 607(6070) Advanced Inorganic Chemistry III: Solid-State Chemistry**

Fall. 4 credits. Prerequisite: undergraduate inorganic chemistry or permission of instructor. Lec, M W F. S. Lee.

Third in a three-semester sequence. Interdisciplinary approach to solids. Topics include solid-state structure and X-ray diffraction, phase diagrams, electronic structure, and physical properties of solids. Texts: Mueller: *Structural Inorganic Chemistry*; Glusker and Trueblood: *Primer on X-ray Crystallography*; and Hoffmann: *Solids and Surfaces*. Readings from inorganic chemistry and solid-state primary literature.

**CHEM 608(6080) Advanced Inorganic Chemistry I: Organometallic Chemistry**

Spring. 4 credits. M W F. P. T. Wolczanski.

Synthesis, structure, and reactivity of organometallic compounds. Evaluation of the current literature is emphasized, and background readings are at the level of *Reaction Mechanisms of Inorganic and Organometallic Systems* by Jordan and *Principles and Applications of Organotransition Metal Chemistry* by Collman, Hegedus, Finke, and Norton.

**[CHEM 622(6220) Chemical Communication]**

Fall. 3 credits. Lec, M W F. Next offered 2007-2008. J. Meinwald and T. Eisner.

For description, see BIONB 623.]

**CHEM 625(6250) Advanced Analytical Chemistry I**

Spring. 4 credits. Prerequisite: CHEM 288 or 390 or equivalent. Lec, M W F; occasional prelims, W. D. B. Zax.

Application of high-resolution NMR spectroscopy to chemical problems. Depending on the time and class interest, either infrared and mass spectroscopy or some practical experience in NMR are offered.

**[CHEM 627(6270) Advanced Analytical Chemistry II]**

Spring. 3 credits. Primarily for graduate students. Prerequisite: CHEM 793 or equivalent preferable. Lec, M W F. Next offered 2007-2008. D. B. Zax.

Modern techniques in nuclear magnetic resonance. Little overlap is expected with CHEM 625, as this course focuses on more general questions of experimental design, understanding of multipulse experiments, and aspects of coherent averaging theory.]

**CHEM 628(6280) Isotopic and Trace Element Analysis (also NS 690[6900])**

Fall. 3 credits. Primarily for graduate students and advanced undergraduates. Prerequisite: CHEM 288 or 390 or 302, or CHEM 208 and PHYS 208, or permission of instructor. Lec, T R. Offered alternate years. J. T. Brenna.

Survey course in modern high-precision isotope ratio mass spectrometry (IRMS) techniques and trace/surface methods of analysis. Topics include dual inlet and continuous flow IRMS, thermal ionization MS, inductively coupled plasma MS, atomic spectroscopy, ion and electron microscopies, X-ray and electron spectroscopies, and biological and solid state applications.

**[CHEM 629(6290) Electrochemistry]**

Spring. 4 credits. Primarily for graduate students and junior and senior undergraduates. Prerequisite: CHEM 390 or equivalent. Recommended: MATH 213. Lec, T R. Next offered 2007-2008. H. D. Abruna.

Fundamentals and applications of electrochemistry. Topics include the fundamentals of electrode kinetics, electron transfer theory, the electrical double layer, diffusion, and other modes of transport.]

**CHEM 650-651(6500-6510) Organic and Organometallic Chemistry Seminar**

650, fall; 651, spring. 0 credits.

Requirement for graduate students majoring in organic or bioorganic chemistry. Juniors and seniors encouraged to attend. T R. Staff.

Series of talks representative of all fields of current research interest in organic organometallic chemistry, given by research associates, faculty members, and distinguished visitors.

**CHEM 665(6650) Advanced Organic Chemistry**

Fall. 4 credits. Primarily for graduate students and junior and senior undergraduates. Prerequisites: CHEM 358 or 360, and CHEM 390 or equivalents, or permission of instructor; some knowledge of elementary quantum mechanics. Lec, M W F. D. T. McQuade.

Discussion of the properties and reactivities of organic molecules and the underlying physical phenomena that affect them.

**CHEM 666(6660) Synthetic Organic Chemistry**

Spring. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisite: CHEM 665 or permission of instructor. Lec, T R. J. Njardarson.

Modern techniques of organic synthesis; applications of organic reaction mechanisms and retrosynthetic analysis to the problems encountered in rational multistep synthesis,

with particular emphasis on modern developments in synthesis design.

**CHEM 668(6680) Chemical Aspects of Biological Processes**

Fall. 4 credits. Prerequisite: CHEM 360 or equivalent. Lec, T R H. Lin.

Examines a representative selection of the most important classes of enzyme-catalyzed reactions from a mechanistic perspective. Topics include the chemical basis of enzymatic catalysis, techniques for the elucidation of enzyme mechanism, cofactor chemistry, and the biosynthesis of selected natural products. The application of chemical principles to understanding biological processes is emphasized.

**CHEM 669(6690) Organic and Polymer Synthesis Using Transition Metal Catalysts**

Spring. 4 credits. Prerequisite: primarily for graduate students; CHEM 359/360 or equivalent or permission of instructor. G. W. Coates.

Transition metal-based catalysts are invaluable in both organic and polymer synthesis. This course begins with a brief overview of organometallic chemistry and catalysis. Subsequent modules on organic and polymer synthesis are then presented. Topics of current interest are emphasized.

**CHEM 670(6700) Fundamental Principles of Polymer Chemistry**

Fall. 4 credits. Prerequisite: CHEM 389/390 and 359/360 or equivalent or permission of instructor. Primarily for graduate students and advanced undergraduates. No previous knowledge of polymers required. Lec, T R D. Y. Sogah.

Emphasizes general concepts and fundamental principles of polymer chemistry. The first part of the course deals with general introduction to classes of polymers, molar masses and their distributions, and a brief survey of major methods of polymer synthesis. The second part deals with characterization and physical properties. These include solution properties—solubility and solubility parameters, solution viscosity, molecular weight characterizations (gel permeation chromatography, viscometry, light scattering, osmometry); bulk properties—thermal and mechanical properties; dynamic mechanical properties; and structure-property relationships.

**[CHEM 671(6710) Synthetic Polymer Chemistry (also MS&E 671(6710), CHEM 675(6750)]**

Spring. 4 credits. Prerequisites: minimum of organic chemistry at level of CHEM 359/360. Students without this organic chemistry background should see instructor before registering. Primarily for graduate students and advanced undergraduates. Recommended: knowledge of material covered in CHEM 670 or MS&E 452. Lec, T R. Next offered 2007–2008. D. Y. Sogah.

Emphasizes application of organic synthetic methods to the development of polymerization methods and control of polymer architecture. Emphasizes modern concepts in synthetic polymer chemistry and topics of current interest: the study of new methods of polymer synthesis, the control of polymer stereochemistry and topology, and the design of polymers tailored for specific uses and properties.]

**CHEM 672(6720) Kinetics and Regulation of Enzyme Systems**

Spring. 4 credits. Primarily for graduate students with interests in biophysical chemistry. Prerequisite: CHEM 288 or 390, BIONB 331, or equivalents or permission of instructor. Lec, M W F. B. Baird.

Focus is on protein interactions with ligands and consequent changes in structure and activity. Topics include protein structure and dynamics; thermodynamics and kinetics of ligand binding; steady state and transient enzyme kinetics; enzyme catalysis and regulation; and the role of cell membrane receptors in regulating cellular activities.

**[CHEM 677(6770) Chemistry of Nucleic Acids]**

Fall. 4 credits. Primarily for graduate students. Prerequisites: CHEM 358 or 360, and 390 or equivalents. Lec, M W. Next offered 2007–2008. D. A. Usher.

Structure, properties, synthesis, and reactions of nucleic acids from a chemical point of view. Special topics include RNAi, antisense and antigen technology, ribozyme reactions (including the ribosome), mutagens, PCR, recent advances in sequencing, DNA as a computer, and alternative genetic materials.]

**[CHEM 681(6810) Introduction to Quantum Chemistry]**

Fall. 4 credits. Prerequisites: one year of undergraduate physical chemistry, three semesters of calculus, one year of college physics. Lec T R. Next offered 2007–2008. G. S. Ezra.

Introduction to the application of quantum mechanics in chemistry. Covers many of the topics in CHEM 793–794 at a more descriptive, less mathematical level.]

**CHEM 686(6860) Physical Chemistry of Proteins**

Fall. 4 credits. Primarily for graduate students. Prerequisite: CHEM 288 or 390 or equivalents. Letter grades for undergraduate and graduates. Lec, M W F. P. Chen.

Protein studies using physical methods are presented, with focuses on using single molecule spectroscopic methods and on metalloprotein structures/functions. Topics include: (1) physical concepts: chemical structure and conformation of proteins; protein folding energy landscape; electron transfer theory; enzyme kinetics; protein-protein interactions; protein-DNA interactions. (2) Experimental methodologies: absorption/emission spectroscopy; fluorescence resonance energy transfer; confocal microscopy; total internal reflection microscopy; single molecule spectroscopy; time correlated single photon counting; fluorescence correlation spectroscopy; atomic force microscopy; optical/magnetic tweezers. (3) Protein structure and function: oxygen binding and activation proteins; electron transfer proteins; oxygenases and oxidases; metallochaperones; metalloregulatory proteins; green fluorescent proteins; motor proteins (kinesin, dynein and F1-ATPase)

**CHEM 700(7000) Baker Lectures**

Fall, on dates TBA. 0 credits. Lec, T R.

This year's lecturer: Robert H. Grubbs, California Institute of Technology. Distinguished scientists who have made significant contributions to chemistry present lectures for approximately six weeks.

**[CHEM 701(7010) Introductory Graduate Seminar]**

Fall. 0 credits. Highly recommended for all senior graduate students in any field of chemistry. Lec, W. Next offered 2007–2008. R. Hoffmann.

Discussion of professional issues facing young chemists as well as life skills: academic and industrial trends, presentations, employment, immigration, publication, research funding, and ethics.]

**[CHEM 716(7160) Introduction to Solid State Organic Chemistry]**

Spring. 3 credits. Recommended: CHEM 607 or some exposure to or course in solid state chemistry and quantum mechanics; good undergraduate physical chemistry course may be sufficient for quantum theory; PHYS 443 or CHEM 793 or 794 are at substantially higher level than what is needed. Lec, M W F. Next offered 2007–2008. S. Lee.

Examines some principles of crystallography and also electronic structure theory of solids. We then consider properties such as conduction, superconductivity, ferroelectricity and ferromagnetism. The final portion of this course is concerned with structure-property relations.]

**[CHEM 765(7650) Physical Organic Chemistry I]**

Spring. 4 credits. Primarily for graduate students. Prerequisite: CHEM 665 or permission of instructor. Lec, M W F. Next offered 2007–2008. B. Carpenter.

Explores contemporary tools for calculating molecular structures and energies of species of all sizes. The course uses computers extensively but requires only a limited knowledge of mathematics (mainly linear algebra).]

**[CHEM 774(7740) Chemistry of Natural Products: Combinatorial Chemistry]**

Spring. 3 credits. Prerequisites: CHEM 360 and BIOBM 330 or equivalent. Lec, M W F. Next offered 2007–2008. T. P. Begley.

Combinatorial chemistry has revolutionized the way organic chemists think about structure function studies on biological systems and the design of inhibitors. This course explores the design, synthesis, screening, and use of natural (i.e., peptide, protein, nucleic acid, carbohydrate) and unnatural (i.e., totally synthetic) libraries.]

**CHEM 780(7800) Chemical Kinetics and Molecular Reaction Dynamics**

Fall. 4 credits. Prerequisite: CHEM 681 or permission of instructor. Lec, T R. P. L. Houston.

Principles and theories of chemical kinetics and molecular reaction dynamics. Topics include potential energy surfaces, transition state theory, and statistical theories of unimolecular decomposition. Depending on class interest, the course also includes special topics such as surface reactions and photochemistry.

**CHEM 787(7870) Mathematical Methods of Physical Chemistry**

Fall. 4 credits. Prerequisites: one year of undergraduate physical chemistry, three semesters of calculus, and one year of college physics. Lec, T R. G. S. Ezra.

Provides the mathematical background for graduate courses in physical chemistry, such as quantum mechanics and statistical mechanics, as well as for research in



experimental and theoretical physical chemistry. It includes linear algebra, matrices, and the eigenvalue problem; methods of solution of relevant differential equations; special functions; partial differential equations; integral transforms; functions of a complex variable. The program *Mathematica*® is employed extensively for both analytical and numerical applications. At the level of *Mathematical Methods for Scientists and Engineers* by McQuarrie, and *Mathematical Methods for Physicists* by Arfken and Weber.

**CHEM 788(7880) Macromolecular Crystallography (also BIOBM 738(7380))**

Fall. 3 credits. Prerequisite: permission of instructor. Lec, T R. S. E. Ealick. Lectures cover the fundamentals of x-ray crystallography and focus on methods for determining the three-dimensional structures of macromolecules. Topics include crystallization, data collection, phasing methods, model building, refinement, structure validation, and structure interpretation.

**CHEM 791(7910) Spectroscopy**

Fall. 4 credits. Prerequisite: CHEM 793 or PHYS 443 or equivalent. Lec, T R. J. H. Freed.

Molecular Spectroscopy and Magnetic Resonance Spectroscopy are offered alternate years. Molecular Spectroscopy includes: principles of molecular rotational, vibrational, and electronic spectroscopy; interaction of molecules with radiation; Born-Oppenheimer approximation; diatomic molecules; polyatomic molecules; molecular symmetry groups. At the level of *Molecular Rotation Spectra* by Kroto. Magnetic Resonance Spectroscopy includes: quantum mechanics of electron and nuclear spins; Fourier Transform and Two Dimensional experiments; spin relaxation; multiple quantum coherence; imaging. At the level of *The Principles of Magnetic Resonance* by Slichter.

**[CHEM 792(7920) Molecular Collision Theory]**

Spring. 4 credits. Lec, T R. Next offered 2007-2008. G. S. Ezra. The concepts and methods of scattering theory are described with particular emphasis on applications to problems of chemical interest. At the level of Child's *Molecular Collision Theory* and Taylor's *Scattering Theory*.

**CHEM 793(7930) Quantum Mechanics I**

Fall. 4 credits. Prerequisites: CHEM 390, co-registration in A&EP 321, or CHEM 787 or equivalents or permission of instructor. Lec, M W F. J. Park.

Topics include Schrodinger's equation, wave packets, uncertainty principle, matrix and operator mechanics, orbital and spin angular momentum, exclusion principle, perturbation theory, and the variational principle. At the level of R. Shankar, *Quantum Mechanics*.

**CHEM 794(7940) Quantum Mechanics II**

Spring. 4 credits. Prerequisites: CHEM 793 or equivalent and CHEM 787 or equivalent or co-registration in A&EP 322, or permission of instructor. Lec, M W F. J. A. Marohn.

Topics include WKB theory; virial theorems; Born-Oppenheimer approximation; non-crossing rule; non-adiabatic transitions; time-dependent perturbation theory; electromagnetic radiation interacting with matter; density matrices; line shape; scattering

theory; Hartree-Fock and density-functional theories of electronic structure; energy bands in extended structure.

**CHEM 795(7950) Statistical Thermodynamics**

Fall. 4 credits. Primarily for graduate students. Prerequisite: CHEM 390 or equivalent. Pre- or corequisite: CHEM 681 or 793 or equivalent. Lec, M W F. G. Chan.

Classical thermodynamics at the level of *Thermodynamics and an Introduction to Thermostatistics* by Callen and statistical thermodynamics at the level of the first 12 chapters of *Statistical Mechanics* by McQuarrie. Topics in the first part include the first and second laws, free energy and Legendre transforms, convexity, thermodynamic potentials, densities and fields, phase equilibrium, thermodynamics of dilute systems, and the third law. Topics in the second part include ensembles and partition functions, fluctuations, ideal gases, ideal harmonic crystals and black-body radiation, the third law (again), chemical-equilibrium constants, imperfect gases, and the quantum ideal gases (Fermi-Dirac and Bose-Einstein statistics).

**CHEM 796(7960) Statistical Mechanics**

Spring. 4 credits. Prerequisites: CHEM 795 and 793 or equivalent. Lec, T R. B. Widom.

Continuation of CHEM 795. Statistical mechanics of interacting systems. Topics include liquid state theory, computational statistical mechanics, critical phenomena, renormalization group theory, and an introduction to nonequilibrium statistical mechanics.

**[CHEM 798(7980) Bonding in Molecules]**

Spring. 4 credits. Prerequisite: some exposure to quantum mechanics; good undergraduate physical chemistry course or CHEM 681 PHYS 433 or CHEM 793-794 are at substantially higher level than what is needed; students should consult instructor if in doubt. Lec, T R. Next offered 2007-2008. R. Hoffmann.

Aims to build a qualitative picture of bonding in all molecules, including organic, inorganic, organometallic systems and extended structures (polymer, surfaces, and three-dimensional materials.)

## CHINA AND ASIA-PACIFIC STUDIES

J. Chen, director (132 McGraw Hall, 255-6262). R. Bush, A. Carlson, Z. Chen, S. Cochran, S. Divo, E. Gunn, P. Katzenstein, W. LaFeber, F. Logevall, T. J. Lowi, J. J. Suh. Affiliated faculty: M. Evangelista, J. Kirshner, J. V. Koschmann, T. Lyons, V. Nee, E. Sanders, M. Shin, E. Tagliacozzo, K. Taylor.

web site: [www.einaudi.cornell.edu/caps](http://www.einaudi.cornell.edu/caps)

China and Asia-Pacific Studies (CAPS) offers a unique approach to the study of China's language, history, politics, society, and foreign relations by providing students with experience both on- and off-campus, including three years in Ithaca, one semester in Washington, D.C., and one semester in Beijing.

### The Major

There are no prerequisites to the major. Students are encouraged to take one of the gateway courses, CAPS 282 (GOVT 282) or CAPS 257 (HIST 257), during their first two

years at Cornell, but they may declare the CAPS major before taking either of these or any other CAPS courses. The other required courses are:

- All of the following language courses: CHIN 101-102, 201-202, and 301-302 or CHIN 109-110 for heritage learners or the equivalent for FALCON students (all in Ithaca or Washington before senior year).
- Two of the following lecture courses: CAPS 385/GOVT 385, CAPS 313/HIST 313, CAPS 314/HIST 314, CAPS 352/HIST 352, and CAPS 469/ECON 469.
- All of the following seminars: CAPS 300 and CAPS 500 (during fall of junior year at Cornell in Washington), CAPS 301 and CAPS 302 (during fall of senior year at Peking University), and CAPS 400 (during spring of senior year in Ithaca).

Students interested in the CAPS major should speak to the program director to arrange for a major advisor.

### Externships

CAPS majors hold externships in government, business, law, the media, museums, non-governmental organizations, or other organizations during their semesters in Washington, D.C., and Beijing. They are encouraged to coordinate the two experiences. For example, in successive years they might hold externships at the China desk of the *Washington Post* in Washington and the China bureau of the *Washington Post* in Beijing.

### Honors

To become a candidate for honors, a CAPS major must maintain a grade average of B+ and have approval for a senior essay proposal from a faculty advisor. During senior year, a CAPS honors student completes the research and writing of a senior essay by taking two tutorials, CAPS 401 in Beijing and CAPS 402 in Ithaca.

### Gateway Courses

**CAPS 257(2570) China Encounters the World (also HIST 257(2571)) @ (HA)**

Fall. 4 credits. J. Chen. This is a lecture and discussion course focusing on how China has encountered the world since the 17th century, with an emphasis on the late 19th and 20th centuries. In particular, it will analyze the age-old Chinese "Central Kingdom" conception and how the conception was challenged during modern times as the result of Western and Japanese incursion and China's inability to deal with the consequences of the incursion. It will further analyze the impact of the Chinese "victim mentality" in order to pursue a deeper understanding of why radical revolutions have dominated China's modern history. While the emphasis of this course is on China's external relations, foreign policy issues will be examined in the context of China's political, economic and social developments in broader terms. The course's purpose is not just to impart information but also to cultivate a basic understanding of the significance of the Chinese experience in the age of worldwide modernization. Grades in this class will be calculated on the basis of class participation, quizzes, midterm and final exams, and one essay assignment.



**CAPS 282(2827) China and the World (also GOVT 282(2827)) @ (HA)**

Spring. 4 credits. A. Carlson.

This course comes to terms with the dramatic rise of China by reviewing Chinese foreign policy since the establishment of the People's Republic of China. In particular, it concentrates on major developments during the 1980s and 1990s. Such a wide-ranging survey encompasses not only China's relations with its major bilateral partners but also its broader relationship with the international system.

**Courses in Ithaca****CHIN 101-102(1101-1102) Elementary Standard Chinese (Mandarin)**

101, fall; 102, spring. 6 credits each semester.

For description, see CHIN 101-102 under "Asian Studies."

**CHIN 201-202(2201-2202) Intermediate Standard Chinese (Mandarin)**

201, fall; 202, spring. 4 credits each semester.

For description, see CHIN 201-202 under "Asian Studies."

**CHIN 301-302(3301-3302) High Intermediate Chinese**

301, fall; 302, spring. 4 credits each semester.

For description, see CHIN 301-302 under "Asian Studies."

**[CAPS 352(3520) Twentieth Century Asian-American Relations (also HIST 352(3520)) @ (HA)]**

Spring. 4 credits. Next offered 2007-2008. J. Chen.

For description, see HIST 352.]

**CAPS 385(3857) American Foreign Policy (also GOVT 385(3857)) (SBA)**

Spring. 4 credits. J. J. Suh.

For description, see GOVT 385.

**[CAPS 314(3140) U.S. Foreign Relations, 1914 to Present (also HIST 314(3140))]**

Spring. 4 credits. Next offered 2007-2008. F. Logevall.

For description, see HIST 314.]

**[CAPS 400(4000) Senior Seminar on China's Foreign Relations]**

Spring. 4 credits. J. Chen. Next offered 2007-2008.]

**[CAPS 402(4020) Honors Essay Tutorial]**

Spring. 4 credits. See J. Chen about making arrangements with appropriate advisors. Next offered 2007-2008.]

**[CAPS 469(4690) China's Economy Under Mao and Deng (also ECON 469(4690))]**

Spring. 4 credits. Next offered 2007-2008. T. Lyons.

For description, see ECON 469.]

**Courses in Washington, D.C.****CAPS 300(3000) Seminar on American Relations with China (also HIST 339(3391))]**

Fall. 4 credits. R. Bush.

A historical review of the fragile and volatile U.S.-China relationship from the opening by Richard Nixon in the early 1970s until the present. Several individual sessions will be led by current or former executive branch or congressional officials, business

people, journalists, representatives of non-governmental organizations and others who have worked in China or have participated in the making of U.S. policy toward China.

**CAPS 500(5000) Politics and Policy: Theory, Research, and Practice (also AM ST 501(4998), PAM 406(4998), GOVT 500(4998), ALS 500(4998))]**

Fall and spring. 8 credits.

For description, see GOVT 500.

**CHIN 301(3301) High Intermediate Chinese**

Fall. 4 credits.

For description, see CHIN 301 under "Asian Studies."

**Courses in Beijing****[CAPS 301(3010) Seminar on China]**

Fall. 4 credits. Next offered 2007-2008.]

**[CAPS 302(3020) Survey of Chinese History, Politics, and Foreign Relations]**

Fall. 4 credits. Q. Jia. Next offered 2007-2008.]

**[CAPS 401(4010) Honors Essay Tutorial]**

Fall. 4 credits. See J. Chen about making arrangements with appropriate advisors. Next offered 2007-2008.]

**CHINESE**

FALCON Program (Chinese)

See Department of Asian Studies.

**CLASSICS**

J. Rusten, acting chair, L. S. Abel (director of undergraduate studies), F. M. Ahl, C. Brittain (director of graduate studies), K. Clinton, J. E. Coleman, G. Fine, M. Fontaine, G. Holst-Warhaft, T. Irwin, D. Mankin, S. Manning, K. McDonnell, A. Nussbaum, H. Pelliccia, P. Pucci, H. R. Rawlings III, E. Rebillard (acting director of graduate studies, fall), A. Ruppel, B. Strauss. Emeritus: G. M. Kirkwood.

The Department of Classics at Cornell is one of the oldest in the country. It offers both the traditional core training in the languages, literature, philosophy, art, and history of ancient Greece and Rome, and also newer approaches developed from the comparative study of Mediterranean civilizations, peace studies, and feminist and literary theory. The broad range of instruction includes courses offered by professors with appointments in the Departments of History, Philosophy, Comparative Literature, History of Art, Linguistics, and Near Eastern Studies, and in the Programs of Archaeology, Medieval Studies, and Religious Studies.

The department offers a wide variety of classical civilization courses in English translation on such subjects as Greek mythology, ancient mystery religions, early Christianity, and Greek and Roman society; ancient epic, lyric, tragedy, comedy, satire, novels, and love-poetry; Periclean Athens, Republican Rome, the Roman Empire, and Plato, Aristotle, and Hellenistic philosophy. These courses are designed to introduce aspects of classical antiquity to the students

with very divergent primary interests. Courses in art, archaeology, and dendrochronology also have wide appeal. These courses make use of the university's large collections of ancient coins and of reproductions of sculptures, inscriptions, and other ancient objects. For example, since 1976 over 500 Cornell students have worked in the Aegean Dendrochronology Project's laboratory, measuring the annual rings on thousands of samples of wood and charcoal, and using the rings to date structures as old as 7000 BC. In the summers selected students have participated in collecting trips around the eastern end of the Mediterranean (see web site at [www.arts.cornell.edu/dendro](http://www.arts.cornell.edu/dendro)). Students who wish to gain first-hand archaeological experience may also join one of several summer Cornell-sponsored field projects in Greece and Turkey.

The study of language is a vital part of classics. Offerings range from 100-level classes designed to further the understanding of English through the study of the Latin and Greek sources of much of its vocabulary, to courses in linguistics on the morphology and syntax of the ancient languages, comparative grammar, and Indo-European (the reconstructed source of the family of languages that includes Greek, Latin, Sanskrit, and most modern European languages).

The core function of the department is the study of ancient Greek and Latin. Elementary Greek and Latin are taught in both two-semester courses and intensive summer courses. (For students whose Latin is a bit rusty, the department also offers a rapid, one-semester review class.) Students with a more advanced knowledge of Greek or Latin can choose from a wide selection of courses, from intermediate language classes at the 200 level, which refresh and broaden knowledge of syntax and vocabulary, to graduate and faculty reading groups. All of these courses concentrate on exciting literary texts, whether the poems of Catullus and Virgil, or the dialogues of Plato and Xenophon, at the 200 level, or, in the advanced reading groups, the latest papyrological discoveries, such as the "new" fragments of Empedocles' cosmic poem or the "new" epigrams of Posidippus.

The primary purpose of language instruction is to make possible the study at first hand of the extraordinary range of powerful and challenging ideas embodied in Greek and Latin texts. The department offers undergraduate and graduate seminars on literary, linguistic, historical, and philosophical topics, studied through the Greek and Latin works of authors from Homer (probably from the eighth century BCE) to Boethius (sixth century CE), and occasionally from later writers such as Dante, Petrarch, or Milton. The department strives to adapt its program to the needs of individual students from all disciplines.

**Majors in Classics**

The major in Classics offers four tracks, which are Greek, Latin, classics, and classical civilization. Only classes passed with a C- or better may be applied to the classics major.

**Classics**

The classics track requires: (1) six courses in Greek and Latin numbered 201 or above; and (2) three courses in related subjects selected in consultation with the student's departmental

advisor (see below). Classics majors are required to take a minimum of two 300-level courses in one language and one 300-level course in the other.

Students who are considering graduate study in classics are strongly advised to complete the classics major.

### Greek

The Greek track requires: (1) GREEK 104; (2) five courses in Greek numbered 201 or above; and (3) three courses in related subjects selected in consultation with the student's departmental advisor (see below). The courses in Greek must include at least three at the 300 level.

### Latin

The Latin track requires: (1) LATIN 109 or 205; (2) five courses in Latin numbered 206 or above; and (3) three courses in related subjects selected in consultation with the student's departmental advisor (see below). The courses in Latin must include at least three at the 300 level.

### Classical Civilization

The classical civilization track requires: (1a) two 200-level courses in either ancient Greek or Latin or (1b) one course at the 200-level in both ancient Greek and Latin; (2) CLASS 211, 217 or HIST 265; CLASS 212 or HIST 267 and 268; and one course at the 200-level in both ancient Greek or Roman material culture; (3) six additional courses in classical civilization, classical archaeology, ancient history, ancient philosophy, ancient Greek or Latin (at 200-level or above), or related subjects (this last may number up to two).

### Related Subjects

Classics is an interdisciplinary field concerned with the study of Mediterranean civilizations from the 15th century BCE to the sixth century CE. Subjects in the field include Greek and Latin language, literature, and linguistics; ancient philosophy, history, archaeology, and art history; papyrology, epigraphy, and numismatics. In addition to the required courses in language and literature, the majors include a requirement for related courses intended to give breadth and exposure to the other disciplines within the field and to enrich the student's study of classical languages and literature. Since the influence of the Greek and Roman world extended far beyond antiquity, a related course may focus on some aspect of the classical tradition in a later period. Students select related courses in consultation with their departmental advisors or the director of undergraduate studies.

### Honors

Candidates for the degree of bachelor of arts with honors in classics, Greek, Latin, or classical civilization must fulfill the requirements of the appropriate major and complete the two-semester honors course, CLASS 472. (Credit for the honors course may be included in the credits required for the major.) Candidates for honors must have a cumulative average grade of 3.0 and an average of 3.5 in their major. Students choose an honors advisor by the end of their sixth semester, in consultation with the departmental honors committee or the DUS. By the second week of their seventh

semester, they submit an outline of their proposed research to their advisor and the committee. The thesis is written in the second semester of the course, under the supervision of the student's honors advisor. The level of honors is determined by the committee, in consultation with students' advisors. Copies of successful honors theses are filed with the department. Further details about this program are provided in the brochure *Guidelines for Honors in Classics*, available in the department office, 120 Goldwin Smith Hall, or on the department web page: [www.arts.cornell.edu/classics/honors.asp](http://www.arts.cornell.edu/classics/honors.asp).

### Independent Study

Independent study at the 300 level may be undertaken by undergraduates upon completion of one semester of work at the 300 level in the relevant field and only with the permission of the director of undergraduate studies.

### Study Abroad

Cornell is associated with four programs that provide opportunities for summer, semester, or yearlong study abroad in Greece and Italy. The American School of Classical Studies at Athens offers a summer program for graduate students and qualified undergraduates; College Year in Athens offers semester-long courses (consult Cornell Abroad for details). The Intercollegiate Center for Classical Studies in Rome provides semester-long courses in Latin, Greek, ancient history, art, archaeology, and Italian; the American Academy in Rome offers both full-year and summer programs for qualified graduate students. The Department of Classics awards several travel grants each year for graduate students from the Townsend Memorial Fund; undergraduates are eligible for the Caplan Travel Fellowships (see "Caplan Fellowships," below). Detailed information on these programs is available in the department office, 120 Goldwin Smith Hall.

### Summer Support for Language Study

The Department of Classics has at its disposal resources to assist students who wish to enroll in intensive Latin or Greek in the Cornell summer session. These courses are designed to enable students to enter second-year Latin or Greek the following fall. Preference is given to undergraduate majors in classics and other students needing Latin or Greek for completion of their majors or graduate programs; dyslexic students are accorded additional preference. Two different kinds of support are available: (1) The Kanders-Townsend Prize Fellowship provides a \$3,225 stipend to cover living expenses and full tuition for either CLASS 103 or 107, and is open only to freshman or sophomore classics majors (or potential classics majors) who have already begun one classical language and wish to start the other in the summer. (2) Classics department tuition support is open to Cornell undergraduate and graduate students and provides some level of tuition support, up to the full amount; no stipend for living expenses is offered. Applications are due to the chair of the Department of Classics by March 31. See also "Caplan Fellowships," below.

### Placement in Greek and Latin

Placement of first-year undergraduates in Greek and Latin courses is determined by examinations given by the Department of Classics during orientation week. For details concerning these examinations, contact the director of undergraduate studies.

### Satisfying the College Language Requirements with Ancient Greek or Latin

Greek: option 1 is satisfied by taking GREEK 201 or above. Option 2 is satisfied by taking either (a) GREEK 101, 102, and 104 or (b) GREEK 103 and 104. (GREEK 103 counts as two courses. Although credits for 103 and 104 add up to only 9, this sequence does satisfy Option 2 of the college's language requirement.)

Latin: option 1 is satisfied by taking LATIN 205 or above. Option 2 is satisfied by taking either (a) LATIN 105, 106 and 109 or (b) LATIN 107 and 109. (LATIN 107 counts as two courses. Although credits for 107 and 109 add up to only 9, this sequence does satisfy Option 2 of the college's language requirement.) The sequence Latin 108-109 does not satisfy Option 2. Students can place into LATIN 205 with an A- or better in LATIN 106, 107 or 108. Upon completing 205, they satisfy Option 1. LATIN 108 overlaps with LATIN 106 therefore cannot be taken (or counted toward the degree) after completing LATIN 106 or 107.

### First-Year Writing Seminars

The department offers first-year writing seminars on a wide range of classical and medieval topics. Consult John S. Knight Writing Seminar Program brochures for times, instructors, and descriptions.

### Caplan Fellowships

The Harry Caplan Travel Fellowships are awarded annually to one or two outstanding juniors by the College of Arts and Sciences for summer travel or projects in Europe or the Near East. Interested juniors should consult the director of undergraduate studies.

### Classical Civilization

#### CLASS 171(1609) English Words: Histories and Mysteries (also LING 109[1109]) # (HA)

Spring, 3 credits. W. Harbert.  
For description, see LING 109.

#### CLASS 211(2601) The Greek Experience # (CA)

Fall, 3 credits. Limited to 50 students.  
F. Ahl.

Introduction to the literature and thought of ancient Greece. Topics include epic and lyric poetry, tragedy and comedy, and historical, political, philosophical, and scientific writings. Some attention is also given to the daily life of ordinary citizens, supplemented by slides of ancient art and architecture.

#### CLASS 212(2620) The Roman Experience # (CA)

Spring, 3 credits. D. Mankin.  
Introduction to the civilization of the Romans as expressed in their literature, religion, and social and political institutions.

**CLASS 217(2603) Initiation to Greek Culture # (LA)**

Fall. 4 credits. Limited to 18 students.

Intended especially for freshmen. Students must apply in writing to chair, Department of Classics, 120 Goldwin Smith Hall.

P. Pucci and L. Abel.

Knowledge of Greek or Latin is not necessary, since all texts are in translation. What is necessary is the willingness to participate in three one-hour seminars each week and also a supplementary one- or two-hour session, during which the class participates in workshops with specially invited guests. This course covers a wide range of Greek literary and philosophical works as well as modern critical and philosophical writings on the Greeks. The focus throughout is on the status of language, the many forms of discourse that appear in the literature, and the attempts the Greeks themselves made to overcome the perceived inadequacies and difficulties inherent in language as the medium of poetry and philosophy. The course inquires into the development of philosophy in the context of a culture infused with traditional, mythological accounts of the cosmos. It asks how poetic forms such as tragedy responded to and made an accommodation with philosophical discourse while creating an intense emotional effect on the audience; how the first historians, using literary and philosophical discourse, created space for their own inquiry; and discusses how these issues persist and are formulated in our own thinking.

**CLASS 223(2641) The Comic Theater (also THETR 223[2230]) # (LA)**

Spring. 3 credits. J. Rusten.

The origins of comic drama in ancient Greece and Rome, and its subsequent incarnations especially in the Italian renaissance (*Commedia erudita* and *Commedia dell'arte*), Elizabethan England, 17th-century France, the English Restoration, and Hollywood in the thirties and forties. Chief topics include the growth of the comic theatrical tradition and conventions; techniques and themes of comic plots (trickster, parody, farce, caricature); and the role of comedy in society. All readings in English.

**CLASS 226(2646) Atheism Then and Now (also RELST 226[2646]) # (KCM)**

Spring. 3 credits. Limited to 18 students. J. Coleman.

Introduction to atheism, defined as the belief that the entities commonly called gods have no real existence. Begins with the origins of western atheism in ancient Greece. Students then read and discuss a selection of later writings illustrating the historical development of atheism and its relationship with deism, naturalism, and modern science. Students are encouraged to make critical use of some of the extensive resources available on the web at atheist, freethinker, and secular humanist sites. Particular themes considered in class discussions and student presentations include: faith vs. reason as means of knowledge; scientific evidence for and against the existence of divinity; the comparison of nonreligious moral and ethical codes with religious ones; atheist critiques of historical Christian attitudes toward science and slavery; the problem of the existence of multiple exclusive religions; and the positive aspects of atheism. Students must give two oral presentations of particular questions chosen in consultation with the instructor that are subsequently written up as 12-page papers;

two in-class preliminary exams and a final exam.

**CLASS 229(2650) War and Peace in Greece and Rome (also HIST 256[2560]) # (HA)**

Spring. 4 credits. B. Strauss.

For description, see HIST 256.

**CLASS 231(2661) Ancient Philosophy (also PHIL 211[2110]) # (KCM)**

Fall. 4 credits. T. Irwin.

For description, see PHIL 211.

**CLASS 236(2604) Greek Mythology (also COM L 236[2360]) # (LA)**

Summer and fall. 3 credits. Limited to 50 students in summer; 200 in fall. D. Mankin.

Survey of the Greek myths, with emphasis on the content and significance of the myths in Mediterranean society, including the place of myth in Greek life and consciousness; the factors and influences involved in the creation of myths; and the use of myths for our understanding of Greek literature, religion, and moral and political concepts.

**[CLASS 237(2607) Greek Religion and Mystery Cults (also RELST 237[2607]) # (CA)**

Spring. 3 credits. Next offered 2007–2008. K. Clinton.

A representative variety of cults and their history are studied with special emphasis on mystery cults.]

**[CLASS 238(2640) The Ancient Epic and Beyond # (LA)**

Spring. 3 credits. Next offered 2007–2008. K. Clinton.

Readings in Greek and Roman epic, and extending to later writers such as Dante, Melville, and Walcott.]

**CLASS 258(2682) Periclean Athens (also HIST 258[2580]) # (HA)**

Spring. 4 credits. H. R. Rawlings, III.

The first five weeks provide a synoptic view of Athens' historical and cultural achievement in the middle of the fifth century BCE—the traditional pinnacle of "The Glory that was Greece." Readings are taken from Greek historians, philosophers, poets, and documentary texts. At least two of the (75-minute) lectures are devoted to art history and delivered by a guest speaker. The next seven to eight weeks follow the course of the Peloponnesian War to its end; readings from Thucydides are interwoven with contemporaneous texts composed by the dramatists (Sophocles, Euripides, and Aristophanes) and the sophists (supplemented with readings from Plato). The remaining classes consider the fate of Socrates and a few other fourth-century developments. The basic aim of the course is to approach an understanding of how and why a vital and creative society came unglued. There are weekly discussion sections.

**[CLASS 260(2662) Conceptions of the Self in Classical Antiquity (also PHIL 209[2090]) # (KCM)**

Spring. 4 credits. Prerequisites: none. All readings in English. Next offered 2007–2008. C. Brittain.

This course examines a variety of very different conceptions of the self using a range of ancient texts from Greek and Roman literature, medical theory, and philosophy.]

**CLASS 265(2650) Ancient Greece from Homer to Alexander the Great (also HIST 265[2650]) # (HA)**

Fall. 4 credits. Open to freshmen.

B. Strauss.

For description, see HIST 265.

**CLASS 267(2683) History of Rome I (also HIST 267[2670]) # (HA)**

Fall. 4 credits. Open to freshmen.

E. Rebillard.

Rome's beginnings and the Roman Republic.

A general introduction to Roman history from the foundation of Rome in the middle of the eighth century BC to the end of the Republic (31 BC). The course is the first part of a two-semester survey of Roman history up to the deposition of the last Roman emperor in the West (AD 476). Examines the rise of Rome from a village in Italy to an imperial power over the Mediterranean world and consider the political, economic, and social consequences of that achievement.

**CLASS 268(2684) History of Rome II (also HIST 268[2671]) # (HA)**

Spring. 4 credits. Open to freshmen.

E. Rebillard.

Roman History II: the Roman Empire. This course, the second part of a two-semester survey of Roman history, examines the history of the Roman Empire from the beginnings of the Augustan Principate (31 BC) to the fall of the Western Empire in the fifth century (AD 476). Students consider the creation and development of the imperial regime, explore the various types of challenges (military, cultural, and religious) to the hegemony of the Roman state, and try to understand the transformations of Roman society and culture down to the middle of the fifth century AD.

**[CLASS 332(3644) Sages and Saints/ Ancient World (also HIST 338[3644], RELST 332[3644]) # (HA)**

Spring. 4 credits. Next offered 2008–2009.

E. Rebillard

This seminar considers the continuities and changes in the representations of the holy man, from the sages of classical antiquity to the saints of early Christianity.]

**[CLASS 333(3643) Greek and Roman Mystery Cults and Early Christianity (also RELST 333[3643]) # (CA)**

Fall. 4 credits. Recommended: classics course (civilization or language) or RELST 101. Next offered 2007–2008. K. Clinton.

After a brief survey of classical mystery cults and Hellenistic religion, the course focuses on Hellenistic and Roman cults.]

**CLASS 339(3669) Plato (also PHIL 309[3090]) # (KCM)**

Fall. 4 credits. Prerequisite: at least one philosophy course. T. Irwin.

For description, see PHIL 309.

**CLASS 340(3664) Aristotle (also PHIL 310[3100]) # (KCM)**

Spring. 4 credits. T. Irwin.

Aristotle's practical and productive works (his *Ethics*, *Politics*, *Rhetoric*, and *Poetics*), with attention to their grounding in his theoretical works.

**[CLASS 341(3661) Hellenistic Philosophy (KCM)**

Fall. 4 credits. Prerequisite: CLASS 231 or philosophy course. Next offered 2007–2008. C. Brittain.

Topics include scepticism, Stoic and Epicurean psychology of action, theories of

language, concept development and content, determinism and responsibility, virtue ethics, and scientific epistemologies.]

**CLASS 345(3645) The Tragic Theater (also COM L 344[3440], THET 345[3450]) # (LA)**

Fall. 4 credits. Limited to 40 students.  
F. Ahl.

Tragedy and its audiences from ancient Greece to modern theater and film. Topics: origins of theatrical conventions; Shakespeare and Seneca; tragedy in modern theater and film. Works studied include: Aeschylus' *Agamemnon*; Sophocles' *Oedipus Tyrannus*, *Philoctetes*; Euripides' *Alceste*, *Helen*, *Iphigenia in Aulis*, *Orestes*; Seneca's *Thyestes*, *Trojan Women*; Shakespeare's *Julius Caesar*, *Titus Andronicus*, *Othello*; Strindberg's *The Father*; Dürrenmatt's *The Visit*; Bergman's *Seventh Seal*; Caccyannis' *Iphigenia*.

**[CLASS 357(3685) Ancient Athens and Sparta # (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
L. Abel.

Herodotus and Thucydides tell us much of what we know about Athens and Sparta in the sixth and fifth centuries BC—about the development, flourishing, and disastrous conflict of these two very different emblematic city-states. Students read Herodotus and Thucydides in English translation, compare what they tell us with other evidence (including Aristotle and Xenophon), and analyze their narratives as historical, historiographical, and literary texts. Students attend to how these formative thinkers and writers created an authoritative version of events.]

**[CLASS 382(3642) Greeks, Romans, and Victorians # (LA)]**

Spring. 4 credits. Next offered 2008-2009.  
F. Ahl.

Explores how 19th-century (and especially Victorian English and Irish) poets, dramatists, and to a lesser extent, novelists, present Greco-Roman antiquity.]

**CLASS 387(3686) Independent Study in Classical Civilization, Undergraduate Level**

Fall and spring. Up to 4 credits.

**[CLASS 405(4665) Augustine's Confessions (also RELST 405[4665]) (KCM)]**

Spring. 4 credits. Next offered 2008-2009.  
C. Brittain.

This course studies Augustine's conception of the mind, focusing on his analysis of memory, desire, and understanding and its relation to Greek and Latin philosophical antecedents.]

**CLASS 436(4320) Topics in Ancient Greek History**

Spring. 4 credits. Limited to 15 students.  
K. Clinton.

Topic: Aristotelian Constitution of Athens.

**CLASS 441(4410) Fourth Century and Early History of Greece (also HIST 441[4411]) # (HA)**

Fall. 4 credits. B. Strauss. Undergrads and grads will meet for two hours; grad students must stay for one additional hour.

For description, see HIST 441.

**[CLASS 442(4662) Topics in Ancient Philosophy (also PHIL 413[4130]) # (KCM)]**

Fall. 4 credits. Next offered 2008-2009.

Mind, self, and psychopathology in ancient philosophy.]

**CLASS 447 Gender, Sexuality, and the Body in Late Antiquity (also NES 445, RELST 445, FGSS 447)**

Fall. 4 credits. K. Haines-Eitzen.  
For description, see NES 445.

**CLASS 464(4684) Women and Gender in Ancient Greek Literature and Society**

Spring. 4 credits. Prerequisites: juniors and seniors with at least one course in ancient Greek history or literature. L. Abel.

Greek literature presents many strong female characters, characters who persevere into our modern culture, and one influential poet of lovely songs, Sappho. On the other hand, Greek law and philosophy (with the important perhaps exception of Plato) define women as less than fully human in bodily, intellectual, and moral capability. Evidence from Greek social history (legal cases, pots, and inscriptions) is contradictory. How can we make sense of these fundamental contradictions and paradoxes? How does attending to gender help us understand ancient Greek literature, ideas, and society? Readings will be in English translation. However, students who can read Greek will be encouraged to make use of their skill, especially in writing their papers.

**[CLASS 475(4625) The Christianization of the Roman World, 300 to 600 CE (also RELST 475[4625], HIST 483[4831]) # (HA)]**

Fall. 4 credits. Next offered 2008-2009.  
E. Rebillard.

Christianization of the Roman world is concerned by the impact of Christianity on the late antique society and by the resistance and/or persistence of the old belief and practices.]

**CLASS 545(7345) Graduate TA Training**

Fall and spring. 1 credit. Staff.  
Pedagogical instruction and course coordination. Requirement for all graduate student teachers of CLASS 105-106 and Classics first-year writing seminars.

**CLASS 632(7682) Topics in Ancient History (also HIST 630[6300])**

Fall. 4 credits. E. Rebillard.  
Topic: Religion and Authority in Late Antique North Africa. Study of the relationship between religious activity and sociopolitical authority in Roman North Africa from the reign of Constantine to the Vandal invasions

**CLASS 638(7686) Ancient Warfare (also HIST 638[6360])**

Spring. 4 credits. B. Strauss.  
A survey of recent theories, methods and publications as well as readings in Greek and Latin. At least one course in ancient history and permission of the instructor, reading knowledge of Greek or Latin.

**CLASS 700(9900) Doctoral Dissertation Research**

Fall and spring. 0 credits. Letter grades only. Staff.

**CLASS 703(7690) Independent Study for Graduate Students in Classical Civilization**

Fall and spring. Up to 4 credits.

## Greek

**GREEK 101(1101) Elementary Ancient Greek I**

Fall. 4 credits. A. Ruppel.  
Introduction to Attic Greek. Designed to enable the student to read the ancient authors as soon as possible.

**GREEK 102(1102) Elementary Ancient Greek II**

Spring. 4 credits. Prerequisite: CLASS 101 or equivalent. A. Ruppel.  
Continuation of CLASS 101, prepares students for CLASS 104.

**GREEK 103(1103) Intensive Greek**

Summer. 6 credits. Staff.  
Intensive introduction combining the fundamentals of ancient Greek grammar with readings from a variety of classical authors in the original Greek. Prepares students in a single semester for CLASS 104.

**GREEK 104(1105) Elementary Ancient Greek III #**

Fall. 3 credits. Prerequisites: CLASS 102, 103, or placement by departmental exam.  
A. Nussbaum.

Introduces students to reading Greek literary texts (Xenophon's *Anabasis*) and a dialogue of Plato. Covers complex syntax and reviews the grammar presented in CLASS 102 or 103.

**GREEK 201(2101) Greek Prose # (LA)**

Spring. 3 credits. *Satisfies Option 1.*  
Prerequisite: CLASS 104. H. Rawlings III.

**[GREEK 202(2105) The Greek New Testament (also RELST 202[2105]) # (LA)]**

Spring. 3 credits. Prerequisites: at least one year of ancient Greek (CLASS 101-103 or 104) or permission of instructor. Next offered 2008-2009. E. Rebillard.

Sequel to NES 229/CLASS 215. Selections in Greek from all four gospels, the letters of Paul, and Acts.]

**GREEK 203(2103) Homer # (LA)**

Spring. 3 credits. *Satisfies Option 1.*  
Prerequisite: CLASS 104. D. Mankin.  
Readings in the Homeric epic.

**[GREEK 204(2104) Euripides: Alceste # (LA)]**

Spring. 3 credits. *Satisfies Option 1.* Next offered 2007-2008. Staff.]

**GREEK 301(3101) Greek Epic # (LA)**

Spring. 4 credits. *Satisfies Option 1.*  
Prerequisite: one 200-level Greek course.  
P. Pucci.  
Undergraduate seminar.

**GREEK 302(3102) Greek Historiography and Oratory # (HA)**

Fall. 4 credits. *Satisfies Option 1.*  
Prerequisite: one 200-level Greek course.  
P. Pucci.  
Undergraduate seminar.

**[GREEK 303(3103) Undergraduate Seminar: Greek Drama (LA)]**

Fall. 4 credits. *Satisfies Option 1.*  
Prerequisite: one 200-level Greek course  
Next offered 2008-2009. P. Pucci.  
Topic: TBA.]

**[GREEK 304(3104) Greek Philosophy and Rhetoric: Plato and the Orators (LA)]**

Fall. 4 credits. Prerequisite: one 200-level Greek course. Next offered 2007–2008. Staff.

Undergraduate seminar.]

**[GREEK 305(3629) Introduction to the New Testament Seminar (also RELST 329(3629))]**

Fall. 1 credit. Offers extra credit option for students who have had one year of Greek, to read portions of New Testament and other Christian writings in Greek. Does not count toward classics major requirement as 300-level Greek course. Prerequisite: one year of Greek. Corequisite: enrollment in NES 229/CLASS 215. Next offered 2008–2009.]

**[GREEK 310(3110) Special Topics in Greek Literature # (LA)]**

Fall and spring. 4 credits. *Satisfies Option 1.* Prerequisite: one 200-level Greek course or permission of instructor. Next offered 2007–2008.]

**[GREEK 313(3113) Hellenistic Poetry # (LA)]**

Spring. 4 credits. Prerequisite: one 200-level Greek course. Next offered 2008–2009. H. Pelliccia.

The Hellenistic Greek poetry of Callimachus, Theocritus, Apollonius of Rhodes and others is often studied as the bridge between archaic and classical Greek poets and Latin poets such as Catullus, Virgil and Ovid. This course gives consideration to these important interrelationships only after attempting to understand and appreciate the accomplishments of the Hellenistic authors on their own terms.]

**[GREEK 316(3116) Greek Prose Composition (LA)]**

Spring. 4 credits. *Satisfies Option 1.* Prerequisite: Prerequisites: One 200-level Greek course. and CLASS 104. Next offered 2007–2008. P. Pucci.]

**[GREEK 385(3185) Independent Study in Greek, Undergraduate Level]**

Fall and spring. Up to 4 credits. Prerequisite: permission of DUS in the case of documented schedule conflict. Staff.

**[GREEK 417(4101) Advanced Readings in Greek Literature # (LA)]**

Fall. 4 credits. Next offered 2007–2008. Staff.]

**[GREEK 418(4102) Advanced Readings in Greek Literature # (LA)]**

Spring. 4 credits. Next offered 2008–2009. P. Pucci.

Topic: Greek epic.]

**[GREEK 419(4116) Advanced Greek Composition (LA)]**

Fall. 4 credits. Prerequisite: CLASS 316 or equivalent. J. Rusten.

**[GREEK 605–606(7105–7106) Graduate Survey of Greek Literature]**

605, fall; 606, spring. 4 credits each semester. Prerequisite: linguistic proficiency to be determined by instructor. Next offered 2007–2008. Staff.

Survey of Greek literature in two semesters. 605: Greek literature from Homer to the mid-fifth century. 606: Greek literature from the late fifth century to the Empire.]

**[GREEK 610(7310) CorHaLi Seminar]**

Spring. 2 credits. P. Pucci.

Topic: The gods in Hesiod's Theogony.

**[GREEK 611(7111) Greek Philosophical Texts (also PHIL 411(4110))]**

Fall and spring. Up to 4 credits.

Prerequisites: knowledge of Greek and permission of instructor. G. Fine.

Readings of Greek philosophical texts in the original.

**[GREEK 671(7171) Graduate Seminar in Greek]**

Fall. 4 credits. Next offered 2007–2008.

Staff.

Topic: TBA.]

**[GREEK 672(7172) Graduate Seminar in Greek (also HIST 662(6620))]**

Fall. 4 credits. H. Rawlings III.

Topic: Thucydides.

**[GREEK 701(7910) Independent Study for Graduate Students in Greek]**

Fall and spring. Up to 4 credits. Was CLASS 701–702.

**Latin****[LATIN 105(1201) Elementary Latin I]**

Fall. 4 credits. Staff.

Introductory course designed to prepare students to start reading Latin prose at the end of a year. The class moves swiftly and meets daily. Work includes extensive memorization of vocabulary and paradigms; study of Latin syntax; and written homework, quizzes, tests, and oral drills.

**[LATIN 106(1202) Elementary Latin II]**

Spring. 4 credits. Prerequisite: 105 or equivalent. Staff.

Continuation of CLASS 105, using readings from various authors; prepares students for CLASS 109.

**[LATIN 107(1203) Intensive Latin]**

Summer. 6 credits. Students must register for CLASS 107 and 107.1. Staff.

Intensive introduction that quickly instills the essentials of Latin grammar before progressing to readings in the original Latin. Prepares students in a single semester for CLASS 109.

**[LATIN 108(1204) Latin in Review]**

Fall. 4 credits. Prerequisite: placement by departmental examination. M. Fontaine.

Designed to accommodate students who have had some Latin, but are insufficiently prepared to take 106. It begins with review of some material covered in 105 and then continues with second-semester Latin material (106). The class moves swiftly and meets daily. Work includes extensive memorization of vocabulary and paradigms; study of Latin syntax; and written homework, quizzes, tests, and oral drills. Students should be ready for LATIN 109 by the end of the course, but may take LATIN 205 if they pass with A– or better.

**[LATIN 109(1205) Elementary Latin III]**

Fall and spring. 3 credits. Prerequisites:

CLASS 106, 107, 108 or placement by departmental exam. Fall, A. Ruppel; spring, K. Clinton.

Introduces students to reading a literary Latin text (Cicero's *Speeches against Catiline*). Covers complex syntax and reviews the grammar presented in CLASS 106, 107, or 108.

**[LATIN 205(2201) Latin Prose # (LA)]**

Fall and spring. 3 credits. *Satisfies Option 1.* Prerequisite: CLASS 109 or grade of A– or above in CLASS 106, 107, 108 or placement by departmental exam. Fall, M. Fontaine; spring, A. Ruppel.

Fall: reading of Cicero's speech in defense of Milo on a charge of murder, with attention paid to the ancient commentary on the speech by Asconius. Spring: Cicero's philosophical texts—reading selections from “De republica” and “de natura deorum.”

**[LATIN 206(2202) Ovid: Erotic Poetry # (LA)]**

Spring. 3 credits. *Satisfies Option 1.*

Prerequisites: CLASS 109, 205, or placement by departmental exam. Next offered 2007–2008. D. Mankin.

Ovid's erotic poetry is relatively easy to translate but rich in its literary structure and influence.]

**[LATIN 207(2203) Catullus # (LA)]**

Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: CLASS 109. Next offered 2007–2008. Staff.

Aims to present the poems of Catullus within their cultural and historical context. The poems are read and translated, and their significance both individually and as products of Late Roman Republican culture discussed in class. Selections from the works of Catullus's contemporaries are assigned in translation.]

**[LATIN 208(2204) Roman Drama # (LA)]**

Spring. 3 credits. *Satisfies Option 1.*

Prerequisite: CLASS 109. M. Fontaine.

Topic: Selected Tragedies of Seneca.

**[LATIN 209(2205) Virgil # (LA)]**

Spring. 3 credits. *Satisfies Option 1.*

Prerequisite: CLASS 109. Next offered 2008–2009. Staff.]

**[LATIN 210(2206) Roman Letters # (LA)]**

Spring. 3 credits. *Satisfies Option 1.*

Prerequisite: CLASS 109. Next offered 2007–2008. Staff.

Offers an overview of prose letter-writing in the Late Republic and Empire. Selections from the correspondence of Cicero, Seneca, and Pliny are read, translated, and discussed in class. Selections from other authors are assigned in translation. Among other topics, the discussion focuses on the issues of transmission, circulation, and publication of letter-collections, as well as on the political and cultural context in which the letters were written.]

**[LATIN 306(3201) Roman Epic # (LA)]**

Spring. 3 credits. *Satisfies Option 1.*

Prerequisite: 200-level Latin. Next offered 2008–2009 P. Pucci.

Undergraduate seminar.]

**[LATIN 307(3202) Roman Historiography # (LA)]**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisite: one semester of 200-level Latin or permission of instructor. H. R. Rawlings, III.

Undergraduate seminar. Close reading of several Roman historians, particularly Sallust and Livy. Students will focus upon Latin prose style, Roman historical traditions and historiographical analysis: source criticism, study of narrative technique and the rhetoric of speeches, and appreciation of irony and implied meaning. The course will also touch upon Greek historiographical models.



**[LATIN 308(3203) Roman Poetry: Virgil, Eclogues and Georgics (LA)]**

3 credits. *Satisfies Option 1.* Prerequisite: one 200-level Latin course. Next offered 2007-2008. Staff.

Undergraduate seminar.]

**[LATIN 309(3204) Roman Prose # (LA)]**

Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: one 200-level Latin course. Next offered 2007-2008. Staff.

Undergraduate seminar.]

**[LATIN 314(3205) The Augustan Age # (LA)]**

Fall. 4 credits. E. Rebillard. *Satisfies Option 1.* Prerequisites: one semester of 200-level Latin or permission of instructor.

Introduction to the literature of the age of Augustus. Reviews the fall of the Republic, the rise to power of Augustus, and a new political system.]

**[LATIN 315(3215) Imperial Latin]**

Spring. 4 credits. *Satisfies Option 1.*

Prerequisite: one semester of 200-level Latin. M. Fontaine.

Undergraduate Latin seminar. Topic: Roman Satire—Horace, Juvenal, Persius.

**[LATIN 317(3217) Latin Prose Composition # (LA)]**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisite: one semester of 200-level Latin. Next offered 2008-2009.

A. Nussbaum.]

**[LATIN 386(3286) Independent Study in Latin, Undergraduate Level]**

Fall and spring. Variable to 4 credits.

Prerequisite: permission of DUS in the case of documented schedule conflict. Staff.

**[LATIN 411(4201) Advanced Readings in Latin Literature # (LA)]**

Fall. 4 credits. D. Mankin.

Topic: Horace.

**[LATIN 412(4202) Advanced Readings in Latin Literature # (LA)]**

Spring. 4 credits. C. Brittain.

Topic: Seneca.

**[LATIN 413(4213) Survey of Medieval Latin Literature (also MEDVL 413/613[4103/6103], LATIN 613[7213])]**

Fall. 3 credits. C. Ruff.

For description, see MEDVL 413.

**[LATIN 414(4216) Advanced Latin Prose Composition # (LA)]**

Spring. 4 credits. Prerequisite: graduate standing; undergraduates who have completed LATIN 317 and have permission of instructor. Next offered 2007-2008. Staff.]

**[LATIN 423(4223) Topics in Medieval Latin Literature (also MEDVL 421/621[4201/6201], LATIN 623[7223])]**

Spring. 3 credits. C. Ruff.

For description, see MEDVL 421.

**[LATIN 603(7207) Later Latin Literature: Late Antique and Medieval Hagiography]**

Spring. 4 credits. Next offered 2007-2008. Staff.]

**[LATIN 613(7213) Survey of Medieval Latin Literature (also MEDVL 413/613[4103/6103], LATIN 613[7213])]**

Fall. 3 credits. C. Ruff.

For description, see MEDVL 413.

**[LATIN 622(7222) Latin Paleography (also MEDVL 612[6102])]**

Fall. 3 credits. C. Ruff.

For description, see MEDVL 612.

**[LATIN 623(7223) Topics in Medieval Latin Literature (also MEDVL 421/621[4201/6201], LATIN 423[4223])]**

Spring. 3 credits. C. Ruff.

For description, see MEDVL 621.

**[LATIN 625-626(7205-7206) Graduate Survey of Latin Literature]**

625, fall; 626, spring. 4 credits each semester. Prerequisite: linguistic proficiency to be determined by instructor. Next offered 2008-2009. Staff.

Survey of Latin literature in two semesters.]

**[LATIN 679(7271) Graduate Seminar in Latin: Catullus and Neoterol]**

Fall. 4 credits. M. Fontaine.

A close reading of the Catullan corpus and Neoteric fragments, with special attention to questions of text, imagery, and influence.

**[LATIN 680(7272) Graduate Seminar in Latin]**

Spring. 4 credits. E. Rebillard.

Topic: Intellectual World of Rome in the Fourth and Fifth Century AD. Through the reading of Latin writings of the fourth and fifth centuries we will study the tensions between the old and the new in the intellectual world of the Roman Empire.

**[LATIN 702(7920) Independent Study for Graduate Students in Latin]**

Fall and spring. Up to 4 credits. Staff.

**Classical Art and Archaeology****[CLASS 220(2700) Introduction to Art History: The Classical World # (HA)]**

Fall. 4 credits. Each student must enroll in a sec. Next offered 2008-2009. Staff.

Overview of the art and archaeology of the Greek and Roman world.]

**[CLASS 221(2726) Minoan-Mycenaean Art and Archaeology (also ARKEO 221[2726]) # (CA)]**

Spring. 3 credits. Next offered 2007-2008.

J. Coleman.

The birth of civilization in Greece and the Aegean islands during the Bronze Age. The main focus is on the rise and fall of Minoan Crete and Mycenaean Greece, with consideration given to the nature and significance of Aegean interactions with Egypt, the Near East, and Anatolia.]

**[CLASS 227(2727) Art and Archaeology in the Ancient Mediterranean World (also ARKEO 228[2727], ART H 227[2227])]**

Fall. 4 credits. S. Manning.

This course introduces students to a selection of the major themes and issues in the archaeology and art of the ancient Mediterranean region from the later prehistoric period (the Bronze Age) through to the Roman era. Emphasis is placed on: (i) study of some key evidence and issues from the various periods/contexts; (ii) the history of the field (temporal and intellectual) and the

impact of this on our experience of the past, and (iii) placing material culture into a social and historical context and analysis. The course is divided into the following sections: (a) discovery of the past and the invention of Classical art and archaeology, (b) prehistoric art, archaeology and material culture studies, (c) Greek art and archaeology, (d) Roman art and archaeology.

**[CLASS 240(2725) Greek Art and Archaeology # (CA)]**

Spring. 3 credits. Next offered 2007-2008. J. Coleman.

Introduction to the material culture of Greece from the Early Iron Age to the coming of the Romans (ca. 1000 BC to 31 BC). Focuses not only on famous monuments such as the Parthenon but also on the evidence for daily life and for contact with other civilizations of the Mediterranean. A critical attitude is encouraged toward the interpretation of archaeological remains and toward contemporary uses (and misuses) of the past.]

**[CLASS 256(2756) Practical Archaeology (also ARKEO 256[2756]) (HA)]**

Fall. 3 credits. J. Coleman.

Introduction to the aims and methods of field archaeology. Topics include remote sensing (satellite images and aerial photos); surface survey; subsurface investigations by magnetometer, ground penetrating radar; the layout and development of a land excavation; underwater excavations; the collection, description, illustration, and analysis of artifacts and data, such as pottery, lithics, botanical samples, and radiocarbon samples. Hands-on experience with potsherds and other artifacts from prehistoric and Classical Greece and Cyprus in the university's collections is intended to prepare students for work in the field.

**[CLASS 321(3721) Mycenae and Homer (also ARKEO 321[3721]) # (HA)]**

Fall. 4 credits. Prerequisite: at least one course in archaeology, classics, or history of art. Next offered 2008-2009. J. Coleman.

Studies the relationship between the Mycenaean period of Greece (known primarily from archaeology) and the Homeric *Iliad* and *Odyssey*. Topics include Mycenaean architecture, burial customs, kingship, and military activities; the reasons for the collapse of the Bronze Age palatial economies; the archaeological evidence for society in the "Dark Ages" that followed; the writing systems of Mycenaean Greece (Linear B) and the Iron Age (the Semitic/Greek alphabet); the nature of the Homeric poems and their value as historical sources.]

**[CLASS 322(3722) Greeks and Their Neighbors (also ART H 328[3228]) # (HA)]**

Fall. 4 credits. Prerequisite: CLASS 220 or 221, or permission of instructor. Next offered 2007-2008. J. Coleman.

Studies the archaeological and other evidence for the interaction between Greek civilization and the peoples of the eastern and western Mediterranean from the 13th to the fourth centuries BCE. Focuses on Greek relationships with Egypt, Phoenicia, Cyprus, Anatolia, and Italy in the post-Bronze Age period.]

**[CLASS 325(3725) Greek Vase Painting (also ART H 325[3205]) # (LA)]**

Spring. 4 credits. Next offered 2008–2009. Staff.

For description, see ART H 325.]

**[CLASS 330(3750) Introduction to Dendrochronology (also ARKEO 309) # (HA)]**

Spring. 4 credits. Limited to 10 students.

Prerequisite: permission of instructor. Letter grades only. S. Manning.

Mediterranean and New World applications to archaeology, art-history and environment. Introduction and training in dendrochronology and its applications through participation in a research project dating ancient to modern tree-ring samples from both the Mediterranean and the Upper New York State region. Supervised reading, laboratory/project work, fieldtrip(s) in local area. A possibility exists for summer fieldwork in the Mediterranean.

**[CLASS 334(3734) Archaeology of Slavery in the Roman World (also ARKEO 334[3734])]**

Spring. 4 credits. K. McDonnell.

This course will examine the archaeological and historical evidence for slavery in the classical world, focusing on the Roman Empire. We will also consider current approaches to slavery in historical archaeology and use comparative evidence from those studies to illuminate the appearance of slaves and freedmen in the archaeological record.

**[CLASS 350(3740) Arts of the Roman Empire (also ART H 322[3202]) # (HA)]**

Fall. 4 credits. Staff.

For description, see ART H 322.

**[CLASS 434(4734) The Rise of Classical Greece (also ARKEO 434[4734]) # (HA)]**

Spring. 4 credits. Recommended: CLASS 220 or 221, ART H 220 or 221, or permission of instructor. Next offered 2008–2009. Staff.

For description, see ARKEO 434.]

**[CLASS 435(4735) Seminar on Roman Art and Archaeology (also ARKEO 435[4207]) # (CA)]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2008–2009. Staff.

For description, see ART H 427.]

**[CLASS 629(7729) The Prehistoric Aegean (also ARKEO 629[7729])]**

Fall. 4 credits. Next offered 2007–2008.

J. Coleman.

Seminar with focus on the Aegean and neighboring regions in the Neolithic and Early Bronze Ages.]

**[CLASS 630(7750) Seminar in Classical Archaeology (also ARKEO 520[5200], ART H 520[5200])]**

Spring. 4 credits. Next offered 2008–2009. P. Kuniholm.

For description, see ARKEO 520.]

**[CLASS 705(7970) Independent Study for Graduate Students in Classical Archaeology]**

Fall and spring. Up to 4 credits. Staff.

**Greek and Latin Linguistics****[CLASS 421(4451) Greek Comparative Grammar (KCM)]**

Spring. 4 credits. Prerequisite: thorough familiarity with morphology of classical Greek. Next offered 2008–2009.

A. Nussbaum.

The prehistory and evolution of the sounds and forms of ancient Greek as reconstructed by comparison with the other Indo-European languages.]

**[CLASS 422(4452) Latin Comparative Grammar (also LING 452[4452]) (KCM)]**

Fall. 4 credits. Prerequisite: thorough familiarity with morphology of classical Latin. Next offered 2007–2008. M. Weiss.

The prehistory and evolution of the sounds and forms of Classical Latin as reconstructed by comparison with the other Indo-European languages.]

**[CLASS 425(4455) Greek Dialects (also LING 455[4455]) (KCM)]**

Fall. 4 credits. A. Nussbaum.

Survey of the dialects of ancient Greek through the reading and analysis of representative epigraphical and literary texts.

**[CLASS 426(4456) Archaic Latin (also LING 456[4456]) (LA)]**

Spring. 4 credits. Prerequisite: reading knowledge of Latin. Next offered 2007–2008. A. Nussbaum.

Reading of epigraphic and literary pre-Classical texts with special attention to archaic and dialectal features. The position of Latin among the Indo-European languages of ancient Italy, the rudiments of Latin historical grammar, and aspects of the development of the literary language.]

**[CLASS 427(4457) Homeric Philology (also LING 457[4457]) # (LA)]**

Spring. 4 credits. Prerequisite: ability to read Homeric Greek. Next offered 2008–2009. A. Nussbaum.

The language of the Homeric epics: dialect background, archaisms, modernizations. The notion of a *Kunstsprache*: its constitution, use, and internal consistency. The phonological and morphological aspects of epic compositional technique.]

**[CLASS 429(4459) Mycenaean Greek (also LING 459[4459]) (LA)]**

Spring. 4 credits. Prerequisite: thorough familiarity with morphology of Classical Greek. M. Weiss.

**Sanskrit****[CLASS 191-192(1331-1332) Elementary Sanskrit (also LING/SANSK 131-132[1131-1132])]**

191, fall; 192, spring. 4 credits each semester. Next offered 2007–2008.

A. Ruppel.

Introduction to the essentials of Sanskrit grammar. Designed to enable the student to read classical and epic Sanskrit as quickly as possible.]

**[CLASS 291-292(2351-2352) Intermediate Sanskrit (also LING/SANSK 251-252[2251-2252]) @ #]**

291, fall; 292, spring. 3 credits each semester. *CLASS 291 satisfies Option 1.* Prerequisite: CLASS 192 or equivalent.

A. Ruppel.

Readings from the literature of Classical Sanskrit. Fall: selections from the two Sanskrit epics, the *Mahabharata* and the *Ramayana*. Spring: more selections from the epics, and from either Sanskrit story literature or from Sanskrit dramas.

**[CLASS 391(3391) Independent Study in Sanskrit, Undergraduate Level]**

Fall and spring. Variable to 4 credits. Staff.

**[CLASS 490(4490) Sanskrit Comparative Grammar (also LING 460[4460])]**

Fall. 4 credits. Next offered 2007–2008.

A. Nussbaum.

Survey of the historical phonology and morphology of Sanskrit in relation to the Indo-Iranian and Indo-European comparative evidence.]

**[CLASS 704(7950) Independent Study for Graduate Students in Sanskrit]**

Fall and spring. Variable to 4 credits. Staff.

**Honors Courses****[CLASS 472(4720) Honors Course: Senior Essay]**

Fall and spring. 8 credits. Student must choose advisor by end of sixth semester. Topics must be approved by Standing Committee on Honors by beginning of seventh semester.

See "Honors" under Classics front matter.

**Related Courses in Other Departments and Programs**

See listings under:

Archaeology

Asian Studies

Comparative Literature

English

Feminist, Gender & Sexuality Studies

History

History of Art

Linguistics

Medieval Studies

Near Eastern Studies

Philosophy

Religious Studies

Society for the Humanities

## COGNITIVE STUDIES PROGRAM

M. Spivey (psychology), director. G. Gay, J. Hancock (communication); C. Cardie, R. Constable, J. Halpern, D. Huttenlocher, T. Joachims, L. Lee, B. Selman, R. Zabih (computer science); A. Hedge (design and environmental analysis); K. Basu, L. Blume, D. Easley (economics); J. Dunn, R. Ripple, D. Schrader (education); S. Wicker (electrical and computer engineering); C. Brainerd, M. Casasola, S. Ceci, B. Koslowski, B. Lust, V. Reyna, S. Robertson, E. Temple, Q. Wang, E. Wethington, W. Williams (human development); K. O'Connor, J. Russo (Johnson Graduate School of Management); J. Bowers, A. Cohn, M. Diesing, W. Harbert, S. McConnell-Ginet, A. Miller-Ockhuizen, M. Rooth, C. Rosen, Y. Shirai, J. Whitman, D. Zec (linguistics); A. Nerode, R. Shore (mathematics); F. Valero-Cuevas (mechanical and aerospace engineering); R. Harris-Warrick, H. Howland, R. Hoy, C. Linster, H. K. Reeve (neurobiology and behavior); R. Boyd, M. Eklund, C. Ginet, H. Hodes, S. Shoemaker, B. Weatherston (philosophy); M. Christensen, J. Cutting, R. Darlington, T. DeVoogd, D. Dunning, S. Edelman, M. Ferguson, D. Field, B. Finlay, T. Gilovich, M. Goldstein, B. Halpern, A. Isen, R. Johnston, C. Krumhansl, U. Neisser, D. Pizzarro, E. Adkins Regan, M. Spivey (psychology); M. Macy (sociology). R. Canfield, S. Hertz (associate members).

Cognitive Studies comprises a number of disciplines that are linked by a major concern with fundamental capacities of the mind, such as perception, memory, reasoning, language, the organization of motor action, and their neural correlates. In the College of Arts and Sciences these disciplines are represented in the departments of Computer Science, Economics, Linguistics, Mathematics, Neurobiology and Behavior, Philosophy, Psychology, and Sociology. Elsewhere in the university they are represented in the Departments of Computer Science, Mechanical and Computer Engineering, and Mechanical and Aerospace Engineering (College of Engineering), the Departments of Design and Environmental Analysis and Human Development (College of Human Ecology), the Departments of Communication and Education (College of Agriculture and Life Sciences), the Information Science Program, and the Johnson Graduate School of Management.

The issues addressed in Cognitive Studies arise at several levels. At the broadest level are problems of characterizing such basic notions as "mind," "knowledge," "information," and "meaning." At a more specific level are questions regarding the abstract operating principles of individual components of the mind, such as those underlying visual perception, language ability, and understanding of concepts. These principles concern the organization and behavior of the components and how they are biologically represented in the brain. At the most specific level are questions about the properties of the elementary computational structures and processes that constitute these components.

Important insights into issues of these kinds have been achieved in recent years as a result of the various Cognitive Studies disciplines converging in their theoretical and methodological approaches. It is this

convergence, in fact, that warrants grouping the disciplines together under the single term "Cognitive Studies." Even greater progress can be expected in the future as a consequence of increasing cooperation among the disciplines.

### Undergraduate Concentration

An interdisciplinary undergraduate concentration in Cognitive Studies is available to Cornell University undergraduates in the College of Arts and Sciences. Students from other colleges who seek such a concentration should discuss such possibilities with the Cognitive Studies office, which will provide information and contacts concerning such concentrations.

The undergraduate concentration in Cognitive Studies is designed to enable students to engage in a structured program directly related to the scientific study of cognition and the mind. The concentration provides a framework for the design of structured, supervised programs of study in this growing interdisciplinary field. Such programs of study serve as complements to course work in a single discipline as represented by an individual department. It is considered crucial that students gain a strong background in their major, independent of their work in the concentration. Independent majors and college scholars may also apply. Colleges vary in their procedures for formal recognition of this concentration (contact the Cognitive Studies office for details). The Cognitive Studies Program faculty have designed five structured "tracks" that offer students different ways of satisfying the concentration. In addition, students are always able to construct their own programs of study subject to approval by their concentration advisor. The courses listed under each track are program suggestions. The student should consult with his or her Cognitive Studies advisor to develop a more customized curriculum. In some cases, students may want to combine or cross tracks.

In general, it is expected that students in the concentration will take COGST 101 or COGST 214 as their introductory course requirement; either COGST 412, COGST 416, COGST 450, or COGST 470 as their lab course requirement; and three courses at the 300 and 400 level in at least two departments (or certain suitable 200-level courses by petition). Courses are to be chosen by student and advisor to provide a coherent program. Even though only five courses are required to complete the concentration, we assume students interested in Cognitive Studies will often end up taking more. An independent research project (e.g., COGST 470 if this is not used to satisfy the lab requirement) and a research workshop (COGST 471) are encouraged. Please note: minor modifications to this outline may be made in extenuating circumstances by the advisor, in consultation with the program director.

The five typical tracks are as follows. Note that many of these courses have substantial prerequisites.

#### 1. Perception and Cognition

This track focuses on psychological, computational, and neurobiological approaches to the interface between perception and cognition. Students will develop a grasp of the continuum between sensory impressions and complex thought.

COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102 Introduction to Cognitive Science  
COGST/COM S/PSYCH 201 Cognitive Science in Context Laboratory  
COGST/PSYCH 214 Cognitive Psychology  
COGST/PSYCH 231 Borges and I: A Quest for Self-Knowledge  
COGST/PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display  
COGST/PSYCH 416 Modeling Perception and Cognition  
COGST 450/HD 437/LING 450/PSYCH 437 Lab Course: Language Development  
BIONB 326 The Visual System  
PSYCH 305 Visual Perception  
PSYCH 316 Auditory Perception  
PSYCH 412 Laboratory in Cognition and Perception  
PSYCH 418 Psychology of Music  
PSYCH 419 Neural Networks Laboratory  
COGST 465/COM S 392/PSYCH 465 Topics in High-Level Vision

#### 2. Language and Cognition

This track focuses on the representation, processing, and acquisition and learning of language, as well as its role in cognition and culture. Students will acquire skills and knowledge in formal and applied linguistic theory, psycholinguistic experimentation, and computational modeling techniques.

COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102 Introduction to Cognitive Science  
COGST/COM S/PSYCH 201 Cognitive Science in Context Laboratory  
COGST/PSYCH 214 Cognitive Psychology  
COGST/LING/PSYCH 215 Psychology of Language  
COGST/PSYCH 416 Modeling Perception and Cognition  
COGST/PSYCH 427 Evolution of Language  
COGST/LING/PSYCH 428 Connectionist Psycholinguistics  
COGST/HD 434 Current Topics in Cognitive Development  
COGST 436/HD 436/LING 436/PSYCH 436 Language Development  
COGST 450/HD 437/LING 450/PSYCH 437 Lab Course: Language Development  
COM S 411 Programming Languages and Logics  
LING 203 Introduction to Syntax and Semantics  
LING 301-302 Phonology I and II  
LING 303-304 Syntax I and II  
LING 309 Morphology  
LING 319-320 Phonetics I and II  
LING 325 Pragmatics  
LING 403 Introduction to Applied Linguistics  
LING 421-422 Semantics I and II  
PHIL 332 Philosophy of Language  
PSYCH 415 Concepts, Categories, and Word Meanings

#### 3. Cognition and Information Processing

This track focuses on how the mind (or a computer) can encode, represent, and store information. Students will develop an understanding of concepts, categories, memory, and the nature of information itself.

COGST 101/COM S 101/LING 170/  
PHIL 191/PSYCH 102 Introduction to  
Cognitive Science  
COGST/COM S/PSYCH 201 Cognitive  
Science in Context Laboratory  
COGST/PSYCH 214 Cognitive Psychology  
COGST/PSYCH 414 Comparative  
Cognition  
COGST/PSYCH 416 Modeling Perception  
and Cognition  
COGST/HD 334 The Growth of the Mind  
COGST/HD 432 Cognitive, Social, and  
Developmental Aspects of Scientific  
Reasoning  
COGST 450/HD 437/LING 450/PSYCH  
437 Lab Course: Language Development  
COM S 211 Computers and Programming  
COM S 212 Structure and Interpretation of  
Computer Programs  
COM S 472 Foundations of Artificial  
Intelligence  
COM S 473 Practicum in Artificial  
Intelligence  
PSYCH 311 Introduction to Human  
Memory  
PSYCH 412 Laboratory in Cognition and  
Perception  
PSYCH 413 Information Processing:  
Conscious and Nonconscious  
PSYCH 415 Concepts, Categories, and  
Word Meanings  
PSYCH 417 The Origins of Thought and  
Knowledge

#### 4. Cognitive Neuroscience

This track focuses on neurobiological and computational approaches to understanding how perception and cognition emerge in the human brain. Students will acquire knowledge of what neural structures subserve what perceptual/cognitive processes, and how they interact.

COGST 101/COM S 101/LING 170/PHIL  
191/PSYCH 102 Introduction to  
Cognitive Science  
COGST/COM S/PSYCH 201 Cognitive  
Science in Context Laboratory  
COGST/PSYCH 214 Cognitive Psychology  
COGST/HD 220 The Human Brain and  
Mind  
COGST/BIONB/PSYCH 330 Introduction  
to Computational Neuroscience  
COGST/PSYCH 416 Modeling Perception  
and Cognition  
COM S 401 Programming Languages and  
Software Engineering  
PSYCH 332/BIONB 328 Biopsychology of  
Learning and Memory  
PSYCH/BIONB 396 Introduction to  
Sensory Systems  
PSYCH 419 Neural Networks Laboratory  
PSYCH 425 Cognitive Neuroscience  
PSYCH 440 The Brain and Sleep

#### 5. Independent Study

With approval from the Cognitive Studies undergraduate curriculum committee, a student and advisor in the Cognitive Studies program can arrange their own unique collection of courses that do not belong to the above categories for satisfying the concentration requirements.

COGST 470 Undergraduate Research in  
Cognitive Studies  
COGST 471 Cognitive Studies Research  
Workshop

A Cognitive Studies undergraduate laboratory and computer facility is available for all students in a Cognitive Studies concentration. This facility will help link resources from different laboratories across the Cornell campus as well as providing a central location for developing and conducting experimental research in Cognitive Studies.

Students who complete the concentration requirements will have their concentration in Cognitive Studies officially represented on their transcript. In addition, students who have made substantial progress toward completing the requirements for the concentration will be eligible for enrollment in the graduate courses in Cognitive Studies during their senior year.

**Concentration Application Procedures.** Initial inquiries concerning the undergraduate concentration should be made to the Cognitive Studies Program coordinator, Julie Simmons-Lynch, [cogst@cornell.edu](mailto:cogst@cornell.edu), 255-6431, who will provide application materials and set up a meeting with a relevant member of the Undergraduate Concentration Committee. This committee will assist the student in selecting a concentration advisor with expertise in the student's main area of interest.

To formally initiate the concentration in Cognitive Studies, a student must gain approval for a selection of courses from a concentration advisor (one of the program faculty). The courses selected must form a coherent cluster that makes sense to both the advisor and the student. To be admitted to the concentration, the student must submit this plan of study to the Cognitive Studies undergraduate faculty committee for final approval.

In addition to assisting in and approving the student's selection of courses, the concentration advisor serves as a general source of information about the field of Cognitive Studies, relevant resources around the university, and job and graduate school opportunities. Often, the advisor can help the student develop independent research experience.

**Independent Research.** The concentration encourages each student to be involved in independent research that bears on research issues in Cognitive Studies, if possible. COGST 470 is available for this purpose. It is recommended that students report on their research activities in an annual undergraduate forum. The Undergraduate Concentration Committee is committed to helping students find an appropriate research placement when needed.

The Committee for Undergraduate Concentration in Cognitive Studies consists of: Bart Selman, Computer Science, 255-5643, 4144 Upson Hall, [selman@cs.cornell.edu](mailto:selman@cs.cornell.edu); Draga Zec, linguistics, 255-0728, 217 Morrill Hall, [DZ17@cornell.edu](mailto:DZ17@cornell.edu); Michael Spivey, psychology, 255-9365, 238 Uris Hall, [spivey@cornell.edu](mailto:spivey@cornell.edu). The current director of undergraduate studies is Draga Zec.

#### Graduate Minor

Entering graduate students, as well as advanced undergraduates, who are interested in cognition and in the cognitive sciences are advised to take the introductory course COGST 101 Introduction to Cognitive Science in the fall semester. Enrolling in the 4-credit version, which involves a weekly section

meeting with the instructor, will satisfy the introductory course requirement.

Graduate students minoring in Cognitive Studies will take additional courses recommended by their graduate committee to complete their course requirements.

For more information, consult the program office (278G Uris Hall, 255-6431, [cogst@cornell.edu](mailto:cogst@cornell.edu)) or the director of graduate studies, Michael Spivey (255-9365, [spivey@cornell.edu](mailto:spivey@cornell.edu)).

## Courses

### Cognitive Studies

**COGST 101(1101) Introduction to Cognitive Science (also COM S 101[1710], LING 170[1170], PHIL 191[1910], PSYCH 102[1200]) (KCM)**

Fall. 3 or 4 credits; 4-credit option involves writing section instead of exams.

M. Spivey.

Surveys the study of how the mind/brain works. Examines how intelligent information processing can arise from biological and artificial systems. Draws primarily from five disciplines that make major contributions to cognitive science: philosophy, psychology, neuroscience, linguistics, and computer science. The first part of the course introduces the roles played by these disciplines in cognitive science. The second part focuses on how each of these disciplines contributes to the study of five topics in cognitive science: language, vision, learning and memory, action, and artificial intelligence.

**COGST 111(1110) Brain, Mind, and Behavior (also BIONB/PSYCH 111[1110]) (PBS)**

Spring. 3 credits. Intended for freshmen and sophomores in humanities and social sciences; seniors not allowed. Not recommended for psychology majors; biology majors may not use course for credit toward major. Letter grades only.

R. Hoy and E. Adkins Regan.

Understanding how the brain creates complex human behavior and mental life is a great scientific frontier of the next century. This course enables students with little scientific background from any college or major to appreciate the excitement. What are the interesting and important questions? How are researchers trying to answer them? What are they discovering? Why did the brain evolve this remarkable capacity?

**COGST 172(1720) Computation, Information, and Intelligence (also COM S/ENGRI/INFO 172[1700]) (MQR)**

Fall. 3 credits. Prerequisite: some knowledge of calculus. Staff.

Introduction to computer science using methods and examples from the field of artificial intelligence. Topics include game playing, search techniques, learning theory, computer-intensive methods, data mining, information retrieval, the web, natural language processing, machine translation, and the Turing test. This is not a programming course; rather, "pencil and paper" problem sets are assigned. Not open to students who have completed the equivalent of COM S 100.



**COGST 201(2010) Cognitive Science in Context Laboratory (also COM S 201[2710], PSYCH 201[2010]) (KCM)**

Spring. 4 credits. Limited to 24 students. Prerequisite: COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102. Knowledge of programming languages not assumed. D. Field and staff.

Explores the theories of cognitive science and provides direct experience with the techniques of cognitive science, in relation to the full range of both present and anticipated future activities in the workplace, the classroom, and in everyday life. Discussions of laboratory exercise results, supplementation of laboratory topics, and analyses of challenging primary research literature are done in meetings of the entire class. Laboratory exercises, which are done on an individual or small group basis, include both preplanned investigations and student-developed experiments. Use of digital computers as well as the Internet, e-mail, and web sites are integral components of the course.

The focus is on human-computer interactions that are intended to permit effective and efficient exchange of information and control of functions or operations. This approach is applied to real-life settings. Students are expected to come to each discussion meeting having read and thought about assigned materials, and to come to scheduled laboratory meetings fully prepared to perform the laboratory exercises. Laboratory facilities are available to students at all times so that statistical analysis of data, preparation of laboratory reports, and collection of experimental data are facilitated.

**COGST 214(2140) Cognitive Psychology (also PSYCH 214/614[2140/6140]) (KCM)**

Fall. 3 credits. Limited to 175 students. Prerequisite: sophomore standing. Note: Undergraduates who want 5 credits also should enroll in COGST 501. S. Edelman.

Introduces the idea of cognition as information processing, or computation, using examples from perception, attention and consciousness, memory, language, and thinking. Participants acquire conceptual tools that are essential for following the current thought on the nature of mind and its relationship to the brain.

**[COGST 215(2150) Psychology of Language (also LING/PSYCH 215[2150]) (KCM)]**

Spring. 3 credits. Prerequisite: sophomore, junior, or senior standing; any one course in psychology or human development. Next offered 2007-2008. M. Christiansen.

Provides an introduction to the psychology of language. The purpose of the course is to introduce students to the scientific study of psycholinguistic phenomena. It covers a broad range of topics from psycholinguistics, including the origin of language, the different components of language (phonology, morphology, syntax, and semantics), processes involved in reading, computational modeling of language processes, the acquisition of language (both under normal and special circumstances), and the brain bases of language.]

**COGST 220(2200) The Human Brain and Mind: Biological Issues in Human Development (also HD 220[2200])**

Fall. 3 credits. Prerequisite: HD 115 or permission of instructor. E. Temple.

This course explores the biology that underlies cognitive processes like language, decision making, and emotion. What do we know about the biology of the mind? As long ago as the 1600s, when the philosopher Descartes speculated on how the mind and body interact, humans have been fascinated by how the chunk of tissue we call the brain can give rise to all the complexity that is human behavior. This course is designed as an introduction to the biology underlying human behavior. After studying basic concepts in neurobiology and neuroanatomy, the course will explore a variety of topics, such as how our brain underlies our perception, thought, language, emotions, memories, and desires. In addition, we will discuss relevant human clinical disorders throughout the course. This course will give background necessary for other courses in HD that focus on biological mechanisms of human development and serves as a prerequisite for many of them.

**[COGST 230(2300) Cognitive Development (also HD 230[2300])**

Spring. 3 credits. Prerequisite: HD 115 or PSYCH 101. Next offered 2007-2008. Q. Wang.

Designed to help students develop a broad understanding of the mechanisms, processes, and current issues in cognitive development and learn to do critical, in-depth analyses of developmental research. Discusses how children's thinking changes over the course of development and evaluate psychological theories and research on various aspects of cognitive development. Topics include perception, representation and concepts, reasoning and problem solving, social cognition, memory, metacognition, language and thought, and academic skills. Students also have hands-on research experiences with "real" kids.]

**COGST 231(2310) SSP: Borges and I: A Quest for Self-Knowledge (also PSYCH 231/BIONB 231)**

Spring. 4 credits. Limited to 15 students. S. Edelman.

This seminar will survey the state of the art in theoretical neuroscience, a discipline whose ultimate goal is finding the mind in the brain. Our journey through the scientific literature on minds and brains, covering topics such as memory and identity, love, solitude and society, language, creativity, religion, and morality, will be accompanied by a choice of short stories by Jorge Luis Borges.

This seminar is sponsored by the John S. Knight Institute's Sophomore Seminars Program and is not restricted to sophomores.

**COGST 330(3300) Introduction to Computational Neuroscience (also BIONB/PSYCH 330[3300]) (PBS)**

Fall. 3-4 credits; 4-credit option includes lab providing additional computer simulation exercises. Limited to 25 students. Prerequisite: BIONB 222 or permission of instructor. Offered alternate years. C. Linster.

Covers the basic ideas and techniques involved in computational neuroscience. Surveys diverse topics including: neural dynamics of small networks of cells, neural coding, learning in neural networks and in brain structures, memory models of the hippocampus, sensory coding, and others.

**COGST 333(3330) Problems in Semantics—Quantification in Natural Language (also LING 333[3333], PHIL 333[3330]) (KCM)**

Spring. 4 credits. Prerequisites: course in logic or semantics or permission of instructor. M. Rooth.

Looks at problems in the semantic analysis of natural languages, critically examining work in linguistics and philosophy on particular topics of current interest.

**[COGST 334(2340) The Growth of the Mind (also HD 334[3340])**

Spring. 4 credits. Prerequisite: course in human experimental psychology, cognitive psychology, statistics, HD 115, or equivalent, or permission of instructor. Primarily intended for sophomores through seniors. Offered alternate years; next offered 2007-2008. B. Lust.

The fundamental issues of cognition are introduced in this course. What is the nature of human intelligence? Of logical and scientific reasoning? How are knowledge and understanding acquired and represented in the human mind? What is the nature of mental representation? What are the cognitive characteristics of the mind at birth? What is the relation of the acquisition of knowledge and understanding to their final representation? What are the relations between language and thought? In the study of those issues, how can epistemology and experimental psychology be related through the experimental method? Basic debates within the study of cognition are introduced and discussed throughout. The course will analyze Piaget's comprehensive theory of cognitive development and experimental results. Current research in cognitive development will be contrasted.]

**COGST 342(3420) Human Perception: Applications to Computer Graphics, Art, and Visual Display (also PSYCH 342/642[3420/6420], VISST 342[3342])**

Fall. 3 or 4 credits; 4-credit option involves term paper. Prerequisite: PSYCH 101 or permission of instructor. Highly recommended: PSYCH 205. D. Field.

Our present technology allows us to transmit and display information through a variety of media. To make the most of these media channels, it is important to consider the limitations and abilities of the human observer. The course considers a number of applied aspects of human perception with an emphasis on the display of visual information. Topics include "three-dimensional" display systems, color theory, spatial and temporal limitations of the visual systems, attempts at subliminal communication, and "visual" effects in film and television.

**COGST 412(4120) Laboratory in Cognition and Perception (III) (also PSYCH 412)**

Spring. 4 credits. Limited to 15 students. Prerequisite: statistics and one course in cognition or perception recommended. Graduate students, see PSYCH 612. M. W. D. J. Field.

Laboratory course designed to introduce students to experimental methods in perception and cognitive psychology. Students take part in a number of classic experiments and develop at least one independent project. Computers are available and used in many of the experiments although computer literacy is not required. Projects are selected from the



areas of visual perception, pattern recognition, memory, and concept learning.

**[COGST 414(4140) Comparative Cognition (also PSYCH 414/714[4140/7140]) (KCM)]**

Spring. 3 or 4 credits; 4-credit option involves annotated bibliography or creating relevant web site. Prerequisites: PSYCH 205, 209, 214, 223, 292, or permission of instructor. Next offered 2007–2008. Staff.

Examines some of the conceptual and empirical work resulting from and fueling the recent surge of interest in animals' thinking. Specific topics may include whether nonhumans behave intentionally; whether they show concept and category learning, memory, and abstract thinking similar to that of humans; the role of social cognition in the evolution of intelligence; and whether animals are conscious or self-aware. Evidence from communication studies in which animal signals provide a "window on the mind" plays a strong role in the deliberations, including studies of naturally occurring signaling in various species and experiments in which nonhumans are trained in human-like language behavior. Cognition in nonhuman primates is a specific focus throughout. The course is a mix of lecture and discussion, emphasizing the latter as much as possible.]

**[COGST 416(4160) Modeling Perception and Cognition (also PSYCH 416/616[4160/6160])]**

Spring. 4 credits. Prerequisites: PSYCH 205, 209, 214, or 215, or permission of instructor. M. Spivey.

Offers a survey of several computational approaches to understanding perception and cognition. Explore linear systems analysis, connectionist models, dynamical systems, and production systems, to name a few. Emphasis is placed on how complex sensory information gets represented in these models, as well as how it gets processed. This course covers computational accounts of language processing, language acquisition, visual perception, and visual development, among other topics.

**[COGST 424(4240) Computational Linguistics (also COM S 324[3470], LING 424[4424]) (MQR)]**

Fall. 4 credits. Prerequisite: LING 203. Recommended: COM S 114. Labs involve work in Unix environment. Next offered 2007–2008. M. Rooth.

For description, see LING 424.]

**[COGST 426(4260) Learning Language (also PSYCH 426)]**

Spring. 4 credits. Limited to 20 students. Prerequisite: PSYCH 214 or by permission of the instructor. S. Edelman.

In this seminar, we shall survey a promising new approach to the understanding of the cognitive function that is at the core of the human nature: language. Thematically, the material to be covered focuses on two aspects of the study of language: (1) psycholinguistic data and their interpretation, and (2) algorithmic studies and computational modeling. In psycholinguistics, we shall read key papers that shed light on the nature of linguistic knowledge ("grammar") possessed by normal adult speakers, and on the acquisition of this knowledge by children. In computation, the focus is on acquisition of grammar from raw data.

**[COGST 427(4270) Evolution of Language (also PSYCH 427/627[4270/6270])]**

Fall. 3 credits. Limited to 20 students.

Prerequisite: senior standing or permission of instructor. Offered alternate years; next offered 2007–2008. M. Christiansen.

Fueled by theoretical constraints derived from recent advances in the brain and cognitive sciences, the last decade of the 20th century saw a resurgence of scientific interest in the evolution of language. This seminar surveys a cross section of modern theories, methods, and research pertaining to the origin and evolution of language. Considers evidence from psychology, the cognitive neurosciences, comparative psychology, and computational modeling of evolutionary processes. Topics for discussion may include: What does the fossil record tell us about language evolution? What can we learn from comparative perspectives on neurobiology and behavior? Can apes really learn language? Did language come about through natural selection? What were the potential preadaptations for language? What is the relationship between phylogeny and ontogeny?]

**[COGST 428(4280) Connectionist Psycholinguistics (also LING/PSYCH 428/628[4280/6280])]**

Fall. 3 credits. Prerequisite: senior standing or permission of instructor. Offered alternate years; next offered 2007–2008. M. Christiansen.

Connectionist psycholinguistics involves using (artificial) "neural" networks, which are inspired by brain architecture, to model empirical data on the acquisition and processing of language. As such, connectionist psycholinguistics has had a far-reaching impact on language research. This course surveys the state of the art of connectionist psycholinguistics, ranging from speech processing and word recognition, to inflectional morphology, sentence processing, language production, and reading. An important focus of discussion is the methodological and theoretical issues related to computational modeling of psychological data. The broader implications of connectionist models of language are discussed, not only for psycholinguistics, but also for computational and linguistic perspectives on language.]

**[COGST 432(4320) Cognitive, Social, and Developmental Aspects of Scientific Reasoning (also HD 432)]**

Fall. 3 credits. Prerequisites: HD 115 or PSYCH 101. Offered alternate years. Not offered 2006–2007. B. Koslowski.

The first section of the course will examine case studies of examples of scientific reasoning, such as identifying the causes of "childbed fever," whether a prehistoric population engaged in cannibalism, whether T. Rex was a fierce hunter or a wimpy scavenger, whether a primitive nomadic tribe might have included warrior women, etc. The case studies will be examined to try to identify the sorts of principles that an adequate description of scientific reasoning would need to include.

We will then consider various models of scientific reasoning with an eye towards identifying the extent to which the models can account for the sort of thinking that is exemplified in the case studies. Along the way, we will consider such questions as the role of theory in scientific reasoning, strategies for responding to anomalous or disconfirming

data, when disconfirming data ought to (and do) prompt rejection rather than modification of a theory, confirmation bias, magical thinking in children, other developmental differences, sociocultural influences on scientific reasoning, etc. In discussing all of these questions, we will also consider developmental aspects of scientific reasoning, such as whether "magical thinking" in children is qualitatively different than what adults do.]

**[COGST 433(4330) Developmental Cognitive Neuroscience (also HD 433[4330])]**

Spring. 3 credits. Limited to 25 students. Prerequisite: HD 115 or PSYCH 101 and one semester of biology; permission of instructor. Next offered 2007–2008. E. Temple.

What are the brain mechanisms underlying human behavior and cognition? How do those underlying brain mechanisms develop? These are the questions that we explore in this course through both lecture and reading and discussion of primary literature. The first weeks of class cover basics of developmental neurobiology and neuroanatomy and methods used in the field of cognitive neuroscience (especially neuroimaging techniques). After the introductory and methods information is covered the format changes to a weekly one including lecture and discussion of current research papers. Each week students focus on a particular cognitive ability such as language, memory, attention, or inhibitory control. For each topic students explore what is known about the brain mechanisms that underlie that particular function, how those brain mechanisms develop over the life span, and where possible, the brain mechanisms underlying disorders of that particular cognitive function.]

**[COGST 434(4340) Current Topics in Cognitive Development (also HD 434)]**

Spring. 3 Credits. Prerequisites: Course HD 234/COGST 234 (simultaneously); permission of instructor. Offered alternate years. Not offered 2006–2007.

The course will supplement survey course HD 234/COGST 234 with additional discussion of current research in the area of cognitive development. Selected current papers will be read and discussed in parallel with the HD 234/COGST 234 survey course. Modern interpretations and challenges to Piaget's theory will be evaluated in light of current literature in the field. A small group format will be adopted to encourage discussion.]

**[COGST 435(4350) Mind, Self, and Emotion: Research Seminar (also HD 431[4310])]**

Fall. 3 credits. Limited to 20 students. Prerequisite: upperclass undergraduate or graduate standing. Letter grades only. Next offered 2007–2008. Q. Wang.

Examines current data and theory concerning memory, self, and emotion from a variety of perspectives and at multiple levels of analysis, particularly focusing on the interconnections among these fields of inquiry. A special emphasis is given to cross-cultural studies on memory development, self-construal, and conception of emotion.]

**COGST 436(4360) Language Development (also HD 337[3370], LING 436[4436], PSYCH 436[4360]) (KCM)**

Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll in HD 633, LING 700, or PSYCH 600, a supplemental graduate seminar. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. B. Lust. Surveys basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental linguistic issues of "Universal Grammar" and the biological foundations for acquisition are discussed, as are the issues of relations between language and thought. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child. An optional lab course supplement is available (see COGST 450/HD 437/LING 450/PSYCH 437).

**COGST 437(4370) Thinking and Reasoning (also HD 238[2380])**

Fall. 3 credits. Prerequisite: HD 115 or PSYCH 101. B. Koslowski. Examines problem solving and transfer, precausal thinking, logical thinking, practical syllogisms, causal reasoning, scientific reasoning, theories of evidence, expert vs. novice differences, and nonrational reasoning. Two general issues run through the course: the extent to which children and adults approximate the sorts of reasoning that are described by various types of models, and the extent to which various models accurately describe the kind of thinking that is required by the types of problems and issues that arise and must be dealt with in the real world.

**COGST 450(4500) Lab Course: Language Development (also HD/PSYCH 437[4370], LING 450[4500])**

Spring. 2 credits. In conjunction with COGST/HD 337, LING/PSYCH 436. B. Lust. Optional supplement to the survey course Language Development (COGST/HD/LING/PSYCH 436). The lab course provides students with a hands-on introduction to scientific research, including design and methods, in the area of first-language acquisition.

**[COGST 452(4520) Culture and Human Development (also HD 452[4520])]**

Fall. 3 credits. Limited to 30 students. Prerequisite: HD 115 or PSYCH 101. Next offered 2007-2008. Q. Wang. Takes an interdisciplinary approach to address the central role of culture in human development. Draws on diverse theoretical perspectives, including psychology, anthropology, education, ethnography, and linguistics, to understand human difference, experience, and complexity. Empirical reflections are taken upon major developmental topics such as cultural aspects of physical growth and development; culture and cognition; culture and language; culture, self, and personality; cultural construction of emotion; culture issues of sex and gender; and cultural differences in pathology.]

**[COGST 465(4650) Topics in High-Level Vision (also COM S 392[4110], PSYCH 465/665[4650/6650]) (KCM)]**

Spring. 4 credits. Offered alternate years; next offered 2007-2008. S. Edelman. For description, see PSYCH 465.]

**COGST 470(4700) Undergraduate Research in Cognitive Studies**

Fall or spring. 1-4 credits. Prerequisite: permission of major advisor; written permission of Cognitive Studies faculty member who supervises research and assigns grade. S-U grades optional. Cognitive Studies faculty. Experience in planning, conducting, and reporting independent laboratory, field, and/or library research in an interdisciplinary area relevant to Cognitive Studies.

**COGST 471(4710) Cognitive Studies Research Workshop**

Fall or spring. Variable credit. Prerequisites: enrollment in an independent research course either in Cognitive Studies (e.g., COGST 470) or in a related department or in honors thesis research in one of the departments relevant to Cognitive Studies. Staff (interdisciplinary faculty from Cognitive Studies Program).

Provides a research workshop in which undergraduate students who are engaged in research in a particular area relevant to cognitive science can meet across disciplines to learn and practice the essentials of research using interdisciplinary approaches. In this workshop, students critique and discuss the existing literature in a field of inquiry, individual students present their research designs, methods, and results from their independent research studies, debate the interpretation of their research results, and participate in the generation of new research hypotheses and designs, in a peer group of other undergraduate students involved in related research.

**COGST 474(4740) Introduction to Natural Language Processing (also COM S 474[4740], LING 474[4474])**

Fall. 4 credits. C. Cardie. For description, see COM S 474.

**COGST 476-477(4760-4770) Decision Theory I and II (also COGST/ECON 676-677[6760-6770], ECON 476-477[4760-4770]) (MQR)**

Fall and spring. 4 credits each semester. In fall, course is lecture based. Students are required to complete several problem sets and there is a final exam. In spring, there are additional lectures as well as visiting speakers. Students are required to read speakers' papers, participate in discussions, and complete a research project. L. Blume, D. Easley, and J. Halpern.

Research on decision theory resides in a variety of disciplines including computer science, economics, game theory, philosophy, and psychology. This new course attempts to integrate these various approaches. The course is taught jointly by two economists/game theorists and a computer scientist. The course covers several areas: (1) basic decision theory. This theory, sometimes known as "rational choice theory," is part of the foundation for the disciplines listed above. It applies to decisions made by individuals or by machines. (2) the limitations of and problems with this theory. Issues discussed here include decision theory paradoxes revealed by experiments, cognitive and knowledge limitations, and

computational issues. (3) new research designed in response to these difficulties. Issues covered include alternative approaches to the foundations of decision theory, adaptive behavior, and shaping the individual decisions by aggregate/evolutionary forces.

**COGST 491(4910) Research Methods in Psychology (also COGST 691[6910], PSYCH 491/691[4910/6910])**

Spring. 4 credits. Limited to 15 students. Recommended: permission of instructor, PSYCH 350, experience in upper-division psychology courses, or graduate standing. Graduate students, see COGST 691. D. Dunning.

Intensive examination of the basic research methods used in social, personality, cognitive, and developmental psychology. The course focuses on designing and conducting experiments, i.e., how to turn vague theories into concrete and testable notions, evaluate studies, avoid common pitfalls, and, finally, remain ethical. Beyond learning methods of "correct" and rigorous experimentation, we also discuss what makes a research study actually interesting. The course, in addition, covers test construction, survey methods, and "quasi experiments." Students concentrate on completing a small research project in which they conduct an experiment, interpret its data, and write up the results.

## Computer Science

**COM S 101(1710) Introduction to Cognitive Science (also COGST 101[1101], LING 170[1170], PHIL 191[1910], PSYCH 102[1020])**

Fall. 3 or 4 credits. M. Spivey.

**COM S 172(1700) Computation, Information, and Intelligence (also COGST 172[1720], ENGRI 172[1700], INFO 172)**

Fall. 3 credits. L. Lee. For description, see COGST 201.

**COM S 201(2710) Cognitive Science in Context Laboratory (also COGST/PSYCH 201[2010])**

Spring. 4 credits. D. Field and staff.

**COM S 211(2110) Computers and Programming**

Fall, spring, or summer. 3 credits.

**COM S 312(3110) Data Structures and Functional Programming**

Fall or spring. 4 credits.

**[COM S 324(3470) Computational Linguistics (also COGST 424[4240], LING 424[4424])]**

Fall. 4 credits. Next offered 2007-2008. M. Rooth.]

**COM S 381(3810) Introduction to Theory of Computing**

Fall, summer. 4 credits.

**[COM S 392(4110) Topics in High-Level Vision (also COGST 465[4650], PSYCH 465/665[4650/6650])]**

Spring. 4 credits. Offered alternate years. Next offered 2007-2008. S. Edelman.]

**COM S 411(4110) Programming Languages and Logics**

Fall. 4 credits. Not offered every year.

**COM S 472(4700) Foundations of Artificial Intelligence**

Fall. 3 credits. T. Joachims.

**COM S 473(470) Practicum in Artificial Intelligence**

Fall. 2 credits. T. Joachims.

**[COM S 474(4740) Introduction to Natural Language Processing (also COGST/LING 474[4474])]**

Fall. 4 credits. Next offered 2007–2008. M. Rooth.]

**COM S 478(4780) Machine Learning**

Spring. 3 credits.

**COM S 481(4810) Introduction to Theory of Computing**

Fall. 4 credits. J. Halpern

**COM S 486(4860) Applied Logic (also MATH 486[4860])**

Spring. 4 credits.

**Education (College of Agriculture and Life Sciences)****EDUC 411(4110) Educational Psychology**

Fall. 3 credits. D. Schrader.

**Human Development (College of Human Ecology)****HD 115(1150) Human Development**

Fall or summer. 3 credits.

**HD 220(2200) The Human Brain and Mind: Biological Issues in Human Development (also COGST 220)**

Fall. 3 credits. E. Temple.

**[HD 230(2300) Cognitive Development (also COGST 230[2300])]**

Spring. 3 credits. Next offered 2007–2008. Q. Wang.]

**HD 238(2380) Thinking and Reasoning (also COGST 437)**

Fall. 3 credits. B. Koslowski.

**HD 266(2660) Emotional Functions of the Brain**

Spring. 3 credits.

**HD 320(3200) Human Developmental Neuropsychology**

Spring. 3 credits. B. Koslowski.

**HD 336(3360) Connecting Social, Cognitive, and Emotional Development**

Fall. 3 credits. M. Casasola.

**HD 337(3370) Language Development (also COGST 436[4360], LING 436[4436], PSYCH 436[4360])**

Spring. 4 credits. B. Lust.

**HD 344(3440) Infant Behavior and Development**

Fall. 3 credits. S. Robertson.

**HD 347(3470) Human Growth and Development: Biological and Behavioral Interactions (also B&SOC 347, NS 347[3470])**

Spring. 3 credits. S. Robertson and J. Haas.

**HD 362(3620) Human Bonding**

Fall. 3 credits.

**[HD 431(4310) Mind, Self, and Emotion: Research Seminar (also COGST 435)]**

Fall. 3 credits. Next offered 2007–2008. Q. Wang.]

**HD 432(4320) Cognitive, Social, and Developmental Aspects of Scientific Reasoning (also COGST 432)**

Fall. 3 credits. B. Koslowski.

For description, see COGST 432.

**[HD 433(4330) Developmental Cognitive Neuroscience (also COGST 433[4330])]**

Spring. 3 credits. Next offered 2007–2008. E. Temple.]

**HD 437(4370) Lab Course: Language Development (also COGST/LING 450[4450], PSYCH 437[4370])**

Spring. 2 credits. In conjunction with HD 337, COGST/LING/PSYCH 436. B. Lust.

**[HD 452(4520) Culture and Human Development (also COGST 452)]**

Fall. 3 credits. Q. Wang.]

**Linguistics****LING 170(1170) Introduction to Cognitive Science (also COGST/COM S 101[1101], PHIL 191[1910], PSYCH 102[1020])**

Fall. 3 or 4 credits. M. Spivey.

**[LING 215(2215) Psychology of Language (also COGST 215, LING 715, PSYCH 215/715[2150/7150])]**

Spring. 3 credits. M. Christiansen.]

**LING 332(3332) Philosophy of Language (also PHIL 332[3320])**

Fall. 4 credits. Staff.

**LING 333(3333) Problems in Semantics—Quantification in Natural Language (also COGST/PHIL 333[3330])**

Spring. 4 credits. S. McConnell-Ginet.

**LING 424(4424) Computational Linguistics (also COGST 424[4240], COM S 324[3470])**

Fall. 4 credits. M. Rooth.

**LING 425(4425) Pragmatics**

Spring. 4 credits.

**LING 428(4428) Connectionist Psycholinguistics (also COGST 428 LING 628, PSYCH 428/628[4280/6280])**

Fall. 3 credits. Offered alternate years. M. Christiansen.

**LING 436(4436) Language Development (also COGST/HD/PSYCH 436[4360])**

Spring. 4 credits. B. Lust.

**LING 450(4450) Lab Course: Language Development (also COGST 450, HD/PSYCH 437[4370])**

Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436. B. Lust.

**LING 474(4474) Introduction to Natural Language Processing (also COGST 474, COM S 474[4740])**

Fall. 4 credits. C. Cardie.

**Mathematics****MATH 281(2810) Deductive Logic (also PHIL 331[3310])**

Fall. 4 credits.

**MATH 481(4810) Mathematical Logic (also PHIL 431[4310])**

Spring. 4 credits. Offered alternate years.

**MATH 486(4860) Applied Logic (also COM S 486[4860])**

Spring. 4 credits.

**Neurobiology and Behavior****BIONB 111(1110) Brain, Mind, and Behavior (also COGST/PSYCH 111[1110])**

Spring. 3 credits. R. Hoy and E. Adkins Regan.

**BIONB 221(2210) Neurobiology and Behavior I: Introduction to Behavior**

Fall. 3 or 4 credits.

**BIONB 222(2220) Neurobiology and Behavior II: Introduction to Neurobiology**

Spring. 3 or 4 credits.

**[BIONB 326(3260) The Visual System**

Spring. 4 credits. Next offered 2007–2008. H. Howland.]

**BIONB 328(3280) Biopsychology of Learning and Memory (also PSYCH 332[3320])**

Spring. 3 credits. T. DeVoogd.

**BIONB 330(3330) Introduction to Computational Neuroscience (also COGST/PSYCH 330[3300])**

Fall. 3–4 credits. C. Linster.

**[BIONB 392(3920) Drugs and the Brain**

Spring. 4 credits. Next offered 2007–2008. R. Harris-Warrick and L. M. Nowak.]

**[BIONB 396(3960) Introduction to Sensory Systems (also PSYCH 396[3960])]**

Spring. 3 or 4 credits. Next offered 2007–2008. B. Halpern.]

**BIONB 421(4210) Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431/631[4310/6310])**

Fall. 3 or 4 credits. B. Halpern.

**[BIONB 424(4240) Neuroethology (also PSYCH 424[4240])]**

Spring. 4 credits. Next offered 2007–2008.]

**[BIONB 426(4260) Animal Communication**

Spring. 4 credits. Next offered 2007–2008.]

**BIONB 492(4920) Sensory Function (also PSYCH 492/692[4920/6920], VISST 492)**

Spring. 3 or 4 credits. H. Howland.

**BIONB 496(4960) Bioacoustic Signals in Animals and Man**

Fall. 3 credits. C. Clark and R. Hoy.

**Philosophy****PHIL 262(2620) Introduction to Philosophy of Mind**

Fall. 4 credits.

**PHIL 431(4310) Mathematical Logic (also MATH 481[4810])****Psychology****PSYCH 102(1200) Introduction to Cognitive Science (also COGST/COM S 101[1101], LING 170[1170], PHIL 191[1910])**

Fall. 3 or 4 credits. M. Spivey.

**PSYCH 111(1110) Brain, Mind, and Behavior (also BIONB 111[1111], COGST 111[1110])**

Spring. 3 credits. R. Hoy and E. Adkins Regan.

**PSYCH 201(2010) Cognitive Science in Context Laboratory (also COGST/COM S 201[2010])**

Spring. 4 credits. D. Field and staff.

**PSYCH 205(2050) Perception (also PSYCH 605[6050])**

Spring. 3 credits. J. Cutting.

**PSYCH 209(2090) Developmental Psychology (also PSYCH 709[7090])**

Spring. 4 credits. M. Goldstein.

**PSYCH 214(2140) Cognitive Psychology (also COGST 214[2140])**

Fall. 3 credits. S. Edelman.

**PSYCH 215(2150) Psychology of Language (also COGST 215, LING 215/715[2215/7715], PSYCH 715[7150])**

Spring. 3 credits. M. Christiansen.

**[PSYCH 223(2230) Introduction to Biopsychology**

Fall. 3 credits. Next offered 2007-2008. Staff.]

**PSYCH 305(3050) Visual Perception (also VISST 305)**

Fall. 4 credits. J. Cutting.

**[PSYCH 311(3110) Introduction to Human Memory (also PSYCH 611[6110])**

Spring. 3 credits. Next offered 2007-2008.]

**PSYCH 316(3160) Auditory Perception (also PSYCH 716[7160])**

Fall. 3 or 4 credits. C. Krumhansl.

**[PSYCH 326(3260) Evolution of Human Behavior (also PSYCH 626[6260])**

Spring. 4 credits. Next offered 2007-2008. R. Johnston.]

**PSYCH 330(3300) Introduction to Computational Neuroscience (also BIONB/COGST 330[3300])**

Fall. 3-4 credits. C. Linster.

**PSYCH 332(3320) Biopsychology of Learning and Memory (also BIONB 328[3280], PSYCH 632[6320])**

Spring. 3 credits. T. DeVoogd.

**PSYCH 342(3420) Human Perception: Applications to Computer Graphics, Art, and Visual Display (also COGST 342[3420], VISST 342[3342], PSYCH 642[6420])**

Fall. 3 or 4 credits. D. Field.

**PSYCH 361(3610) Biopsychology of Normal and Abnormal Behavior (also NS 361[3610])**

Fall. 3 credits. B. J. Strupp.

**[PSYCH 396(3960) Introduction to Sensory Systems (also BIONB 396[3960], PSYCH 696[6960])**

Spring. 3 or 4 credits. Next offered 2007-2008. B. Halpern.]

**[PSYCH 412(4120) Laboratory in Cognition and Perception (also PSYCH 612[6121])**

Spring. 4 credits. Next offered 2007-2008. D. Field.]

**[PSYCH 413(4130) Information Processing: Conscious and Nonconscious**

Spring. 4 credits. Next offered 2007-2008.]

**[PSYCH 414(4140) Comparative Cognition (also COGST 414[4140], PSYCH 714[7140])**

Spring. 3 or 4 credits. Next offered 2007-2008.]

**[PSYCH 415(4150) Concepts, Categories, and Word Meanings (also PSYCH 615[6150])**

Fall. 4 credits. Next offered 2007-2008.]

**PSYCH 416(4160) Modeling Perception and Cognition (also COGST 416[4160], PSYCH 616[6160])**

Spring. 4 credits. M. Spivey.

**[PSYCH 417(4170) The Origins of Thought and Knowledge (also PSYCH 717[7170])**

Fall. 4 credits. Next offered 2007-2008.]

**PSYCH 418(4180) Psychology of Music (also PSYCH 618[6180])**

Spring. 3 or 4 credits. C. Krumhansl.

**[PSYCH 424(4240) Neuroethology (also BIONB 424[4240])**

Spring. 4 credits. Next offered 2007-2008.]

**PSYCH 425(4250) Cognitive Neuroscience (also PSYCH 625[6250])**

Fall. 4 credits. B. Finlay.

**[PSYCH 427(4270) Evolution of Language (also COGST 427, PSYCH 627[6270])**

Fall. 3 credits. Offered alternate years; next offered 2007-2008. M. Christiansen.]

**PSYCH 428(4280) Connectionist Psycholinguistics (also COGST 428, LING 428/628[4428/6628], PSYCH 628[6280])**

Fall. 3 credits. Offered alternate years. M. Christiansen.

**PSYCH 431(4310) Effects of Aging on Sensory and Perceptual Systems (also BIONB 421[4210], PSYCH 631[6310])**

Fall. 3 or 4 credits. B. Halpern.

**PSYCH 436(4360) Language Development (also COGST 436, HD 436[4360], LING 436[4436])**

Spring. 4 credits. B. Lust.

**PSYCH 437(4370) Lab Course: Language Development (also COGST/LING 450[4450], HD 437[4370])**

Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436. B. Lust.

**[PSYCH 465(4650) Topics in High-Level Vision (also COGST 465[4650], COM S 392, PSYCH 665[6655])**

Spring. 4 credits. Offered alternate years; next offered 2007-2008. S. Edelman.]

**PSYCH 491(4910) Research Methods in Psychology (also COGST 491/691[4910/6910], PSYCH 691[6910])**

Spring. 4 credits. D. Dunning.

**[PSYCH 492(4920) Sensory Function (also BIONB/VISST 492[4920], PSYCH 692[6920])**

Spring. 4 credits. Next offered 2007-2008. B. Halpern and H. Howland.]

## Graduate Courses and Seminars

The following courses and seminars are generally for graduate students only. However, some may be appropriate for advanced undergraduates. The director of the concentration must approve an undergraduate's use of any of these for satisfying the concentration requirements.

**[COGST 501(6150) Issues in Biological Information Processing (also LING 501[5501], PSYCH 501[5010])**

Fall. 2 credits. Corequisite: COGST/PSYCH 214 or permission of instructor. Next offered 2007-2008. S. Edelman.

Introduces graduate students interested in cognition (especially those who plan to pursue the Cognitive Studies minor) to the central issues in computational cognitive psychology. It consists of a series of advanced-level discussions of selected examples from the material covered in COGST 101 (also COM S 101, LING 170, PHIL 191, PSYCH 102) and COGST 214 (also PSYCH 214/614). The material from those courses includes perception, attention and consciousness, memory, thinking, and language. The course focuses on the development of skills required for critical evaluation of research in cognitive sciences, backed by an in-depth understanding of the relevant concepts and theories.]

**[COGST 530(6300) Representation of Structure in Vision and Language (also LING 530[5530], PSYCH 530[6300])**

Spring. 4 credits. Limited to 20 students. Graduate seminar. Prerequisites: graduate standing or undergraduates by permission of instructor; one course each in cognitive psychology, linguistics, and computer science, or permission of instructor. Offered alternate years; next offered 2007-2008. S. Edelman.

Concentrates on the nature of the representation of visual objects and scenes in the brain and compares it with the structural framework that serves as the main explanatory tool in current theories of language processing. Data and ideas are drawn from visual psychophysics, neurophysiology, psycholinguistics, computational vision and linguistics, and philosophy. Students present published research papers and preprints, which are then discussed and critiqued.]

**[COGST 550 Special Topics in Cognitive Science (also PSYCH 550[5500])**

Fall or spring. 4 credits. Topics and schedule available in Psychology Department main office just before start of classes each semester. Next offered 2007-2008. M. Spivey.]

**[COGST 614 Cognitive Psychology (also PSYCH 614[6140])**

Fall. 5 credits. Includes (M W F) lec of COGST/PSYCH 214 and a sec. S. Edelman. Introduces the idea of cognition as information processing, or computation, using examples from perception, attention and consciousness, memory, language, and thinking. Participants acquire conceptual tools that are essential for following the current thought on the nature of mind and its relationship to the brain.]

**COGST 633(6330) Language Acquisition Seminar (also HD 633[6633], LING 633[6633])**

Fall or spring. 1–4 credits. Prerequisite: COGST/HD/LING/PSYCH 436 or equivalent, or permission of instructor. B. Lust.

Reviews and critiques current theoretical and experimental studies of first-language acquisition, with a concentration on insights gained by cross-linguistic study of this area. Attention is also given to the development of research proposals.

**[COGST 671(6710) Introduction to Automated Reasoning (also COM S 671[6762])**

Fall. 4 credits. Prerequisite: (COM S 611 and graduate standing) or permission of instructor.

Topics in modern logic needed to understand and use automated reasoning systems such as HOL, Nuprl, and PVS. Special emphasis is on type theory and logic and on tactic-oriented theorem proving.]

**COGST 676–677(6760–6770) Decision Theory (also COGST 476/477, COM S 576/577, ECON 476–477/676–677[4460–4470/6760–6770])**

Fall and spring. 4 credits each semester. Fall: lecture-based; students must complete several problem sets and a final exam. Spring: additional lectures as well as visiting speakers; students must read speakers' papers, participate in discussions, and complete a research project. L. Blume, D. Easley, and J. Halpern.

Research on decision theory resides in a variety of disciplines including computer science, economics, game theory, philosophy, and psychology. This new course attempts to integrate these various approaches. The course covers several areas: (1) basic decision theory. This theory, sometimes known as "rational choice theory," is part of the foundation for the disciplines listed above. It applies to decisions made by individuals or by machines; (2) the limitations of and problems with this theory. Issues discussed here include decision theory paradoxes revealed by experiments, cognitive and knowledge limitations, and computational issues; (3) new research designed in response to these difficulties. Issues covered here include alternative approaches to the foundations of decision theory, adaptive behavior, and shaping the individual decisions by aggregate/evolutionary forces.

**COGST 691(6910) Research Methods in Psychology (also COGST 491[4910], PSYCH 491/691[4910/6910])**

Spring. 4 credits. Limited to 15 students. D. Dunning.

Intensive examination of the basic research methods used in social, personality, cognitive, and developmental psychology. Focuses on designing and conducting experiments, i.e., how to turn vague theories into concrete and testable notions, evaluate studies, avoid common pitfalls, and, finally, remain ethical. The course, in addition, covers test construction, survey methods, and "quasi experiments." Students concentrate on completing a small research project in which they conduct an experiment, interpret its data, and write up the results.

**COGST 710(7100) Research in Human Experimental Psychology (also PSYCH 710[7100])**

Fall or spring. Credit TBA. Prerequisite: permission of instructor.

**COM S 664(6670) Machine Vision**

Fall. 4 credits. R. Zabih.

**[COM S 671(6762) Introduction to Automated Reasoning (also COGST 671)]**

Fall. 4 credits. Next offered 2007–2008.]

**COM S 672(6700) Advanced Artificial Intelligence**

Spring. 4 credits. Prerequisite: COM S 472.

**COM S 674(6740) Natural Language Processing**

Spring. 4 credits. Prerequisite: COM S 472. Not offered every year.

**[COM S 676(6764) Reasoning about Knowledge**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic. Next offered 2007–2008.]

**[COM S 677(6766) Reasoning about Uncertainty**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic. Next offered 2007–2008.]

**COM S 772(7970) Seminar in Artificial Intelligence**

Fall and spring. 2 credits.

**COM S 775(7794) Seminar in Natural Language Understanding**

Fall and spring. 2 credits. C. Cardie.

**EDUC 611(6110) Educational Psychology**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor. D. Schrader.

**EDUC 614(6140) Gender, Context, and Epistemological Development (also FGSS 624[6240])**

Fall. 3 credits. D. Schrader.

**EDUC 714(7140) Moral Development and Education**

Spring. 3 credits. Offered alternate years. D. Schrader.

**HD 633(6330) Language Acquisition Seminar (also COGST/LING 633[6633])**

Fall. 1–4 credits. Prerequisite: COGST/HD/LING/PSYCH 436 or equivalent. B. Lust.

**HD 600/700 Graduate Seminars****[LING 501(5501) Issues in Biological Information Processing (also COGST 501)]**

Fall. 2 credits. Corequisite: COGST/PSYCH 214 or permission of instructor. Next offered 2007–2008. S. Edelman.]

**[LING 530(5530) Representation of Structure in Vision and Language (also COGST/PSYCH 530[6150])**

Spring. 4 credits. Offered alternate years; next offered 2007–2008. S. Edelman.]

**[LING 609(6609) Second Language Acquisition and the Asian Languages (also ASIAN 610[6610])**

Fall. 4 credits. Prerequisite: LING 414–415. Next offered 2007–2008. Y. Shirai.]

**[LING 628 Connectionist Psycholinguistics (also COGST/LING 428, PSYCH 428/628[4280/6280])**

Fall. 3 credits. Offered alternate years. M. Christiansen.]

**LING 633(6633) Language Acquisition Seminar (also COGST/HD 633[6330])**

Fall. 1–4 credits. Prerequisite: COGST/HD/LING/PSYCH 436 or equivalent. B. Lust.

**LING 700(7700) Graduate Seminars****MATH 681(6810) Logic**

Spring. 4 credits.

**MATH 781–782(7810–7820) Seminar in Logic**

Fall and spring. 4 credits each.

**MATH 788(7880) Topics in Applied Logic**

Fall. 4 credits.

**NBA 663(6630) Managerial Decision Making**

Fall. 3 credits. J. Russo.

**PHIL 700(7000) Graduate Seminars****PSYCH 519(6830) Affects and Cognition (also NRE 507)**

Fall. 4 credits. A. M. Isen.

**PSYCH 521(6210) Behavioral and Brain Sciences**

Fall and spring. 4 credits each semester.

**[PSYCH 530(6300) Representation of Structure in Vision and Language (also COGST 530[6300], LING 530[5530])**

Spring. 4 credits. Offered alternate years; next offered 2007–2008. S. Edelman.]

**PSYCH 550(5500) Special Topics in Cognitive Science (also COGST 550[5500])**

Spring. 4 credits. M. Spivey.

**[PSYCH 614(6140) Cognitive Psychology (also COGST 614)]**

Fall. 5 credits. S. Edelman.]

**PSYCH 616(6160) Modeling Perception and Cognition (also COGST/PSYCH 416[4160])**

Spring. 4 credits. M. Spivey.

**PSYCH 618(6180) Psychology of Music (also PSYCH 418[4180])**

Spring. 4 credits. C. Krumhansl.

**[PSYCH 628(6280) Connectionist Psycholinguistics (also COGST/PSYCH 428[4280], LING 428/628[4428/6628])**

Fall. 3 credits. Next offered 2007–2008. M. Christiansen.]

**PSYCH 631(6310) Effects of Aging on Sensory and Perceptual Systems (also BIONB 421[4210], PSYCH 431[4310])**

Fall. 3 or 4 credits. B. Halpern.

**[PSYCH 665(6650) Topics in High-Level Vision (also COM S 392, COGST 465, PSYCH 465[4650])**

Spring. 4 credits. Offered alternate years; next offered 2007–2008. S. Edelman.]

**PSYCH 691(6910) Research Methods in Psychology (also COGST 491/691[4910/6910], PSYCH 491[4910])**

Spring. 4 credits. D. Dunning.



**[PSYCH 714(7140) Comparative Cognition (also COGST/PSYCH 414[4140])]**

Spring. 3 or 4 credits. Next offered 2007–2008.]

**[PSYCH 716(7160) Auditory Perception (also PSYCH 316[3160])]**

Fall. 4 credits. Next offered 2007–2008. C. Krumhansl.]

## COLLEGE SCHOLAR PROGRAM

K. Gabard, director (55 Goldwin Smith Hall, 255-5792)

The College Scholar Program is described in the introductory section of Arts and Sciences.

**COLLS 397 Independent Study—Senior Project**

Fall or spring. 1–4 credits. Prerequisite: permission of program office.

**COLLS 499 Honors Research**

Fall or spring. 1–8 credits; max. 8 credits may be earned for honors research. Prerequisite: permission of program director. Each participant must submit brief proposal approved by honors committee.

## COMPARATIVE LITERATURE

J. Culler, chair (247 Goldwin Smith Hall), B. Maxwell, director of undergraduate studies (247 Goldwin Smith Hall); T. Murray, director of graduate studies (fall) (247 Goldwin Smith Hall); W. Cohen, director of graduate studies (spring) (247 Goldwin Smith Hall); F. Ahl, A. Banerjee, C. Carmichael, C. Chase, B. deBary, A. François, P. Hohendahl, G. Holst-Warhaft, E. Hyman, W. J. Kennedy, D. LaCapra, P. Liu, B. Maxwell, N. Melas, J. Monroe, J. R. Resina, N. Saccamano, N. Sakai. Emeritus: A. Caputi, D. Grossvogel, W. Holdheim, E. Rosenberg, L. Waugh.

Also cooperating: B. Bosteels, R. Brann, P. Carden, P. Gilgen, E. Hanson, M. Hart, R. Klein, D. Mankin, T. McNulty, L. Paterson, K. Perry-Long, D. Reese, D. Rubenstein, B. Rusk, N. Salvato, D. Schwarz, D. Starr, G. Waite, D. Woubshet.

The Department of Comparative Literature provides a broad range of courses in European and non-European literature as well as visual and media studies. Courses stress significant authors, themes, problems, styles, genres, historical periods, and theoretical perspectives. In cooperation with related departments in the humanities, the departmental offerings reflect current interdisciplinary approaches to literary study: hermeneutics, semiotics, deconstruction, cultural criticism, Marxism, reception aesthetics, feminism, and psychoanalysis.

### The Major

The Department of Comparative Literature provides a broad range of courses in European as well as non-European literatures. Courses devoted to literary studies variously stress significant authors, themes, problems, genres, historical periods, and theoretical perspectives. The Department also offers an array of courses in visual and media studies and enables the study of literature in relation to the history and theory of film, video, and other arts, as well as media. In

cooperation with related departments in the humanities, the department encourages the interdisciplinary study of literature—in conjunction with anthropology, history, philosophy, sexuality studies, psychology, sociology, and so forth. The course offerings reflect current theoretical approaches to literature, media, and the arts—hermeneutics, semiotics, deconstruction, cultural criticism, Marxism, postcolonialism, reception aesthetics, feminism, and psychoanalysis.

### Requirements for the Major

All majors in Comparative Literature are expected to have completed 10 courses, half of which must be devoted to the study of works in cultures other than English in their original languages.

Five of these courses must be taken in the Department of Comparative Literature. One of these must be a Core Course, to be taken in the junior or the senior year. The designated core courses change each semester (for 2006–2007, COM L 470 [fall], COM L 448 [spring]). If elected, an honors essay will also count as one of these required five courses.

An honors essay (COM L 493) of roughly 50 pages is optional. It is to be written during the senior year under the direction of a faculty member, preferably from within the department, who has agreed to work in close cooperation with the student. Students are urged to begin research on their thesis topic during the summer preceding their senior year.

Students who elect to do a double major with another literature department may count up to three courses from that major toward their requirements in Comparative Literature.

The department encourages students to study abroad in pursuit of their cultural and linguistic interests, and the number of courses that may be counted toward the major will be determined in consultation with the faculty advisor and with the approval of the director of undergraduate studies.

The major enables students to pursue this commitment to a comparative study that includes a substantial non-English component by offering two tracks.

- A. Comparative Literary Studies. This track is designed for students who wish to place greater emphasis on literary study in their course work. Students who select this track are required to complete:
  1. Five courses in Comparative Literature at the 200 level and above.
  2. Five courses in literature or other areas of the humanities at the 200 or higher level, to be taken in one or more foreign literature departments. Texts must be read in the original language. A student may offer one advanced-level foreign language course (conversation, composition, etc.) toward fulfilling this requirement.
- B. Literary, Visual, and Media Studies. This track is designed for students who wish to pursue their comparative study of literature and theory by integrating rigorous work on film, video, or other arts and media. Students who select this track are required to complete:
  1. Four courses in literary study at the 200 or higher level offered by the Department of Comparative Literature

or other humanities departments or programs.

2. Six courses in visual arts or media studies at the 200 or higher level offered by the Department of Comparative Literature or other humanities departments or programs.

The following guidelines might be used to determine whether a course in Literary, Visual, and Media Studies may be counted toward the five courses in non-English cultural study required of all majors. Where the media involve a large component of speech or writing (such as film, video, or hypertext), the student would need to work with this material in the original foreign language. Where text or speech in a foreign language is peripheral in a course that focuses on visual material (such as art or architecture) from non-English cultures, the student would need to draw on primary and secondary materials in a foreign language for oral reports, papers, and so forth. Because of the flexibility and interdisciplinary range of this track, students who select it should work closely with their faculty advisor to organize a coherent plan of study and to determine, with the approval of the Director of Undergraduate Studies, which courses satisfy the foreign language requirement of the major.

### Honors

A student who completes the requirements for the major is eligible for the degree of bachelor of arts with honors in Comparative Literature. The department bases its decision on the students achieving grades of at least B+ on the senior essay, in course work for the major, and in their overall academic performance at Cornell.

### First-Year Writing Seminars

Most 100-level courses may be used toward satisfying the first-year writing seminar requirements. See "John S. Knight Institute for Writing in the Disciplines" for a full description of the first-year seminar program.

### Courses

**COM L 200(2000) Introduction to Visual Studies (also VISST 200[2000], ENGL 292[2920]) (LA)**

Spring. 4 credits. T. Murray. For description, see VISST 200.

**[COM L 201(2010) Great Books # (LA)]**

Fall. 4 credits. COM L 201 and 202 may be taken independently of each other. Next offered 2007–2008. Staff.

A reading of seminal texts that represent and have shaped Western culture and hence form an essential part of the student's intellectual equipment. By evaluating and interpreting selections from the Bible, Homer, Virgil, Lady Murasaki, Dante, Castiglione, and Shakespeare, students gain practice in critical reading, thinking, and writing.]

**COM L 202(2020) Great Books (LA)**

Spring. 4 credits. A. Banerjee. The course traces the evolution of the story of the road as theme, trope, and organizing principle of seminal books from the Renaissance to the postmodern. Through readings of Rabelais, Cervantes, Swift, Sterne, Twain, Gogol, Conrad, Hemingway, Nabokov, and Kerouac, we will explore how literary adventures structure our experience of the world.

**COM L 203(2030) Introduction to Comparative Literature (LA)**

Fall. 4 credits. W. J. Kennedy.

The course is intended to answer the question persistently asked by undergraduates: "What is comparative literature, anyway?" The format of the course is designed to acquaint students with the range and variety of the field by having members of the Department present those aspects that reflect their areas of expertise and their methods of teaching. Of the three meetings each week, the first will generally take the form of a lecture; the second will be a discussion of the assigned text. Text and topics range from bawdy tales by Chaucer and Boccaccio to the naturalism of Thomas Mann and the trauma of post-colonial identity politics, and from modern American poetry to post-modern critical theory. All readings in English translation. Open to majors and prospective majors as well as students intending majors other than Comparative Literature.

**COM L 204(2040) Global Fictions (CA)**

Summer, 3-week. 4 credits. B. Maxwell.

What does the world write when it has a story to tell? Literature courses frequently define themselves according to geographies of nation or continent. By contrast, this course considers the globe as the limit-unit for the production of fiction. Are endless (and illuminating) differences all that we discover, or can we validly and gainfully observe shared features of fictions from markedly different parts of the globe. Can we take up the dare that fiction puts before us, to learn about the world from stories and novels? Can we take up the dare that translation puts before us, to read in literatures from places wholly unfamiliar to us? Readings are drawn mainly, but not only, from the contemporary period.

**[COM L 205(2050) Introduction to Poetry (LA)]**

Fall. 4 credits. Next offered 2007–2008. W. J. Kennedy.]

**[COM L 215(2150) SSP: Comparative American Literatures (also AM ST 215[2150]) (LA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007–2008. B. Maxwell.]

**COM L 220(2200) Thinking Surrealisms (also ART H 219[2019], VISST 219[2190]) (LA)**

Spring. 4 credits. B. Maxwell.

Borrowing its title from a formulation of the Marxist philosopher Ernst Bloch, and beginning from the "forays of demoralization" instigated by the Dadas, who bequeathed to surrealism the precious gift of unreconciliation to the given, this course will range over the protean expressiveness of several surrealist movements of the last century. The inception of surrealist precept and practice in Paris in the mid-1920s will be a consideration, perhaps only slightly more central to the course than the explicitly anti-fascist political phase of the 1930s and 40s; the supplementation of Parisian surrealism by Caribbean, Mexican, African American, Quebecois, and Mauritian writers and artists; the renegade practice of Hans Bellmer and the unschooled surreality of Eugene Atget; the reflections of and on surrealism by Walter Benjamin, Ernst Bloch, and Theodor W. Adorno; the relations of surrealism to the Situationist International; and the recent critiques of surrealism in fiction (Milan Kundera) and scholarship (Hal Foster). Throughout, the course will ask what the

proliferation of "thinking surrealisms" meant to 20th-century culture and politics. All readings in English.

**COM L 231(2310) Holy War, Jihad, Crusade (also HIST 269[2691], JWST 251[2651], NES 251[2651]) @ # (HA)**

Fall. 4 credits. R. Brann.

For description, see NES 251.

**COM L 236(2360) Greek Mythology (also CLASS 236)**

Summer. 3 credits. D. Mankin.

For description, see CLASS 236.

**COM L 276(2760) Desire (also ENGL 276[2760], THETR 278[2780], FGSS 276[2760]) (LA)**

Spring. 4 credits. E. Hanson.

For description, see ENGL 276.

**COM L 277(2770) Literatures of the Black Atlantic: Reading the Contemporary (also ENGL 277[2770], AS&RC 277[2504]) (LA)**

Spring. 4 credits. D. Woubshet.

For description, see ENGL 277.

**[COM L 282(2820) Japanese Animation and New Media (ASIAN 282[2822], VISST 282[2820]) @ (CA)]**

Fall. 4 credits. Next offered 2007–2008.

T. Lamarre.

For description, see ASIAN 282.]

**COM L 293(2930) SSP: Middle Eastern Cinema (also NES 293[2793], FILM 293[2930], VISST 293[2193], JWST 291[2793]) @ (LA)**

Fall. 4 credits. Limited to 15 students.

D. Starr.

For description, see NES 293.

**COM L 302(3020) Literature and Theory (also COM L 622[6220], ENGL 302/602[3020/6020]) (LA)**

Fall. 4 credits. J. Culler.

For description, see ENGL 302.

**[COM L 304(3040) Europe and Its Others: An Introduction to the Literature of Colonialism @ (LA)]**

Fall. 4 credits. Next offered 2007–2008.

N. Melas.]

**[COM L 306(3060) Comparative Martial Arts Film and Literature @ (LA)]**

Fall. 4 credits. Next offered 2007–2008.

P. Liu.]

**[COM L 317(3170) Postcolonial State Theory (CA)]**

Spring. 4 credits. Next offered 2007–2008.

P. Liu.]

**COM L 319(3910) Objects on Objects: Women Writers and the Aesthetics of the Modern (also FGSS 341[3410]) (LA)**

Fall. 4 credits. D. Reese.

For description, see FGSS 341.

**COM L 326(3260) Christianity and Judaism (also RELST 326[3260]) # (LA)**

Spring. 4 credits. C. Carmichael.

Study of the New Testament as a product of the first-century Palestinian and Hellenistic Judaism. Other text (also in translation): *The Passover Haggadah*.

**COM L 328(3280) Literature of the Old Testament (also RELST 328[3280]) @ # (LA)**

Fall. 4 credits. C. M. Carmichael.

Analysis of small sections of well-known material for in-depth discussion.

**COM L 332(3320) Technologies of Knowledge (also ASIAN 352[3352]) @ # (CA)**

Fall. 4 credits. B. Rusk.

For description, see ASIAN 352.

**COM L 335(3350) Modern Western Drama, Modern Western Theater: Theory and Practice (also THETR 335[3350], VISST 335[3735]) (LA)**

Fall. 4 credits. S. Warner.

For description, see THETR 335.

**COM L 341(3410) Imagining America: Race and National Fantasy in French and Italian Writing (also AM ST 326[3031], FRLIT 324[3240], GOVT 303[3031]) (CA)**

Fall. 4 credits. D. Rubenstein.

For description, see AM ST 326.

**COM L 344(3440) Tragic Theatre (also CLASS 345[3646], THETR 345[3450]) # (LA)**

Fall. 4 credits. F. Ahl.

For description, see CLASS 345.

**COM L 348(3480) Shakespeare and Europe (also ENGL 349[3490]) (LA)**

Fall. 4 credits. W. J. Kennedy.

In their own times, Shakespeare's plays registered a strong interest in the culture and society of Renaissance Europe beyond England. In later times, they cast a powerful spell over culture and society in 19th- and 20th-century Europe. This course will examine their debts to and influences upon continental drama. Readings will focus upon Shakespeare's plays in relation to Italian comedy, early French tragedy, and plays by Anton Chekhov, Bertolt Brecht, and Yasmina Reza.

**COM L 350(3500) Education and Philosophical Fantasies (also RUSSL 350[3550]) # (LA)**

Fall. 4 credits. P. Carden.

For description, see RUSSL 350.

**COM L 353(3530) Monsters A-X-files (also FRLIT 353/FGSS 353[3530])**

Fall. 4 credits. K. Long.

For description, see FRLIT 353.

**COM L 355(3550) Decadence (also ENGL 355[3550]) (LA)**

Fall. 4 credits. E. Hanson.

For description, see ENGL 355.

**COM L 356(3560) Renaissance Literature (also ENGL 320[3200]) # (LA)**

Spring. 4 credits. W. J. Kennedy.

An introduction to Renaissance literary texts with some attention to cultural backgrounds and intellectual history. Readings from Machiavelli, Erasmus, Rabelais, Shakespeare, Cervantes, and others.

**[COM L 362(3620) The Culture of the Renaissance II (also ENGL 325[3250], HIST 364[3640], MUSIC 390[3242], ART H 351[3420], FRLIT 362[3620]) # (CA)]**

Fall. 4 credits. Required F sec. Next offered 2007–2008. W. J. Kennedy.]

**COM L 363(3630) The European Novel # (LA)**

Fall. 4 credits. N. Saccamano.

This course will survey the history of the novel until the mid-19th century, focusing on the social, literary, and philosophical significance of its narrative forms. Topics to

be discussed: the novel as a site of conflict between "high" and "low" culture; the relation of fictional narrative to historical and autobiographical narrative; the gender politics and class ideology of romance. Texts may include Lazarillo de Tormes or Cervantes' *Don Quixote*, Fielding's *Tom Jones*, Laclós's *Dangerous Liaisons*, Goethe's *The Sorrows of Young Werther*, Brontë's *Wuthering Heights*.

**[COM L 364(3640) The European Novel # (LA)]**

Spring. 4 credits. W. Cohen.

Covering the period from 1850 to 1940. Formal emphasis will fall on realism and modernism, the latter as a radicalization and break with the former, and both as aesthetic acts of cognition, as distinctive ways of conceptualizing the world sometimes, perhaps, unavailable in philosophical or social thought. Thematic emphasis will center on Europe and its outside—geopolitical, religious, ideological, sexual, etc. Readings: Dostoevsky, *Crime and Punishment*; Tolstoy, *War and Peace* (major selections); Kafka, "The Judgment," "The Metamorphosis," "In the Penal Colony," "Before the Law"; Proust, *Swann's Way*, opening, and *Sodom and Gomorrah*, opening; Joyce, *Ulysses* (major selections); Woolf, *Mrs. Dalloway*.

**[COM L 365(3650) Contemporary Fiction @ (LA)]**

Fall. 4 credits. Limited to 15 students. Next offered 2007-2008. B. Maxwell.]

**[COM L 379(3790) Southeast Asian Literature in Translation (also ASIAN 379(379)) @ (LA)]**

Fall. 4 credits. L. Paterson.

For description, see ASIAN 379.

**[COM L 386(3860) Literature and Film of South Asia (also ASIAN 387(387), VISST 387(387)) @ (CA)]**

Fall. 4 credits. Next offered 2007-2008. A. Banerjee.]

**[COM L 400(4000) Forms of the Novel (LA)]**

Fall. 4 credits. Next offered 2007-2008. P. Liu.]

**[COM L 401(4010) Open Secrets: Studies in Narrative (also ENGL 401(401)) (LA)]**

Fall. 4 credits. Limited to 15 students. Next offered 2007-2008. A. François.]

**[COM L 408(4080) Martial Arts Film and Literature: Globalization from the East (also ASIAN 452(4452), S HUM 408)]**

Fall. 4 credits. Limited to 15 students. P. Liu.

For description, see S HUM 408.

**[COM L 410(4100) Science, Technology, and Culture (also S&TS 412(4101)) (CA)]**

Fall. 4 credits. Next offered 2007-2008. A. Banerjee.]

**[COM L 415(4150) The Theory and Analysis of Narrative (LA)]**

Spring. 4 credits. Next offered 2007-2008. J. Culler.]

**[COM L 419-420(4190-4200) Independent Study]**

419, fall; 420, spring. Variable credit. COM L 419 and 420 may be taken independently of each other. Applications available in 247 Goldwin Smith Hall.

**[COM L 421(4210) Terrorism and Its Representations (also ENGL 497(4970))]**

Fall. 4 credits. E. Hyman.

In this course, we will examine authors whose work corresponds to particular moments both in the development of the novel and the development of terrorism as a feature of modern life. From anarchist acts of the late 19th century to the transnational terror of the 21st, we will investigate how writers have attempted to understand the phenomenon of revolutionary or terrorist violence, exploring how terrorism at once depends upon representation (a sort of symbiotic relationship with the media) and defies representation altogether. Consequently, we will look not only at realist/historicist accounts of terrorist acts, but also avant-garde notions of l'acte gratuite, "the mythology of ends," and pure expenditure. Ultimately, we will explore how the gratuitous, excessive or spectacular nature of these acts comes to underscore a crisis around language and rationality in the twentieth century.

**[COM L 426(4260) New Testament Seminar (also RELST 426(4260)) # (HA)]**

Spring. 4 credits. Limited to 15 students. C. Carmichael.

Topic: Sex and religion in the Bible. Identification and discussion of problems in the New Testament. Discussing attitudes to sexuality in the Bible, we will examine in Old and New Testament texts the clash between ancestral behavior and subsequent laws, as well as the contrast between legal and religious ideas. Topics will include: marriage and divorce, incest, intermarriage, gender discrimination, guilt and shame, homosexuality, women and purity, sexual language and symbols. It should be possible to say something new about the topics and also, because of the perennial nature of the issues, to say something that is relevant to contemporary life.

**[COM L 428(4280) Biblical Seminar (also RELST 427(4280)) # @ (HA)]**

Fall. 4 credits. Limited to 15 students. C. Carmichael.

A study of how biblical ethical and legal rules (in Exodus, Leviticus, and Deuteronomy) comment on incidents in the biblical narratives (Genesis-2 Kings). The link between law and narrative enables us to observe in detail how ancient thinkers evaluate ethical and legal problems of perennial interest.

**[COM L 431(4310) Animation of Animal Philosophy (also ASIAN 454(4454)) (CA)]**

Fall. 4 credits. T. Lamarre.

For description, see ASIAN 454.

**[COM L 432(4320) Time and the Other (also S HUM 424)]**

Spring. 4 credits. N. Melas.

For description, see S HUM 424.

**[COM L 433(4330) Electronic Innovations (also ENGL 433(4330), VISST 433(4133)) (CA)]**

Fall. 4 credits. Next offered 2007-2008. T. Murray.]

**[COM L 438(4380) Arendt, Morisaki, Weil (also COM L 624(6240), ASIAN 468(668)(468/668))]**

Fall. 4 credits. Limited to 20 students. B. deBary.

For description, see ASIAN 468.

**[COM L 441(4410) Derrida, Writing, and the Institution of Literature (also COM L 641(6410), ENGL 441/642(4410/6240)) (LA)]**

Spring. 4 credits. Prerequisite: reading knowledge of French. Next offered 2007-2008. J. Culler.]

**[COM L 442(4420) Culture, Sovereignty, the State (also S HUM 420)]**

Spring. 4 credits. M. Hart.

For description, see S HUM 420.

**[COM L 443(4430) Partitioned Postmodernity and Anomalous Colonies in East Asia (also S HUM 425)]**

Spring. 4 credits. Limited to 15 students. P. Liu.

For description, see S HUM 425.

**[COM L 446(4460) Metafiction (also ENGL 455(4550))]**

Fall. 4 credits. W. Cohen.

A reading of Cervantes' *Don Quixote*, Melville's *Moby-Dick*, and Joyce's *Ulysses* that brings together a formalist interest in self-referentiality with a culturalist, postcolonial concern with inter-ethnic relations. Emphasis on the ways in which a radical commitment to realist narrative paradoxically ends up calling the very enterprise of realism into question. The resulting formal originality raises epistemological doubts that are in turn linked to a social critique, the latter arising from the authorial incorporation of marginal voices. The broader aim of the course, aided by some attention to criticism of the three texts and theories of fiction, is thus to reject the separation of aesthetic from sociological concerns.

**[COM L 448(4480) The City as Text (also SPANL 442(4420))]**

Spring. 4 credits. Core Course for COM L majors. Limited to 15 students. J. R. Resina.

Ever since Hegel observed that the city was the stage of modern life, Western culture has been consciously bound to the growth and transformation of cities. It has also been argued that the modern novel is intimately linked to such urban processes. This course will explore representations of the city in European narrative and film of the 19th and 20th centuries. Sociological approaches to the urban experience will be taken into consideration, as well as the literary process by which the modern image of the city was constituted. Some of the authors and film directors discussed will be Dickens, Balzac, James, Mann, Calvino, Benjamin, Rodoreda, Vertov, Ruthmann, Almodovar, Guerin.

**[COM L 450(4500) Renaissance Poetry (also COM L 650(6500), ITAL 450(650)) # (LA)]**

Spring. 4 credits. W. J. Kennedy.

A reading and discussion of key texts in lyric poetry from Italian, French, English, and other European literatures of the Renaissance. Topic for Spring 2007: Economic transactions and exchanges in the poetry of Petrarch, Michelangelo, Labe, Ronsard, Shakespeare, Mary Wroth, and others.

**[COM L 452(4520) Renaissance Humanism (also COM L 652(6520)) # (LA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007-2008. W. J. Kennedy.]

**[COM L 458(4580) Narratives of Travel, Migration, and Exile (CA)]**

Fall. 4 credits. Limited to 15 students. Next offered 2007–2008. A. Banerjee.]

**[COM L 463(4630) Moses Maimonides and Mediterranean Islamic and Jewish Culture (also JWST 440[4540], RELST 440[4540])]**

Spring. 4 credits. R. Brann.  
For description, see JWST 440.

**[COM L 470(4700) Translation and Cultural Difference (also ASIAN 481[4481])]**

Fall. 4 credits. Limited to 15 students. Core Course for COM L majors. N. Sakai.  
Problems concerning translation are explored in this course. We will survey the theories of translation with a special emphasis on the relationship between trans-national translation and trans-national transference that establishes a division of two spheres and thereby marks the limit of what can be expressed in one medium. Broadly understood, however, translation can take place not only between two national languages but also at a variety of boundaries within a single society. The seminar will investigate different modes of translation by which different social and cultural identities are constructed, emphasizing the disappearance of multi-lingualism and the emergence of philology in the modern nation-state. The historical transformation of translation and the accompanying genesis of linguistic and cultural identity will be examined in reference to historical materials.

**[COM L 474(4740) Topics in Modern European Intellectual and Cultural History (also HIST 474[4740], JWST 474/674[4740/6740])]**

Fall. 4 credits. Prerequisite: permission of instructor. D. LaCapra.  
Topic: History and critical theory. For description, see HIST 474.

**[COM L 480(4800) Baudelaire in Context (also COM L 680[6800], FRLIT 488/688[4880/6880]) # (LA)]**

Spring. 4 credits. Prerequisite: reading knowledge of French. J. Culler.  
Study of *Les Fleurs du Mal* in relation to the tradition of the lyric and modern critical theory. Topics of special interest include: structures of address, the role of the Devil, and Baudelaire's relation to Romanticism and to the traditions of love poetry. Reading knowledge of French required.

**[COM L 481(4810) Studies in Gender Theory: Kinship and Embodiment (also FGSS 480[4800]) (CA)]**

Spring. 4 credits. Limited to 15 students.  
Next offered 2007–2008. P. Liu.]

**[COM L 483(4830) Imagining the Holocaust (also ENGL 458/658[4580/6580], GERST 457[4570]) (LA)]**

Spring. 4 credits. D. Schwarz.  
For description, see ENGL 458.

**[COM L 486(4860) Contemporary Poetry and Poetics (also ENGL 488[4880], FRLIT 435[4350], SPANL 474[4740]) (LA)]**

Fall. 4 credits. Next offered 2008–2009.  
J. Monroe.]

**[COM L 493(4930) Senior Essay]**

Fall and spring. 8 credits.  
Times TBA individually in consultation with director of Senior Essay Colloquium.

Approximately 50 pages to be written over the course of two semesters in the student's senior year under the direction of the student's advisor. An R grade is assigned on the basis of research and a preliminary draft completed in the first semester. A letter grade is awarded on completion of the second semester.

**[COM L 496(4960) Imagining the Mediterranean (also NES 438[4738], JWST 438[4738])]**

Fall. 4 credits. G. Holst-Warhaft.  
For description, see NES 438.

**[COM L 497(4970) Sexual Citizenship (also FGSS 497[4970], FRLIT 495[4950])]**

Spring. 4 credits. Core course for COM L majors. Limited to 15 students. L. Hyman.  
The objective of this course is to understand the ways in which sexual and political economy have converged and diverged in theories of the public and private sphere. Beginning with reading some founding texts of modern notions of citizenship, we will examine how the mythical establishment of civil society as a social contract also entails a "sexual contract." We will then turn to literary works of the 19th and 20th centuries, assessing the ways that they support or disrupt sexual contracts of various kinds, such as those of marriage, prostitution or enslavement. We will also consider the way that discourses around homosexuality—from the late 19th century to our own day—put into question the sexual and marital relations that underpin State order. Readings will include Rousseau, Kant, de Sade, Masoch, Balzac, Wilde, Zola and others.

**[COM L 601(6010) Readings of Recollection (also GERST 638[6380])]**

Fall. 4 credits. P. Gilgen.  
For description, see GERST 638.

**[COM L 605(6050) Contemporary Global Fiction (also ENGL 683[6830])]**

Spring. 4 credits. W. Cohen.  
The post-1945 novel, understood as the first full instance of world literature. Emphasis on global transformations of a primarily European genre. Issues of form—realism, modernism, postmodernism—and of relations among languages, nations, social systems, and continents in the modern world system. Discussion of race and empire, gender, and class. Probable readings: García Márquez, *One Hundred Years of Solitude*; Kundera, *The Unbearable Lightness of Being*; Morrison, *Beloved*, and/or Nabokov, *Lolita* or *Pale Fire*; Rushdie, *Midnight's Children*; and some of the following writers: Mann or Grass; Achebe or Ngugi; Kawabata or Mishima; Eileen Chang or Wang Anyi; El Saadawi or Mahfouz; Hagedorn or Toer; Chamoiseau or Naipaul; Wendt or Hulme.

**[COM L 609(6090) Comparison and Cultural Difference]**

Fall. 4 credits. Next offered 2007–2008.  
N. Melas.]

**[COM L 619–620(6190–6200) Independent Study]**

619, fall; 620, spring. Variable credit. COM L 619 and 620 may be taken independently of each other. Applications available in 247 Goldwin Smith Hall.

**[COM L 622(6220) Literature and Theory (also COM L 302[3020], ENGL 302/602[3020/6020])]**

Fall. 4 credits. J. Culler.  
For description, see ENGL 302.

**[COM L 623(6230) Walter Benjamin (also GERST 639[6390])]**

Spring. 4 credits. A. Schwarz.  
For description, see GERST 639.

**[COM L 624(6240) Arendt, Morisaki, Weil (also COM L 438[4380], ASIAN 468/668[4468/6668])]**

Fall. 4 credits. B. deBary.  
For description, see ASIAN 468.

**[COM L 626(6260) Thinking the Event: Alain Badiou's Philosophy (also FRLIT 444/644[4440/6440])]**

Spring. 4 credits. B. Bosteels.  
For description, see FRLIT 444.

**[COM L 630(6300) Aesthetics in the 18th Century (also ENGL 630[6300])]**

Fall. 4 credits. Next offered 2007–2008.  
N. Saccamano.]

**[COM L 634(6340) Deleuze and Lyotard: Aesthetics (also ENGL 629[6290], FRLIT 672[6720], VISST 634[6340])]**

Fall. 4 credits. Next offered 2007–2008.  
T. Murray.]

**[COM L 636(6360) Comparative Modernisms/Alternative Modernities]**

Fall. 4 credits. Limited to 15 students.  
N. Melas.

This course will inquire into the geographical coordinates that alternately relay and obscure the relation between modernism as an aesthetic movement and modernity as world-historical and political-economic project. Central emphasis will fall on colonialism and its particular inflection of the temporality of modernist aesthetics and the progress of modernity in the two regions that will be our focus: the French Caribbean and Mediterranean Egypt. While including canonical theoretical texts on Western modernity, modernism and postcolonial theory, readings will be focussed on the multiple and intersecting influences around two central figures, Martinican poet Aimé Césaire and the modern Greek Alexandrian poet, Constantine Cavafy.

**[COM L 638(6380) Comparative Literacy: The 18th C and Literary Modernity (also ASIAN 626[6626])]**

Spring. 4 credits. Next offered 2007–2008.  
N. Sakai.

For description, see ASIAN 626.]

**[COM L 641(6410) Derrida, Writing, and the Institution of Literature (also COM L 441[4410], ENGL 441/642[4410/6420])]**

Spring. 4 credits. Next offered 2007–2008.  
J. Culler.]

**[COM L 650(6500) Renaissance Poetry (also COM L 450[4500], ENGL 622[6220], ITALL 450/650[4500/6500])]**

Spring. 4 credits. W. J. Kennedy.  
For description, see COM L 450.

**[COM L 652(6520) Renaissance Humanism (also COM L 452[4520])]**

Spring. 4 credits. Limited to 15 students.  
Next offered 2007–2008. W. J. Kennedy.]

**[COM L 657(6570) Baroque (also GERST 627[6270])]**

Fall. 4 credits. G. Waite.  
For description, see GERST 627.

**[COM L 662(6620) Cinematic Desire (also ENGL 660[6600])]**

Spring. 4 credits. E. Hanson.

**[COM L 665(6650) The Literature of Empire in the Renaissance (also ENGL 626(6260))**

Spring. 4 credits. Next offered 2007-2008.  
W. Cohen.]

**[COM L 668(6680) Theorizing Gender and Race in Asian Histories and Literatures with a Particular Focus on Japanese Cases (also COM L 398(3980), ASIAN 388/688(3388/6688))**

Fall. 4 credits. Next offered 2007-2008.  
N. Sakai.]

**[COM L 673(6730) Topics in Modern European Intellectual and Cultural History (also HIST 673(6730), JWST 674(6674))**

Fall. 4 credits. D. LaCapra.  
For description, see HIST 673.

**[COM L 675(6750) Critical Passions (also ENGL 675(6750))**

Spring. 4 credits. Next offered 2007-2008.  
A. Francois.]

**[COM L 680(6800) Baudelaire in the Lyric (also FRLIT 688(6880))**

Spring. 4 credits. J. Culler.  
For description, see COM L 480.

**[COM L 688(6880) Wordsworth and Rousseau (also ENGL 741(7410))**

Spring. 4 credits. C. Chase.  
A study of the contrasting autobiographies (beginning with the fact that one is in prose and the other in poetry) written at the turn of the 18th century by Jean-Jacques Rousseau and William Wordsworth, and other texts which reveal, in spite of great differences in genre and subject matter, their common concerns, such as memory, poetic language, and the significance of literature. Writing requirements: two ten-page papers, short writing assignments, oral presentation. Some knowledge of French recommended but not required.

**[COM L 689(6890) Adorno's Aesthetic Theory (also GERST 689(6890))**

Fall. 4 credits. P. Hohendahl.  
For description, see GERST 689.

**[COM L 692(6920) Digital Bodies, Virtual Identities (also ENGL 696(6960), THETR 633(6330))**

Fall. 4 credits. T. Murray.  
For description, see ENGL 696.

**[COM L 697(6970) Cosmopolitanism (also ENGL 697(6970))**

Spring. 4 credits. N. Saccamano.

## COMPUTER SCIENCE

E. Tardos, chair; G. Bailey, K. Bala, K. Birman, C. Cardie, R. Caruana, R. L. Constable, R. Elber, D. Fan, P. Francis, J. Gehrke, D. Greenberg, D. Gries, J. Halpern, J. E. Hopcroft, D. Huttenlocher, T. Joachims, U. Keich, J. Kleinberg, R. Kleinberg, D. Kozen, L. Lee, S. Marschner, A. Myers, R. Ruzina, F. B. Schneider, D. Schwartz, B. Selman, D. Shmoys, E. G. Sier, E. Tardos, R. Teitelbaum, C. Van Loan, S. Vavasis, R. Zabih

The Department of Computer Science is affiliated with both the College of Arts and Sciences and the College of Engineering. Students in either college may major in

Computer Science. For details, visit our web site at [www.cs.cornell.edu/ugrad](http://www.cs.cornell.edu/ugrad).

## The Major

CS majors take courses in algorithms, data structures, logic, programming languages, scientific computing, systems, and theory. Electives in artificial intelligence, computer graphics, computer vision, databases, multimedia, and networks are also possible. Requirements include:

- three semesters of calculus (MATH 111-122 (or 112)-221 or 191-192-294)
- two semesters of introductory computer programming (COM S 100 and 211)
- a 1-credit project (COM S 212)
- a seven-course Computer Science core (COM S 280, 312, 314, or 316; one of 321, 322, 421, or 428; 381, 414, and 482)
- two 400+ Computer Science electives, totaling at least 6 credits (COM S 490 not allowed)
- a Computer Science project course (COM S 413, 415, 419, 433, 468, 473, 501, 514, or 664)
- a mathematical elective course (e.g., ENGRD 270, MATH 222 or 293, MATH 300+, T&AM 310)
- two 300+ courses that are technical in nature and total at least 6 credits
- a three-course specialization in a topic area other than Computer Science. These courses must be numbered 300 level or greater.

**Note:** All of the field electives described above must be courses of 3 or more credit hours with the exception of the COM S project course, which is 2 credits or more.

The program is broad and rigorous, but it is structured in a way that supports in-depth study of outside areas. Intelligent course selection can set the stage for graduate study and employment in any technical area and any professional area such as business, law, or medicine. With the advisor, the Computer Science major is expected to put together a coherent program of study that supports career objectives and is true to the aims of liberal education.

## Admission

All potential affiliates are reviewed on a case-by-case basis relative to the following criteria:

- a grade of C or better in all COM S courses and MATH courses
- a GPA of 2.5 or better in COM S 211, 212, and 280.
- a GPA of 2.5 or better in MATH 112, 122, or 192 and COM S 280.

Courses used in the affiliation GPA computations may be repeated if the original course grade was below a C. The most recent grade will be used for all repeated courses. Qualifying courses must be taken at Cornell.

Departmental honors in Computer Science is granted to students who have maintained a cumulative GPA greater than or equal to 3.5 and completed a set of coherent courses and research activities that satisfy the following requirements:

- at least one COM S course (at least 3 credit hours) at or above the 500 level with a grade of A- or better; no seminars.
- at least two semester-long 3-credit courses of COM S 490 (Independent Research) with a COM S faculty member, with grades of A- or better each semester.

Latin Designations (appended to the degree), awarded by the field of Computer Science for all who qualify as stated above, are based on the final cumulative GPA, as follows:

- *cum laude*, 3.50 or above
- *magna cum laude*, 3.75 or above
- *summa cum laude*, 4.00 or above

**Note:** Honors courses may not be used to satisfy the COM S 400+ elective requirement, the COM S project requirement, the math elective, the technical electives, or the specialization. See the COM S undergraduate web site for more information on eligibility: [www.cs.cornell.edu/ugrad](http://www.cs.cornell.edu/ugrad).

## Computing in the Arts Undergraduate Concentration

A concentration in Computing in the Arts with an emphasis on computer science is available both to Computer Science majors and to students majoring in other subjects. For more information, see p. 509.

## Courses

For complete course descriptions, see "Computer Science" under "Computing and Information Science (CIS)."

**COM S 099(1109) Fundamental Programming Concepts**

Summer. 2 credits. Freshmen only.  
Prerequisites: none. S-U grades only.

**COM S 100(1110, 1112) Introduction to Computer Programming (MQR)**

Fall, spring, summer. 4 credits.  
Four versions of COM S 100 are offered. COM S 100J, COM S 100M, and COM S 100R are offered in the fall. COM S 100H, COM S 100J, and COM 100M are offered in the spring. COM S 100J is offered in the summer. All versions are described in the "Computing and Information Science (CIS)" section.

**COM S 101(1710) Introduction to Cognitive Science (also COGST 101(1101), LING 170(1170), PHIL 191(1910), PSYCH 102(1200)) (KCM)**

Fall, summer. 3 credits.  
For description, see COGST 101.

**COM S 113(2000) Introduction to C**

Fall, spring, usually weeks 1-4. 1 credit.  
Prerequisite: COM S 100 or equivalent programming experience. Credit granted for both COM S 113 and 213 only if 113 taken first. S-U grades only.

**COM S 114(2006) Unix Tools**

Fall, usually weeks 5-8. 1 credit.  
Prerequisite: COM S 100 or equivalent programming experience. Recommended: knowledge of at least one programming language. S-U grades only.

**COM S 130(1300) Introductory Design and Programming for the Web (also INFO 130(1300))**

Fall. 3 credits. Prerequisites: none. No computer background necessary.



**COM S 165(1610) Computing in the Arts (also ART 175, CIS 165[1610], DANCE 165[1540], ENGRI 165[1610], MUSIC 165[1465], PSYCH 165[1650])**  
Spring. 3 credits. Recommended: good comfort level with computers and some of the arts.

**COM S 167(1620) Visual Imaging in the Electronic Age (also ART 170[1700], CIS 167[1620], ENGRI 167[1670])**  
Spring. 3 credits.  
For description, see ART 170.

**COM S 172(1700) Computation, Information, and Intelligence (also COGST 172, ENGRI 172[1700], INFO 172[1700]) (MQR)**  
Fall. 3 credits. Prerequisite: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100.

**COM S 201(2710) Cognitive Science in Context Laboratory (also COGST 201, PSYCH 201[2010]) (KCM)**  
Fall or spring. 4 credits. Limited to 24 students. Recommended: concurrent or prior registration in PSYCH 102/COGST 101/COM S 101/LING 170/PHIL 191. Knowledge of programming languages not assumed.  
For description, see COGST 201.

**COM S 211(2110) Computers and Programming (also ENGRD 211[2110]) (MQR)**  
Fall, spring, summer. 3 credits.  
Prerequisite: COM S 100 or equivalent course in Java or C++.

**COM S 212(2111) Java Practicum**  
Fall, spring. 1 credit. Pre- or corequisite: COM S/ENGRD 211. Letter grades only.

**COM S 214(2008) Advanced UNIX Programming and Tools**  
Spring, usually weeks 5–8. 1 credit.  
Prerequisite: COM S 114 or equivalent. S-U grades only.

**COM S 215(2004) Introduction to C #**  
Fall, spring, usually weeks 5–8. 1 credit.  
Prerequisite: COM S/ENGRD 211 or equivalent experience. S-U grades only.

**COM S 230(2300) Intermediate Design and Programming for the Web (also INFO 230[2300])**  
Spring. 3 credits. Prerequisite: COM S 130 or equivalent knowledge.

**COM S 280(2800) Discrete Structures (MQR)**  
Fall, spring. 3 credits. Pre- or corequisite: COM S 100 or permission of instructor.

**COM S 305(3050) Creative Problem-Solving in Computer Science**  
Spring. 3 credits. Prerequisites: COM S 211 and 280.

**COM S 312(3110) Data Structures and Functional Programming (MQR)**  
Fall, spring. 4 credits. Prerequisite: COM S 211 and 212 or equivalent programming experience. Should not be taken concurrently with COM S 314 or 316.

**COM S 314(3420) Computer Organization (also ECE 314[3140])**  
Spring. 4 credits. Prerequisite: COM S 211 or ENGRD 230. Should not be taken concurrently with COM S 312.

**COM S 316(3410) Systems Programming**  
Fall. 4 credits. Prerequisites: COM S 211 or equivalent programming experience. Should not be taken concurrently with COM S 312.

**[COM S 321(3510) Numerical Methods in Computational Molecular Biology (also BIOBM 321[3210], ENGRD 321[3510]) (MQR)**

Fall. 3 credits. Prerequisites: at least one course in calculus (e.g., MATH 106, 111, or 191) and course in linear algebra (e.g., MATH 221 or 294 or BTRY 417); COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421. Offered odd-numbered years; next offered 2007–2008.]

**COM S 322(3220) Introduction to Scientific Computation (also ENGRD 322[3220])**

Spring, summer. 3 credits. Prerequisites: COM S 100 and MATH 221 or 294; knowledge of discrete probability and random variables at the level of COM S 280. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

**[COM S 324(3470) Computational Linguistics (also COGST 424[4240], LING 424[4424]) (MQR)**

Fall or spring. 4 credits. Prerequisites: LING 203. Labs involve work in UNIX environment; COM S 114 recommended.  
For description, see LING 424.]

**COM S 330(3300) Data-Driven Web Applications (also INFO 330[3300])**  
Fall. 3 credits. Prerequisite: COM S/ENGRD 211. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

**COM S 381(3810) Introduction to Theory of Computing**  
Fall, summer. 3 credits. Prerequisite: COM S 280 or permission of instructor. Credit not granted for both COM S 381 and 481; corrective transfers between COM S 381 and 481 (in either direction) encouraged during first few weeks of instruction.

**[COM S 400(4150) The Science of Programming**  
Fall. 3 credits. Prerequisite: COM S 211.]

**COM S 411(4110) Programming Languages and Logics**  
Fall. 4 credits. Prerequisite: COM S 312 or permission of instructor.

**COM S 412(4120) Introduction to Compilers**  
Spring. 3 credits. Prerequisites: COM S 312 (or permission of instructor) and COM S 314 or 316. Corequisite: COM S 413.

**COM S 413(4121) Practicum in Compilers**  
Spring. 2 credits. Corequisite: COM S 412. A compiler implementation project related to COM S 412.

**COM S 414(4410) Operating Systems**  
Fall, spring, summer. 3 credits.  
Prerequisite: COM S 314 or 316.  
Corequisite: COM S 415 in spring only.

**COM S 415(4411) Practicum in Operating Systems**  
Fall, spring. 2 credits. Corequisite: COM S 414.

**COM S 416(4420) Computer Architecture (also ECE 475)**  
Fall. 4 credits. Prerequisites: ENGRD 230 and COM S/ECE 314.  
For description, see ECE 475.

**COM S 419(4450) Computer Networks**  
Spring. 4 credits. Pre- or corequisites: COM 414 or permission of instructor.

**COM S 421(4210) Numerical Analysis**  
Fall. 4 credits. Prerequisites: MATH 221 or 294 or equivalent, one additional mathematics course numbered 300 or above, and knowledge of programming. COM S majors and minors may use only one of the following toward their degree: COM S 321, 322, or 421.

**COM S 426(4520) Introduction to Bioinformatics**  
Spring. 4 credits. Prerequisites: COM S/ENGRD 211, COM S 280.

**COM S 428(4510) Introduction to Computational Biophysics**  
Fall. 3 credits. Prerequisites: COM S 100, CHEM 211 or equivalent, MATH 221, 293, or 294, PHYS 112 or 213, or permission of instructor. Recommended: BIOBM 330.

**COM S 430(4300) Information Retrieval (also INFO 430[4300])**  
Fall. 3 credits. Prerequisite: COM S 211 or equivalent.

**COM S 431(4302) Web Information Systems (also INFO 431[4302])**  
Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

**COM S 432(4320) Introduction to Database Systems**  
Fall. 3 credits. Prerequisites: COM S 312 (or 211, 212, and permission of instructor).

**COM S 433(4321) Practicum in Database Systems**  
Fall. 2 credits. Prerequisite: COM S 432 or coregistration in COM S 432. COM S majors may use only one of the following toward their degree: COM S/INFO 330 or COM S 433.

**COM S 465(4620) Computer Graphics I (also ARCH 374)**  
Fall. 4 credits. Prerequisite: COM S/ENGRD 211. May not be taken for credit after completion of COM S 417.

**COM S 467(4630) Computer Graphics II**  
Spring. 3 credits. Prerequisite: COM S 465.

**COM S 468(4631) Computer Graphics Practicum**  
Spring. 2 credits. Prerequisite: COM S 465. Corequisite: COM S 467.

**COM S 472(4700) Foundations of Artificial Intelligence**  
Fall. 3 credits. Prerequisites: COM S 211 and 280 (or equivalent).

**COM S 473(4701) Practicum in Artificial Intelligence**  
Fall. 2 credits. Corequisite: COM S 472.

**COM S 474(4740) Introduction to Natural Language Processing (also COGST 474[4740], LING 474[4474])**

Fall or spring. 4 credits. Prerequisite: COM S 211.

**COM S 475(4702) Artificial Intelligence: Uncertainty and Multi-Agent Systems**

Spring. 4 credits. Prerequisites: COM S/ENGRD 211 and COM S 280 or equivalent.

**COM S 478(4780) Machine Learning**

Spring. 4 credits. Prerequisites: COM S 280, 312, and basic knowledge of linear algebra and probability theory.

**COM S 480(4870) Introduction to Cryptology (also MATH 335[3350]) (MQR)**

Fall, spring. 3 credits. Prerequisite: COM S 100 and MATH 222 or 294. Students who take this course may not also receive credit for MATH 336.

For description, see MATH 335.

**COM S 482(4820) Introduction to Analysis of Algorithms**

Spring, summer. 4 credits. Prerequisites: COM S 280 and 312.

**[COM S 483(4812) Quantum Computation (also PHYS 481/681[4481/7681])]**

Spring. 2 credits. Prerequisite: familiarity with theory of vector spaces over complex numbers. Not offered every year; next offered 2007-2008.

For description, see PHYS 481.]

**COM S 485(4850) Mathematical Foundations for the Information Age**

Spring. 4 credits. Prerequisite: COM S 381.

**COM S 486(4860) Applied Logic (also MATH 486[4860]) (MQR)**

Fall or spring. 4 credits. Prerequisites: MATH 222 or 294, COM S 280 or equivalent (e.g., MATH 332, 432, 434, 481), and some additional course in mathematics or theoretical computer science.

For description, see MATH 486.

**COM S 490(4999) Independent Reading and Research**

Fall, spring. 1-4 credits.

**COM S 501(5150) Software Engineering**

Spring. 4 credits. Prerequisite: COM S 211 or equivalent experience programming in Java or C++.

**COM S 513(5430) System Security**

Fall. 4 credits. Prerequisites: COM S 414 or 419 and familiarity with JAVA, C, or C# programming languages.

**COM S 514(5410) Intermediate Computer Systems**

Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

**[COM S 516(5420) Parallel Computer Architecture (also ECE 572[5720])]**

Spring. 4 credits. Prerequisite: ECE 475.

For description, see ECE 572.]

**COM S 530(5300) The Architecture of Large-Scale Information Systems (also INFO 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or COM S 432.

**[COM S 565(5640) Computer Animation (also ART 273, CIS 565[5640])]**

Fall. 4 credits. Prerequisite: none.

For description, see ART 273.]

**[COM S 566(5642) Advanced Animation (also ART 372/CIS 566[5642])]**

Spring. 4 credits. Prerequisites: none.

For description, see ART 372.]

**COM S 572(5722) Heuristic Methods for Optimization (also CEE 509[5090], CIS 572[5722], OR&IE 533[5340])**

Fall. 3 or 4 credits. Prerequisites: COM S/ENGRD 211 or 322 or CEE/ENGRD 241, or graduate standing, or permission of instructor.

For description, see CEE 509.

**COM S 578(5780) Empirical Methods in Machine Learning and Data Mining**

Fall. 4 credits. Prerequisites: COM S 280 and 312 or equivalent.

**COM S 611(6110) Advanced Programming Languages**

Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.

**COM S 612(6120) Compiler Design for High-Performance Architectures**

Spring. 4 credits. Prerequisites: COM S 314 and 412 or permission of instructor.

**COM S 614(6410) Advanced Systems**

Fall or spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

**COM S 615(6460) Peer-to-Peer Systems**

Spring. 4 credits. Recommended: COM S 614.

**COM S 619(6450) Advanced Computer Networks**

Fall. 4 credits. Prerequisites: COM S 419 or permission of instructor.

**COM S 621(6210) Matrix Computations**

Fall. 4 credits. Prerequisites: MATH 411 and 431 or permission of instructor.

**COM S 622(6220) Numerical Optimization and Nonlinear Algebraic Equations**

Spring. 4 credits. Prerequisite: COM S 621.

**[COM S 624(6240) Numerical Solution of Differential Equations]**

Spring. 4 credits. Prerequisites: exposure to numerical analysis (e.g., COM S 421 or 621), differential equations, and knowledge of MATLAB. Offered even-numbered years; next offered 2007-2008.]

**COM S 626(6510) Computational Molecular Biology**

Spring. 4 credits. Prerequisites: familiarity with linear programming, numerical solutions of ordinary differential equations, and nonlinear optimization methods.

**COM S 628(6522) Biological Sequence Analysis**

Fall. 4 credits. Prerequisites: none.

**COM S 630(6300) Human Language Technology (also INFO 630[6300])**

Spring. 4 credits. Prerequisite: basic knowledge of linear algebra and probability theory; basic programming skills.

**COM S 632(6320) Database Systems**

Spring. 4 credits. Prerequisite: COM S 432/433 or permission of instructor.

**COM S 633(6322) Advanced Database Systems**

Spring. 4 credits.

**[COM S 664(6670) Machine Vision]**

Fall. 4 credits. Prerequisites: undergraduate-level understanding of algorithms and MATH 221 or equivalent.]

**COM S 665(6620) Advanced Interactive Graphics**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, probability and statistics, vector calculus, and programming.

**[COM S 667(6630) Physically Based Rendering]**

Fall or spring. 4 credits. Prerequisites: COM S 465 and 467 or equivalent and undergraduate-level understanding of algorithms, programming, and vector calculus.]

**COM S 671(6762) Introduction to Automated Reasoning**

Fall or spring. 4 credits. Prerequisite: COM S 611 and graduate standing or permission of instructor. Not offered every year.

**COM S 672(6700) Advanced Artificial Intelligence**

Spring. 4 credits. Prerequisite: COM S 472 or permission of instructor.

**[COM S 673(6724) Integration of Artificial Intelligence and Operations Research (also CIS 673[6724])]**

Spring. 3 credits.]

**COM S 674(6740) Natural Language Processing**

Spring. 3 credits. Prerequisite: COM S 472 or permission of instructor. COM S 474 is *not* a prerequisite.

**[COM S 676(6764) Reasoning about Knowledge]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.]

**[COM S 677(6766) Reasoning about Uncertainty]**

Fall. 4 credits. Prerequisites: mathematical maturity and acquaintance with propositional logic.]

**COM S 678(6780) Advanced Topics in Machine Learning**

Spring. 4 credits. Prerequisites: COM S 478 or equivalent, or COM S 578 or equivalent, or permission of instructor. Not offered every year.

**COM S 681(6820) Analysis of Algorithms**

Fall. 4 credits. Prerequisite: COM S 482 or graduate standing.

**[COM S 682(6810) Theory of Computing]**

Spring. 4 credits. Prerequisite: COM S 381 or 481 and COM S 482 or 681 or permission of instructor. Not offered every year; next offered 2007-2008.]

**COM S 683(6822) Advanced Design and Analysis of Algorithms**

Spring. 4 credits. Prerequisite: COM S 681 or permission of instructor.

**[COM S 684(6840) Algorithmic Game Theory]**

Fall or spring. 4 credits. Prerequisite: background in algorithms and graphs at level of COM S 482. No prior knowledge of game theory or economics assumed.]

**[COM S 685(6850) The Structure of Information Networks (also INFO 685(6850))**

Fall or spring. 4 credits. Prerequisite: COM S 482.]

**COM S 686(6860) Logics of Programs**

Spring. 4 credits. Prerequisites: COM S 481, 682, and MATH 481 or MATH/COM S 486.

**COM S 709(7090) Computer Science Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in computer science. S-U grades only.

**COM S 711(7191) Seminar in Advanced Programming Languages**

Fall or spring. 3 credits.

**COM S 713(7491) Seminar in Systems and Methodology**

Fall, spring. 4 credits. Prerequisites: graduate course employing formal reasoning (e.g., COM S 611, 613, 671), a logic course, or permission of instructor. Not offered every year.

**COM S 714(7410) Topics in Systems**

Fall or spring. 3 credits. Prerequisite: permission of instructor.

**COM S 715(7192) Seminar in Programming Refinement Logics**

Fall, spring. 4 credits. Prerequisite: permission of instructor.

**COM S 717(7430) Topics in Parallel Architectures**

Fall. 4 credits. Prerequisite: COM S 612 or permission of instructor. Not offered every year.

**COM S 718(7690) Computer Graphics Seminar**

Fall, spring. 3 credits.

**COM S 719(7190) Seminar in Programming Languages**

Fall, spring. 4 credits. Prerequisite: COM S 611 or permission of instructor. S-U grades only.

**COM S 721(7210) Topics in Numerical Analysis**

Fall, spring. 4 credits. Prerequisite: COM S 621 or 622 or permission of instructor. Not offered every year.

**COM S 726(7590) Problems and Perspectives in Computational Molecular Biology**

Fall, spring. 1 credit. Open to all from life sciences, computational sciences, and physical sciences. S-U grades only.

**COM S 732(7320) Topics in Database Systems**

Fall, spring. 4 credits. S-U grades only.

**COM S 733(7390) Database Seminar**

Spring. 1 credit. Prerequisite: COM S 633 or permission of instructor. S-U grades only.

**COM S 750(7726) Evolutionary Computation and Design Automation (also CIS 750[7726], M&AE 650[6500])**

Fall. 4 credits. Prerequisite: programming experience or permission of instructor.

**COM S 754(7490) Systems Research Seminar**

Fall, spring. 1 credit. S-U grades only.

**COM S 764(7670) Visual Object Recognition**

Spring. 3 credits. Prerequisite: none.

**COM S 772(7790) Seminar in Artificial Intelligence**

Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 775(7794) Seminar in Natural Language Understanding**

Fall, spring. 2 credits.

**COM S 785(7850) Seminar on Information Networks**

Fall. 4 credits. Prerequisites: COM S 485 or 685 or permission of instructor.

**COM S 786(7860) Introduction to Kleene Algebra**

Spring. 4 credits. Prerequisites: COM S 481. Recommended: COM S 482 or 681, COM S 682, elementary logic (MATH 481 or 681), algebra (MATH 432).

**COM S 789(7890) Seminar in Theory of Algorithms and Computing**

Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

**COM S 790(7999) Independent Research**

Fall, spring. Prerequisite: permission of a Computer Science advisor. Independent research for master of engineering project.

**COM S 990(9999) Thesis Research**

Fall, spring. Prerequisite: permission of a Computer Science advisor. S-U grades only.

Doctoral research.

## COMPUTING IN THE ARTS UNDERGRADUATE CONCENTRATION

The computer plays a role in almost every aspect of human life, and its influence and potential now extend routinely not only to technical and commercial pursuits but also into the realms of the imaginative and the aesthetic. The Computing in the Arts concentration offers students opportunities to use computers to realize works of art, to study the perception of artistic phenomena, and to think about new, computer-influenced paradigms and metaphors for the experiences of making and appreciating art. Faculty from several departments in the college offer courses toward the concentration, drawing on disciplines in the arts, the social sciences, the humanities, and the physical sciences. Currently, the concentration is offered in five tracks: computer science, dance and film, music, and psychology, each described in more detail below. Students may concentrate in the same area as their major, or in a different area.

It is likely that additional tracks in other disciplines will be added to the concentration, indeed possible that this will have occurred after the publication deadline for this year's Courses of Study but in time to take effect in the 2006-2007 academic year. The director and area representatives listed below will always have the latest information.

### Director

Graeme Bailey

## Applying for the Concentration and Choosing Courses

Students should meet with the track representative in their chosen discipline for initial advising about the concentration. For 2006-2007, these representatives are Graeme Bailey (computer science track), Kevin Ernste (music track), Allen Fogelsanger (dance track), Marilyn Rivchin (film track), and Carol Krumhansl (psychology track).

Regardless of which track they choose, all students in the concentration are required to take the core course, Computing in the Arts (COM S 165, cross-listed as ART 175, CIS 165, ENGRI 165, MUSIC 165, and PSYCH 165). This course combines fundamental background in cognitive modeling, statistics, programming, and algorithmic thinking, as preparation for more specialized work; hence, though it is not a formal prerequisite to other courses, it should be taken as early as possible in the student's program. For students who have already gained an equivalent background through other courses, however, it may be waived by permission of the director.

In addition to the core course, each student chooses another five courses satisfying the following requirements:

1. At least one must entail a significant computing component, regardless of its home department (marked \* in the lists below).
2. At least two must entail a significant artistic component (marked † in the lists below).
3. For students majoring in a field offering a track, none of the courses from that track may be double-counted as also satisfying major requirements.

The goal is to encourage the development of reasonable depth within one area, without neglecting the interdisciplinary nature of the field. Hence, rather than choosing courses at random from the lists below or focusing too narrowly on one particular corner of the field, each student should work actively with an advisor from his or her concentration in building an appropriate program.

### Course Lists

**Computer Science track.** In addition to the core course, COM S 165, any five of the following. Note that some of these courses have COM S prerequisites.

†ART 170, Visual Imaging in the Electronic Age (also CIS 167, COM S 167, ENGRI 167)

\*†CIS 300, Introduction to Computer Game Design

\*COM S 211, Computers and Programming + 212, Java Practicum (together these count as one course)

\*COM S 465, Computer Graphics I

\*COM S 467, Computer Graphics II + 468, Computer Graphics Practicum (together these count as one course)

\*COM S 472, Foundations of Artificial Intelligence

\*COM S 474, Introduction to Natural Language Processing

\*COM S 478, Machine Learning

\*COM S 565, Computer Animation

\*COM S 566, Advanced Computer Animation

\*COM S 578, Empirical Methods in Machine Learning and Data Mining

\*INFO 345, Human-Computer Interaction Design

\*INFO 440, Advanced Human-Computer Interaction Design

INFO 450, Language and Technology

Up to two courses from another track.

**Dance track.** In addition to the core course, DANCE 165 (for description, see COM S 165), any five of the following. Note that some of these courses have DANCE pre-and/or co-requisites. Note also that for this track, two courses marked \* should be taken, and they should not be I and II of any one series for the purposes of satisfying the \* requirement.

†DANCE 210/VISST 211 Beginning Dance Composition

†DANCE 235/VISST 235 Hip-Hop, Hollywood, and Home Movies

†\*DANCE 258/VISST 258 Techno Soma Kinesics I

†DANCE 310 Intermediate Dance Composition I

†DANCE 311 Intermediate Dance Composition II

†\*DANCE 358/VISST 358 Techno Soma Kinesics II

†DANCE 362/THETR 362/VISST 362 Lighting Design Studio I

\*DANCE 368/MUSIC 355/THETR 368 Sound Design and Digital Audio

\*DANCE 369/MUSIC 356/THETR 369 Digital Performance

†DANCE 391/MUSIC 391 Media Arts Studio

†DANCE 410 Advanced Dance Composition I

†DANCE 411 Advanced Dance Composition II

†DANCE 462/THETR 462/VISST 462 Lighting Design Studio II

†\*MUSIC 320 Scoring the Moving Image

†PSYCH 305/VISST 305 Visual Perception

\*THETR 365 Automated Lighting and Control Systems

Up to two courses from another track

**Film track.** In addition to the core course, CIS 165, any five of the following. Note that some of these courses have FILM pre-and/or co-requisites.

†ART 170 Visual Imaging in the Electronic Age

†ART 272 Digital Video and Sound

†FILM 377 Introduction to 16mm and Digital Filmmaking

FILM 325 Animation: History and Practice

†FILM 391 Media Arts Studio

\*THETR 368 Sound Design and Digital Audio

†\*THETR 369 Digital Performance

\*ART 273/COM S 565 Computer Animation

\*COM S 566 Advanced Computer Animation

†FILM 422 Cinematography

†FILM 477 Intermediate Film and Video Projects: Documentary and Experimental Workshop

†FILM 493 Advanced Film and Video Projects

Up to two courses from another track

**Music track.** In addition to the core course, MUSIC 165, any five of the following. Note that some of these courses have MUSIC prerequisites.

\*†CIS 300 Introduction to Computer Game Design

†\*MUSIC 120 Introduction to Digital Music

†\*MUSIC 220 Computers in Music Performance

†\*MUSIC 320 Scoring the Moving Image

\*MUSIC 355/THETR 368 Sound Design and Digital Audio

\*†MUSIC 356/THETR 369 Digital Performance

†MUSIC 361/362/363 Jazz Improvisation (any two of these 2-credit courses)

†MUSIC 451 Counterpoint

†MUSIC 453 Composition in Recent Styles

†MUSIC 454 Composition

†MUSIC 457 20th-Century Musical Languages

PHYS/MUSIC 204 Physics of Musical Sound

Up to two courses from another track.

**Psychology track.** In addition to the core course, PSYCH 165, any five of the following. Note that some of these courses have PSYCH prerequisites.

†ART 170, Visual Imaging in the Electronic Age (also CIS/COM S/ENGRI 167)

\*COM S 465 Computer Graphics I

\*COM S 467 Computer Graphics II + 468, Computer Graphics Practicum (together these count as one course)

\*INFO 214/PSYCH 214 Cognitive Psychology

†\*MUSIC 120 Introduction to Digital Music

PSYCH 205 Perception

†PSYCH 305 Visual Perception

PSYCH 316 Auditory Perception

\*PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display

†PSYCH 418/MUSIC 418 Psychology of Music

Up to two courses from another track.

## CZECH

See "Department of Russian."

## DANCE

See "Department of Theatre, Film, and Dance."

## DUTCH

See "Department of German Studies."

## EARTH AND ATMOSPHERIC SCIENCES

T. E. Jordan, chair; S. J. Colucci, co-chair (CALS); director of undergraduate studies, B. L. Isacks; R. W. Allmendinger, W. D. Allmon, C. Andronicos, M. Barazangi, L. D. Brown, L. M. Cathles, J. L. Cisne, K. H. Cook, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, M. Goman, C. H. Greene, D. L. Hysell, R. W. Kay, S. Mahlburg Kay, M. C. Kelley, B. Monger, A. Moore, A. J. Pershing, J. Phipps Morgan, M. Pritchard, S. J. Riha, W. M. White, D. S. Wilks, M. W. Wysocki

The Department of Earth and Atmospheric Sciences covers the breadth of modern earth

sciences. We live on a planet with finite resources and a finite capacity to recover quickly from human-induced environmental stresses. It is a naturally powerful planet, with geologic hazards such as earthquakes and volcanic eruptions that alter the course of history with little prior warning. As the human population grows, understanding the earth and its resources becomes progressively more important to both future policymakers and ordinary citizens, who must find new energy sources and sustain the quality of our environment.

During the past several decades, with the increasing concern about air and water pollution, nuclear waste disposal, the destruction of the ozone layer, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The department has been the home of two majors in the College of Arts and Sciences: geological sciences and science of earth systems (SES). The geological sciences major emphasized the solid earth and its history, while the science of earth systems major emphasized study of the interactions among rock, water, air, and life in our planet's operation. The SES major grew out of recognition of the fundamental interconnectedness of the components of the earth system, and the importance of understanding both the system's operation at present and in the geological past. The SES major reflects the new strategy of modern earth science. Thus, starting in Fall 2006, the geological sciences major will become a concentration within the SES major. The geology concentration within SES provides an equivalent to the geological sciences major, but with an increased breadth. Other concentrations include atmospheric sciences, ocean sciences, and biogeochemistry. The SES major will be the only major offered by the department for students graduating in 2009 or later.

The SES major prepares students for a number of career paths in basic or applied sciences of our planet. The major can lead to graduate study and research in geology, geophysics, geochemistry, biogeochemistry, atmospheric sciences, ocean sciences, hydrology, or environmental science and engineering. Career opportunities with university research groups, governmental agencies or the private sector deal with energy, mineral and water resources; natural hazards; weather and climate forecasting; ocean resources; and a host of environmental issues. The major can also prepare students for careers in environmental management and policy, law or medicine, science journalism, and K-12 science teaching.

### Requirements for the Science of Earth Systems major

1. The science of earth systems curriculum includes strong preparation in mathematics, physics, chemistry and biology, including the following:

MATH 111-112 (or MATH 191-192);

Two semesters of chemistry: CHEM 207-208 or CHEM 211-257;

PHYS 207–208 or 112–213;

BIO G 109–110, 101/103–102/104 or 105–106 (a second semester of biology can be replaced by CHEM 257 if CHEM 207–208 is selected; or replaced by a third semester of mathematics).

- The required introductory course in earth science, EAS 220, The Earth System.

- The core courses emphasize the interconnectedness of the earth system, and are founded on the most modern views of the planet as an interactive and ever-changing system. Each crosses the traditional boundaries of disciplinary science. Three courses selected from the following four core courses are required for the major.

EAS 301 Evolution of the Earth System

EAS 303 Biogeochemistry

EAS 304 Interior of the Earth

EAS 305 Climate Dynamics

- The concentration is achieved by four intermediate to advanced-level courses (300 level and up) that build on the core courses and have prerequisites in the required basic sciences and mathematics courses. Note that additional basic math and science course may be required to complete the concentration courses, depending upon the student's choice of concentration. The concentration courses build depth and provide the student with a specific expertise in some facet of Earth system science. Four concentrations are defined for the major: geological sciences, biogeochemistry, atmospheric sciences, and ocean sciences. Other concentrations can be tailored to a student's interests in concert with the student's advisor and approval of the curriculum committee. The concentration should be chosen during the junior year or before in consultation with the student's advisor and the approval of the Director of Undergraduate Studies.
- Exposure to the basic observations of earth science, whether directly in the field, or indirectly by various techniques of remote sensing, or in the laboratory, is necessary to understand fully the chosen area of concentration in the major. Means of satisfying this requirement generally include 3 credits of course work. Possibilities for fulfilling the field/observation requirement include the following:

courses in the Hawaii Environmental Semester program;

courses given by the Shoals Marine Laboratory;

EAS 250 Meteorological Observations and Instruments;

EAS 352 Synoptic Meteorology I;

EAS 417 Field Mapping in Argentina;

EAS 491 and/or 492 Undergraduate Research, with appropriate choice of project;

Field courses taught by another college or university (3-credit minimum).

Sciences, bli1@cornell.edu, and visit the web site: [www.eas.cornell.edu](http://www.eas.cornell.edu).

**Honors.** An honors program is offered by the Department of Earth and Atmospheric Sciences for superior students. Candidates for honors must maintain an overall 3.0 GPA, a cumulative average of 3.5 in the major, and complete and honors thesis (EAS 491 or 492). Students interested in applying should contact the director of undergraduate studies during the second semester of the junior year.

## Courses

### EAS 101(1101) Introductory Geological Sciences (To Know Earth) (PBS)

Fall. 3 credits. Staff.

Designed to enhance an appreciation of the physical world. Emphasizes natural environments, surface temperatures, and dynamic processes such as mountain belts, volcanoes, earthquakes, glaciers, and river systems. Interactions of the atmosphere, hydrosphere, biosphere, and lithosphere (earth system science). Water, mineral, and fuel resources; environmental concerns. Field trips in the Ithaca region.

### EAS 102(1102) Evolution of the Earth and Life (also BIO G 170[1700]) (PBS)

Spring. 3 credits. J. L. Cisne.

Earth systems and their evolution: Earth history's astronomical context; plate tectonics, continental drift, and their implications for climate and life; co-evolution of life and the atmosphere; precedents for ongoing global change; dinosaurs, mass extinctions, and human ancestry. Includes laboratories on reconstructing geological history and mapping ancient geography. Fossil collecting on field trips.

### EAS 108(1108) Earth in the News (PBS)

Summer. 3 credits. S. L. Losh.

Provides an introduction to physical geology and earth systems science and explores the scientific basis for informed decision making regarding many timely environmental issues, including global warming; water pollution and use; geologic hazards such as floods, earthquakes, and volcanoes; fossil fuel distribution and use; and land use. A field trip is taken in the Ithaca area.

### EAS 109(1109) Dinosaurs

Fall. 1 credit. J. L. Cisne.

An introductory survey course for anyone interested in dinosaurs. Lectures examine the fossil evidence and illustrate how various geological and biological disciplines contribute to understanding dinosaurs and their world.

### EAS 121(1121) Introduction to MATLAB (also CIS 121[1121])

Fall, spring, 8-week course. 2 credits.

Prerequisites: MATH 111, 191, or equivalent. D. Fan.

For description, see CIS 121.

### EAS 122(1220) Earthquake! (also ENGR 122[1120]) (PBS)

Spring. 3 credits. Staff.

Explores the science of natural hazards and strategic resources. Techniques for locating and characterizing earthquakes and assessing the damage they cause; methods of using sound waves to image the earth's interior to search for strategic minerals; the historical importance of such resources. Seismic experiments on campus to probe for

groundwater, the new critical environmental resource.

### EAS 131(1310) Basic Principles of Meteorology (PBS)

Fall. 3 credits. M. W. Wysocki.

Simplified treatment of the structure of the atmosphere: heat balance of the Earth; general and secondary circulations; air masses, fronts, and cyclones; and hurricanes, thunderstorms, tornadoes, and atmospheric condensation. In the laboratory, emphasis is on techniques of analysis of weather systems. The optional 1-credit laboratory for this course is offered as EAS 133.

### EAS 133(1330) Basic Meteorology Lab

Fall. 1 credit. Requirement for atmospheric science majors; optional for other students taking EAS 131. Corequisite: EAS 131.

M. W. Wysocki.

Laboratory course covering topics presented in EAS 131. This course is required for atmospheric science majors, but is optional for other students taking EAS 131.

### EAS 150(1500) Fortran Applications in Earth Science (also CIS 112[1122])

Spring, seven-week course. 2 credits.

Prerequisite: CIS/EAS 121 or equivalent.

Letter grades only. A. J. Pershing.

Emphasizes the application of scientific computing in the Earth sciences, including data processing and modeling of the Earth, its atmosphere, and oceans. Extends the procedural programming concepts developed in CIS/EAS 121 and considers their implementation in high-performance, compiled languages. Topics include the structure and syntax of a FORTRAN program, data input/output, compilation, and debugging.

### EAS 154(1540) Introductory Oceanography, Lecture (also BIOEE 154[1540]) (PBS)

Fall, summer. 3 credits. Fall: B. C. Monger and C. H. Greene; summer: B. C. Monger.

Intended for both science and nonscience majors. Covers the basic workings of the ocean including its physics, chemistry, and biology. Following this basic description, the course examines threats to the health of the ocean and the important role the ocean plays in global climate change. Non-science majors should pay particular attention to this course to fulfill a science requirement, because they learn broadly how the earth works (physically, chemically and biologically) in just a single class.

### EAS 155(1550) Introductory Oceanography, Laboratory (also BIOEE 155[1550])

Fall. 1 credit. Corequisite: EAS 154.

B. C. Monger and C. H. Greene.

Laboratory course covering topics presented in EAS/BIOEE 154.

### EAS 201(2010) Introduction to the Physics and Chemistry of the Earth (also ENGRD 201[2010]) (PBS)

Fall. 3 credits. Prerequisites: PHYS 112 or 207. J. Phipps Morgan.

Topics include formation of the solar system; accretion and evolution of the earth; the rock cycle: radioactive isotopes and the geological time scale, plate tectonics, rock and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, and contaminant transport; and the weathering cycle: chemical cycles, CO<sub>2</sub> (weathering), rock cycle, controls on



global temperature (CO<sub>2</sub> or ocean currents), oil, and mineral resources.

**EAS 213(2130) Marine and Coastal Geology (PBS)**

Summer. 4 credits. Prerequisite: introductory geology or ecology or permission of instructor. Staff.

A special two-week course offered at Cornell's Shoals Marine Laboratory (SML), located on an island near Portsmouth, N.H. For more details and an application, contact SML office, G14 Stimson Hall. Estimated cost for 2005 (including tuition, room, board, and ferry transportation): \$2,120.

**EAS 220(2200) The Earth System (PBS)**

Spring. 4 credits. Letter grades only. Staff. Integrated introduction to the earth system stressing the biological, chemical, geological, and physical interactions among the atmosphere, ocean, and solid earth. Topics include biogeochemical cycles, climate dynamics, and the evolution of the atmosphere, biosphere, cryosphere (ice), hydrosphere (oceans and inland waters), and lithosphere (solid earth).

**EAS 222(2220) Seminar—Hawaii's Environment**

Fall. 1 credit. S-U grades only. A. Moore and C. H. Greene.

For students interested in the unique environmental systems of the Hawaiian Islands. Designed to bring together students returning from field studies in Hawaii with students interested in going there to study. Through reading and discussion students explore the geology, biology, ocean, atmosphere, and culture of the Hawaiian environment.

**EAS 240(2400) Field Study of the Earth System (PBS)**

Spring. 5 credits. Prerequisites: enrollment in Earth and Environmental Sciences Semester in Hawaii; one semester of calculus (MATH 191/192/193 or 111/112), and two semesters of any of the following: PHYS 207/208 or 112/213; CHEM 207/208; BIO 101/103-102/104 or 105/106 or 109/110; or equivalent course work. A. Moore.

Interdisciplinary field course covering fundamental concepts of the Earth system. Topics include global circulation patterns in the solid Earth, atmosphere, and ocean; energy and mass transfer; change and variability of Earth, atmosphere, and ocean systems; and the temporal record of change preserved in the geologic record; and Earth, oceanic, and atmospheric controls on ecosystem processes. The course is project-based with students engaged in hands-on, active learning that takes advantage of local resources.

**EAS 250(2500) Meteorological Observations and Instruments**

Fall. 4 credits. Prerequisite: EAS 131. M. W. Wysocki and B. Monger.

Methods and principles of meteorological measurements and observations including surface, free-air, and remote systems. Topics include instrument siting, mounting, and protection; instrument response characteristics, calibration, and standardization; and recorders and data logging systems. Includes laboratory exercises in observation and data analysis. Intended to serve as preparation for Observers Examination.

**EAS 268(2680) Climate and Global Warming (PBS)**

Spring. 3 credits. Prerequisite: basic college math. S-U grades optional. A. T. DeGaetano.

Students from a range of disciplines become familiarized with such contemporary issues in climatology as global warming and El Niño. Introductions to the natural greenhouse effect, past climates, observed and projected climate changes and impacts. Also natural climate variations and their consequences and predictability. Weekly student-led discussions of issues appearing in journals such as *Nature*.

**EAS 296(2960) Forecast Competition**

Fall and spring. 1 credit; may be repeated for credit. Students enroll for two consecutive semesters; credit awarded after second semester. Prerequisite: sophomore standing in atmospheric science or permission of instructor. S-U grades only. D. S. Wilks.

Two-semester course providing daily exercise in probabilistic weather forecasting, in which students compete to forecast local weather most skillfully.

**EAS 301(3010) Evolution of the Earth System (PBS)**

Fall. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent. Four Saturday field trips. T. E. Jordan, S. Riha, and W. D. Allmon.

Covers the co-evolution of life and the earth system: Earth's early history; plate tectonics, continental drift, and climate changes during the past billion years; mountain building, ice ages, and our own emergence during the past 10 million years. Serves as an introduction to methods of interpreting information preserved in the rock record.

**EAS 303(3030) Introduction to Biogeochemistry (also NTRES 321[3210]) (PBS)**

Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, plus a course in biology and/or geology. L. A. Derry.

Control and function of the Earth's global biogeochemical cycles. Begins with a review of the basic inorganic and organic chemistry of biologically significant elements, and then considers the biogeochemical cycling of carbon, nutrients, and metals that take place in soil, sediments, rivers, and the oceans. Topics include weathering, acid-base chemistry, biological redox processes, nutrient cycling, trace gas fluxes, bio-active metals, the use of isotopic tracers, controls on atmospheric carbon dioxide, and mathematical models. Interactions between global biogeochemical cycles and other components of the Earth system are discussed.

**EAS 304(3040) Interior of the Earth (PBS)**

Spring. 3 credits. C. Andronikos.

This class will investigate the geology of the solid earth with emphasis on igneous and metamorphic petrology, structure of the continents and ocean basins, and large scale tectonics. Interaction between deformation, melt generation and metamorphism will be examined as mechanisms by which the crust is differentiated from the underlying mantle. Geophysical and geochemical techniques for probing the deep interior of the earth will be investigated. Plate tectonics will be used as a unifying theme to understand processes operating in the solid earth.

**EAS 305(3050) Climate Dynamics (also ASTRO 331[3311]) (PBS)**

Fall. 3 credits. Prerequisites: two semesters of calculus and one of physics. K. H. Cook. Processes that determine climate and contribute to its change are discussed, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Contemporary climate change issues are investigated and discussed in the context of natural variability of the system.

**EAS 315(3150) Geomorphology (PBS)**

Fall. 3 credits. Prerequisite: 3-credit EAS course. B. L. Isacks.

A study of the processes that sculpt the Earth's terrestrial landscapes. Landforms constructed by Earth's internal processes are the point of departure as students examine their modification by physical interaction with the atmosphere. Laboratory exercises include both field examination of landforms of the Finger Lakes area and computer analysis of satellite images and digital elevation models of examples from around the globe. Includes two Saturday field trips.

**EAS 322(3220) Biogeochemistry of the Hawaiian Islands (PBS)**

Spring. 4 credits. Prerequisites: enrollment in Earth and Environmental Sciences Semester in Hawaii; EAS 220, EAS 303, or permission of instructor. L. Derry.

Field-oriented study of biogeochemical processes and ecosystem interactions across the Hawaiian islands. Field, class, and laboratory work focus on how landscape age and climate strongly control biogeochemical cycling and ecosystem development in Hawaii. Other topics include succession of ecosystems, evolution of nutrient cycles, and impacts of invasive species. The class is structured around field projects, carried out both in groups and individually.

**[EAS 326(3260) Structural Geology (PBS)]**

Spring. 4 credits. Prerequisite: one semester of calculus, plus introductory geology course or permission of instructor. One weekend field trip. Alternate years; next offered 2007-2008. R. W. Allmendinger.]

**[EAS 334(3340) Microclimatology (PBS)]**

Spring. 3 credits. Prerequisite: physics course. Offered alternate years; next offered 2007-2008. D. S. Wilks.]

**EAS 341(3410) Atmospheric Thermodynamics and Hydrostatics (PBS)**

Fall. 3 credits. Prerequisites: one year of calculus and one semester of physics. A. T. DeGaetano.

Introduction to the thermodynamics and hydrostatics of the atmosphere and to the methods of description and quantitative analysis used in meteorology. Topics include thermodynamic processes of dry air, water vapor, and moist air and concepts of hydrostatics and stability.

**EAS 342(3420) Atmospheric Dynamics (also ASTRO 342[3420]) (PBS)**

Spring. 3 credits. Prerequisites: MATH 192, 213, or equivalent; one year of physics. K. H. Cook.

Introduction to the basic equations and techniques used to understand motion in the atmosphere, with an emphasis on the space and time scales typical of storm systems (the synoptic scale). The governing equations of atmospheric flow are derived from first principles and applied to middle latitude and tropical meteorology. Topics include balanced

flow, atmospheric waves, circulation, and vorticity. Text used is *An Introduction to Dynamic Meteorology* by Holton.

**EAS 350(3500) Dynamics of Marine Ecosystems (also BIOEE 350[3500]) (PBS)**

Fall. 3 credits. Prerequisites: one year of calculus and a semester of oceanography (i.e., EAS 154), or permission of instructor. Offered alternate years; next offered 2007–2008. C. H. Greene and R. W. Howarth.]

**EAS 351(3510) Marine Ecosystems Field Course (also BIOEE 351[3510]) (PBS)**

Spring. 4 credits. Prerequisites: EAS 240; enrollment in Earth and Environmental Sciences Semester in Hawaii. Recommended: oceanography course. C. H. Greene, B. Monger, and C. D. Harvell.

Covers the interactions of physical and biological processes in marine ecosystems. Starts by looking at these processes on ocean-basin to regional scales and works down to the smaller scales relevant to individual organisms. Students are introduced to modern techniques of marine-ecosystems research, including remote sensing, oceanographic-survey methods, and experimental marine ecology. This course is field and laboratory intensive with students engaged in hands-on, active learning that takes advantage of local resources.

**EAS 352(3520) Synoptic Meteorology (PBS)**

Spring. 3 credits. Prerequisite: EAS 341. Corequisite: EAS 342. M. W. Wysocki.

Weather map analysis and forecasting techniques are studied by applying the principles of fluid and heat flow. This course strengthens previously introduced meteorological concepts which are applied to forecasting midlatitude synoptic scale weather systems, such as cyclones, anticyclones, jet streams, fronts, and waves.

**EAS 353(3530) Physical Oceanography (PBS)**

Fall. 3 credits. Prerequisites: MATH 112 or 192, or one year of physics, or permission of instructor. B. C. Monger.

The course covers thermohaline and wind-driven circulation and surface-ocean boundary-layer dynamics. Mathematical expressions for describing conservation of momentum, mass, and heat in a fluid are used to explain the ocean's responses to wind and buoyancy forcing, but the course will emphasize the basic physical principles at play, and not just the mathematical results. Student presentations of recent research papers will elaborate principles learned in the course.

**EAS 355(3550) Mineralogy (PBS)**

Fall. 4 credits. Prerequisites: EAS 101, 201, or 220 and CHEM 207 or 211 or permission of instructor. S. Mahlburg Kay.

Covers chemical and physical properties and identification of minerals with emphasis on the rock-forming minerals that are the principal constituents of the Earth and nearby planets. Topics include internal and external crystallography, crystal chemistry, introductions to x-ray crystallography and optical mineralogy, and a systematic examination of the structures, chemistry, and occurrence of the rock-forming minerals. Independent project includes use of electron microprobe (EPMA) and x-ray facilities.

**EAS 356(3560) Petrology and Geochemistry (PBS)**

Spring. 4 credits. Prerequisite: EAS 355. R. W. Kay.

Principles of phase equilibrium as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. The petrological evolution of the planets.

**EAS 388(3880) Geophysics and Geotectonics (PBS)**

Spring. 3 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. Offered alternate years; next offered 2007–2008. M. Pritchard.]

**EAS 401(4010) Fundamentals of Energy and Mineral Resources (PBS)**

Spring. 3 credits. Next offered 2007–2008. L. Cathles.]

**EAS 404(4040) Geodynamics**

Spring. 3 credits. Prerequisite: calculus and calculus-based physics or permission of instructor. J. Phipps Morgan.

Quantitative study of the deformation, heat transport, and melting processes that have shaped the evolution of the solid Earth. Familiar physical and chemical principles and concepts are applied to the study of plate tectonics, fluid dynamics, mantle convection, melting, and mountain building.

**EAS 405(4050) Active Tectonics (PBS)**

Spring. 3 credits. Recommended: mechanical background equivalent to EAS 326/388. S-U grades optional. Offered alternate years. M. Pritchard.

The class develops the ideas and methods necessary to understand how the Earth deforms—from individual earthquakes to the construction of mountain ranges. We discuss the driving forces of deformation, and how these forces interact with different geologic materials to cause deformation.

**EAS 417(4170) Field Mapping in Argentina (PBS)**

Summer. 3 credits. Prerequisite: introductory EAS course and EAS 326. S. Mahlburg Kay.

Field mapping course in Argentina that fulfills field requirement for majors with interests in Geological Sciences and provides a field geological experience for others. Course consists of lectures in Buenos Aires followed by field exercises in the Sierras Pampeanas, Precordillera, and Main Cordillera Ranges of the Argentine Andes in the provinces of San Juan and Mendoza. A variety of exercises use modern techniques in the field mapping of a broad range of variably deformed sedimentary, metamorphic and igneous rocks. The course further provides an introduction to the tectonics and magmatic processes of the central Andes with emphasis on comparable processes in the U.S. Exercises are done in combination with students and faculty of the University of Buenos Aires.

**EAS 420(4200) The Linux Supercomputing Environment**

Fall, spring. 3 credits. Prerequisite: EAS 150 or introductory programming. M. Wysocki and V. Manakkal.

This course will address the use of computers and software for research. An understanding of basic operating concepts and computer hardware will tie into a survey of available

software packages for programming and data presentation as well as computational techniques such as parallel processing. Students will be required to formulate and conduct a project using tools of their choice and demonstrate in a report and oral presentation that is open to other students and faculty that they have used the Linux supercomputing cluster and acquired significant skills. Undergraduates may work in a team.]

**EAS 425(4250) European Discovery of Impacts and Explosive Volcanism**

Spring. 2 credits. Prerequisite: junior, senior, or graduate students with background in geology and permission of instructor. Letter grades only. Meets one day per week plus field trip during spring break. Fee probably charged for required weeklong field trip. Offered alternate years; next offered 2007–2008. J. Phipps Morgan.]

**EAS 434(4340) Reflection Seismology (PBS)**

Fall. 3 credits. Prerequisites: MATH 192 and PHYS 208, 213, or equivalent. Offered alternate years; next offered 2007–2008. L. D. Brown.

Fundamentals of subsurface imaging by multichannel seismic reflection techniques as used in oil exploration and geohydrological investigations. Covers survey design, acquisition, analysis, processing, and interpretation in both 2-D and 3-D. Includes discussion of related techniques such as seismic refraction analysis, tomographic inversion, vertical seismic profiling, shear wave exploration, and ground-penetrating radar. Lab is keyed to state-of-the-art seismic processing, modeling, and interpretation software from LandMark.]

**EAS 435(4350) Statistical Methods in Meteorology and Climatology (MQR)**

Fall. 3 credits. Prerequisites: introductory statistics course (e.g., AEM 210) and calculus. D. S. Wilks.

Covers statistical methods used in climatology, operational weather forecasting, and selected meteorological research applications; some statistical characteristics of meteorological data, including probability distributions and correlation structures; operational forecasts derived from multiple regression models, including the MOS system; and forecast evaluation techniques.

**EAS 437(4370) Geophysical Field Methods (also ARKEO 437[4370]) (PBS)**

Fall. 3 credits. Prerequisite: PHYS 213 or 208, or permission of instructor. Offered alternate years; next offered 2007–2008. L. D. Brown.]

**EAS 447(4470) Physical Meteorology (PBS)**

Fall. 3 credits. Prerequisites: one year each of calculus and physics. Offered alternate years; next offered 2007–2008. A. T. DeGaetano.]

**EAS 451(4510) Synoptic Meteorology II (PBS)**

Fall. 3 credits. Prerequisites: EAS 341 and 342. S. J. Colucci.

Structure and dynamics of large-scale, mid-latitude weather systems, such as cyclones, anticyclones, and waves, with consideration of processes that contribute to temperature changes and precipitation. Laboratory sessions involve real-time weather forecasting and the computer application of a numerical model of

the atmosphere to study selected large-scale, mid-latitude weather events.

**[EAS 453(4530) Advanced Petrology (PBS)]**

Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years; next offered 2007–2008 R. W. Kay.]

**[EAS 454(4540) Advanced Mineralogy (PBS)]**

Spring. 3 credits. Prerequisite: EAS 355 or permission of instructor. Offered alternate years. S. Mahlburg Kay.

Covers crystallography and crystal chemistry of minerals and the methods of their study. Includes X-ray diffraction, optical methods, and computer simulation of crystal structures. Emphasizes effects of high pressures and temperatures with implications for understanding the Earth's interior.

**[EAS 455(4550) Geochemistry (PBS)]**

Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years; next offered 2007–2008. W. M. White.]

**[EAS 456(4560) Mesoscale Meteorology (PBS)]**

Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Next offered 2007–2008. S. J. Colucci.]

**[EAS 457(4570) Atmospheric Air Pollution (PBS)]**

Fall. 3 credits. Prerequisites: EAS 341 or thermodynamics course, and one semester of chemistry, or permission of instructor. M. W. Wysocki.

Examines sources, effects, transports, measurement, and controls of air pollution. Discusses the basic principles in each area with an emphasis on their local, regional, and global impacts.

**[EAS 458(4580) Volcanology (PBS)]**

Fall. 3 credits. Prerequisite: EAS 356 or equivalent. Offered alternate years. R. W. Kay and W. White.

Causes of volcanism, melting in the Earth, and the origin of magmas. Physical volcanology, nature and types of volcanic eruptions and associated deposits, and eruption mechanisms. Volcanic plumbing systems, magma chamber processes, evolution of magma. Volcanism and impact phenomena in the solar system. Volcanic hazard assessment and volcano monitoring. Ore deposits associated with volcanism.

**[EAS 460(4600) Late Quaternary Paleocology (PBS)]**

Fall. 4 credits. M. Goman.

Explores topics in Late Quaternary paleocology. Broadly divided into two sections: (1) lectures that cover a variety of topics, such as philosophy of paleocology, radiometric dating methods, and paleoenvironmental proxies; (2) field and laboratory based research. The field research provides students with hands-on experience in sediment core collection while in the laboratory students learn the basics of core description, pollen, and macrofossil analysis.

**[EAS 462(4620) Marine Ecology (also BIOEE 462(4620)) (PBS)]**

Fall. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. C. D. Harvell and C. H. Greene.

For description, see BIOEE 462.

**[EAS 470(4700) Weather Forecasting and Analysis (PBS)]**

Spring. 3 credits. Prerequisites: EAS 352 and 451. TBA. M. W. Wysocki.

Applied course with an opportunity to focus on weather forecasting and analysis techniques for various regions around the world. Lectures emphasize the application of student's knowledge of atmospheric dynamics, thermodynamics, and computer-data analysis to forecast the development and movement of multiscale weather systems. Students participate in weekly forecast discussions, write daily forecasts that include a synoptic discussion, quantitative precipitation forecasts, and severe-weather outlook for the forecast region, and lead class discussion on assigned readings.

**[EAS 471(4710) Ground Water Hydrology (also BEE 471(4710)) (PBS)]**

Spring. 3 credits. Prerequisite: MATH 294 and ENGRD 202. Next offered 2007–2008. L. Cathles.]

**[EAS 475(4750) Special Topics in Oceanography]**

Fall, spring, summer. 2–6 credits, variable. Prerequisites: one semester of oceanography and permission of instructor. Fall, spring: C. H. Greene; summer: B. C. Monger.

Undergraduate instruction and participation in advanced areas of oceanographic research. Topics change from semester to semester. Contact instructor for further information.

**[EAS 476(4760) Sedimentary Basins: Tectonics and Mechanics (PBS)]**

Fall. 3 credits. Prerequisite: EAS 301 or permission of instructor. Offered alternate years; next offered 2007–2008. T. E. Jordan.]

**[EAS 478(4780) Advanced Stratigraphy (PBS)]**

Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.

Covers modern improvements on traditional methods of study of ages and of genetic relations among sedimentary rocks, emphasizing 3-D relationships. Introduces techniques and applications of sequence stratigraphy at scales ranging from beds to entire basins. Considers physical correlation, dating techniques, and time resolution in sedimentary rocks as well as physical controls on the stratigraphic record and numerical modeling.

**[EAS 479(4790) Paleobiology (also BIOEE 479(4790)) (PBS)]**

Fall. 4 credits. Prerequisites: one year of introductory biology and either BIOEE 274, 373, EAS 375, or permission of instructor. Offered alternate years. W. Allmon.

Surveys the major groups of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of Earth and atmospheric science students concerning the nature and significance of the fossil record for their respective studies.

**[EAS 481(4810) Senior Survey of Earth Systems]**

Fall, spring. 2 credits each semester. Fall, J. Cisne; spring, R. Kay.

Weekly seminar for seniors in the Science of Earth Systems major on current topics in Earth System Science. Readings, presentations and discussions will focus results from the recent literature, including how to analyze a scientific paper, and exploration of connections across

the sub-disciplines in the field. The course will serve as both a review of key concepts, and a vehicle to explore developing concepts in the field.

**[EAS 483(4830) Environmental Biophysics (also CSS 483(4830)) (PBS)]**

Spring. 3 credits. Offered alternate years; next offered 2007–2008. S. J. Riha.]

**[EAS 484(4840) Inverse Methods in the Natural Sciences (PBS)]**

Spring. 3 credits. Prerequisite: MATH 294. D. Hysell.

An exploration of solution methods for inverse problems with examples taken from geophysics and related fields, with particular attention to making inferences from inaccurate, incomplete, or inconsistent physical data. Applications include medical and seismic tomography, earthquake location, image processing, and radio/radar imaging. Linear algebra (including condition numbers) and probability and statistics (including error analysis, Bayes theorem, Gibbs distribution, and Markov chains) will be reviewed. Methods to be covered include nonlinear least-squares, maximum likelihood methods, and local and global optimization methods, including simulated annealing and genetic algorithms.

**[EAS 487(4870) Introduction to Radar Remote Sensing (also ECE 487(4870)) (PBS)]**

Fall. 3 credits. Prerequisite: PHYS 208 or 213 or equivalent. D. L. Hysell.

Covers the fundamentals of radar, antennas, and remote sensing. Students are exposed to the principles underlying the analysis and design of antennas used for communication and for radar-related applications. They also encounter both a mathematical and a practical description of how radars function, how their performance can be optimized for different applications, and how signals acquired by them can be processed. The objective is to familiarize students with a wide variety of radars rather than turn them into practicing radar engineers. Each topic is developed from basic principles so students with a wide variety of backgrounds are able to take the course. Emphasis is placed on radar applications in geophysics, meteorology and atmospheric sciences, astronomy and space sciences. Radar remote sensing of the Earth from spacecraft receives special attention.

**[EAS 491–492(4910–4920) Undergraduate Research]**

Fall, spring. 1–4 credits. Students should fill out form at 2124 Sneek Hall. Staff (B. L. Isacks, coordinator).

Introduction to the techniques and philosophy of research in the earth sciences and an opportunity for undergraduates to participate in current staff research projects. Topics chosen in consultation with, and guided by, a staff member. A short written report is required, and outstanding projects are prepared for publication.

**[EAS 494(4940) Special Topics in Atmospheric Science]**

Fall, spring. 8 credits max. Undergraduate level. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the beginning of the semester. The same course is not offered more than twice.

**EAS 496(4960) Internship Experience**

2 credits. Prerequisites: EAS 240; enrollment in Earth and Environmental Sciences Semester in Hawaii. A. Moore.

During the last three and a half weeks of the semester students carry out a service learning project with a local NGO, environmental business, government agency, research lab, or educational facility. Projects are carefully designed with the student, sponsoring agency, and faculty member. A final report is required.

**EAS 497(4790) Individual Study in Atmospheric Science**

Fall or spring. 1–6 credits. S-U grades optional. Students must register using independent study form. Staff.

Topics are arranged at the beginning of the semester for individual study or for group discussions.

**EAS 498(4980) Teaching Experience in Earth and Atmospheric Sciences**

Fall, spring. 1–4 credits. S-U grades only. Staff.

The student assists in teaching an EAS course appropriate to his or her previous training. The student meets with a discussion or laboratory section, prepares course materials, grades assignments, and regularly discusses course objectives and teaching techniques with the faculty member in charge of the course.

**EAS 499(4990) Undergraduate Research in Atmospheric Science**

Fall or spring. Credit TBA. S-U grades only. Students must register using independent study form. Staff.

Independent research on current problems in atmospheric science.

**[EAS 500(5000) Design Project in Geohydrology]**

Fall, spring; may continue over two or more semesters. 3–12 credits. Alternative to industrial project for M.Eng. students choosing geohydrology option. Next offered 2007–2008. L. M. Cathles.]

**[EAS 502(5020) Case Histories in Groundwater Analysis]**

Spring. 4 credits. Next offered 2007–2008. L. M. Cathles.]

**EAS 575(5750) Planetary Atmospheres (also ASTRO 575[6575])**

Fall. 4 credits. Offered alternate years. P. Gierasch.

For description, see ASTRO 575.

**EAS 577(5770) Planetary Surface Processes (also ASTRO 577[6577])**

Spring. 3 or 4 credits. Offered alternate years. J. Bell.

For description, see ASTRO 577.

**EAS 578(5780) Planet Formation and Evolution (also ASTRO 578[6578])**

Fall. 4 credits. Offered alternate years. J. L. Margot, M. Pritchard.

For description, see ASTRO 578.

**EAS 584(5840) Inverse Methods in the Natural Sciences**

Spring. 3 credits. Prerequisite: MATH 294. D. Hysell.

An exploration of solution methods for inverse problems with examples taken from geophysics and related fields, with particular attention to making inferences from inaccurate, incomplete, or inconsistent physical data. Applications include medical and seismic tomography, earthquake location,

image processing, and radio/radar imaging. Linear algebra (including condition numbers) and probability and statistics (including error analysis, Bayes theorem, Gibbs distribution, and Markov chains) will be reviewed. Methods to be covered include nonlinear least-squares, maximum likelihood methods, and local and global optimization methods, including simulated annealing and genetic algorithms. Students taking the course for advanced (500-level) credit will be expected to complete and present a substantial class project to be negotiated with the instructor.

**[EAS 620(6200) The Linux Supercomputing Environment]**

Fall and spring. 3 credits. Prerequisite: EAS 150 or introductory programming. M. Wysocki and V. Manakkal.

This course will address the use of computers and software for research. An understanding of basic operating concepts and computer hardware will tie into a survey of available software packages for programming and data presentation as well as computational techniques such as parallel processing. Students will be required to formulate and conduct a project using tools of their choice and demonstrate in a report and oral presentation that is open to other students and faculty that they have used the Linux supercomputing cluster and acquired significant skills. Graduate students will be expected to conduct an independent project and solve a computational problem in their domain of expertise.]

**[EAS 622(6220) Advanced Structural Geology I]**

Fall. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years; next offered 2007–2008. R. W. Allmendinger and C. Andronicos.]

**[EAS 624(6240) Advanced Structural Geology II]**

Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years; next offered 2007–2008. R. W. Allmendinger.]

**[EAS 628(6280) Geology of Orogenic Belts]**

Spring. 3 credits. Prerequisite: permission of instructor. Next offered 2007–2008. Staff.]

**EAS 641(6410) Analysis of Biogeochemical Systems**

Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. L. A. Derry.  
Covers dynamics of biogeochemical systems; kinetic treatment of biogeochemical cycles; box models, residence time, response time; analytical and numerical solutions of model systems; Eigen-analysis of linear systems; feedback and nonlinear cases, problems of uncertainties in natural systems; modeling software such as MATLAB; and applications to current research of participants or from recent literature.

**[EAS 652(6520) Advanced Atmospheric Dynamics (also ASTRO 652[7652])]**

Spring. 3 credits. Prerequisites: EAS 341 and 342 or equivalent. Offered alternate years; next offered 2007–2008. S. J. Colucci.]

**[EAS 656(6560) Isotope Geochemistry]**

Fall. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.]

Nucleosynthetic processes and the isotopic abundance of the elements; geochronology and cosmochronology using radioactive decay schemes, including U-Pb, Rb-Sr, Sm-Nd, K-Ar, U-series isotopes, and cosmogenic isotopes such as  $^{14}\text{C}$  and  $^{36}\text{Cl}$ . Use of radiogenic and stable isotopes in petrology and their application to study of the evolution of the crust and mantle. Isotopic evidence regarding the formation of the Earth and the solar system. Stable isotopes and their use in geothermometry, ore petrogenesis, paleontology, and the global climate system.

**[EAS 666(6660) Applied Multivariate Statistics]**

Spring. 3 credits. Prerequisites: multivariate calculus, matrix algebra, and two statistics courses. Offered alternate years; next offered 2007–2008. D. S. Wilks.]

**[EAS 675(6750) Modeling the Soil-Plant-Atmosphere System (also CSS 675[6750])]**

Spring. 3 credits. Prerequisite: EAS/CSS 483 or equivalent. Next offered 2008–2009. S. J. Riha.]

**EAS 692(6920) Special Topics in Atmospheric Science**

Fall or spring. 1–6 credits. S-U grades optional. Staff.

Study of topics in atmospheric science that are more specialized or different from other courses. Special topics covered depend on staff and student interests.

**EAS 693(6930) Special Topics in Geological Sciences**

Fall or spring. 1–3 credits, variable. S-U grades optional. Staff.

Study of specialized advanced topics in the Earth sciences through readings from the scientific literature, seminars, and discussions.

**EAS 700–799(7000–7990) Seminars and Special Work**

Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.

Advanced work on original investigations in earth and atmospheric sciences. Topics change from semester to semester. Students should contact appropriate professor for more information.

**EAS 701–702(7010–7020) Thesis Research**

701, fall; 702, spring. 1–15 credits, variable. Staff.

**EAS 711(7110) Upper Atmospheric and Space Physics**

Fall or spring. 1–6 credits. Seminar course. TBA. D. L. Hysell.

**EAS 722(7220) Advanced Topics in Structural Geology**

R. W. Allmendinger.

**EAS 731(7310) Advanced Topics in Remote Sensing and Geophysics**

M. Pritchard.

**EAS 733(7330) Advanced Topics in Geodynamics**

Spring. J. Phipps Morgan.

**EAS 750(7500) Remote Satellite Sensing in Biological Oceanography**

Summer. 3 credits. B. C. Monger.

The intensive summer course meets from 9 a.m. to 5:00 p.m. for a two-week period. The goal of the course is to teach participants the skills needed to work independently to acquire data sets derived from a variety of



satellite sensors (SeaWiFS, MODIS, AVHRR, SeaWinds and Topex-Poseidon) and to merge these data sets to examine biological response to changes in the physical environment. Course time is split equally between lectures and computer lab work. Lectures cover the fundamentals of bio-optics, pigment algorithms, primary production algorithms and the underlying physical principals leading to the measurement of sea surface temperature, ocean wind speed and ocean topography. Computer labs focus on developing the IDL (Research Systems, Inc.) programming skills needed to process, analyze and visualize satellite image data. See the course syllabus for more details on the topics covered in this course.

**EAS 751(7510) Petrology and Geochemistry**

R. W. Kay.

**EAS 755(7550) Advanced Topics in Geodynamics**

Fall. 3 credits. J. Phipps Morgan.

**EAS 757(7570) Current Research in Petrology and Geochemistry**

S. Mahlburg Kay.

**EAS 762(7620) Advanced Topics in Paleobiology**

W. D. Allmon.

**EAS 771(7710) Advanced Topics in Sedimentology and Stratigraphy**

T. E. Jordan.

**EAS 773(7730) Paleobiology**

J. L. Cisne.

**EAS 775(7750) Advanced Topics in Oceanography**

C. H. Greene.

**EAS 780(7800) Earthquake Record Reading**

Fall. M. Barazangi.

**EAS 781(7810) Exploration Geophysics**

L. D. Brown.

**EAS 783(7830) Advanced Topics in Geophysics**

B. L. Isacks.

**EAS 793(7930) Andes-Himalayas Seminar**

S. Mahlburg Kay, R. W. Allmendinger, B. L. Isacks, and T. E. Jordan.

**EAS 795(7950) Low Temperature Geochemistry**

1-3 credits. S-U letter grades. L. A. Derry.

**EAS 796(7960) Geochemistry of the Solid Earth**

W. M. White.

**EAS 797(7970) Fluid-Rock Interactions**

L. M. Cathles.

**EAS 799(7990) Soil, Water, and Geology Seminar**

Spring. L. M. Cathles and T. S. Steenhuis.

**EAS 850(8500) Master's-Level Thesis Research in Atmospheric Science**

Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.

Limited to students specifically in the master's program in atmospheric science.

**EAS 950(9500) Graduate-Level Dissertation Research in Atmospheric Science**

Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.

Limited to students in the atmospheric science Ph.D. program *only before* "A" exam has been passed.

**EAS 951(9510) Doctoral-Level Dissertation Research in Atmospheric Science**

Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.

Limited to students admitted to candidacy in the atmospheric science Ph.D. program *after* "A" exam has been passed.

**EAST ASIA PROGRAM**

140 Uris Hall

E. Gunn, director; T. LaMarre, associate director; D. Boucher, J. Chen, Z. Chen, A. Carlson, S. G. Cochran, B. de Bary, H. Diffloth, S. Divo, G. Fields, M. Fiskejo, E. M. Gunn, J. Grimheden, J. Hagen, T. Hahn, H. Hong, N. Howson, Y. Katagiri, P. J. Katzenstein, Y. Kawasaki, J. S. Kil, J. V. Koschmann, F. Kotas, T. LaMarre, N. Larson, J. M. Law, P. Liu, T. P. Lyons, S. Martin, R. McNeal, F. L. Mehta, H. Miyazaki, Y. Nakanishi, V. Nee, A. Pan, L. Paterson, C. A. Peterson, A. Riles, B. Rusk, N. Sakai, P. S. Sangren, K. Selden, M. Shin, Y. Shirai, J. J. Suh, R. J. Sukle, K. W. Taylor, Q. Teng, H. Wan, Q. Wang, D. X. Warner, R. Weiner, Emeritus: R. Barker, K. W. Brazell, P. Chi, E. H. Jorden, L. C. Lee, J. McCoy, T. L. Mei, R. J. Smith, M. W. Young

The East Asia Program draws together faculty from departments and fields throughout the university who participate in a program of research and teaching on the civilizations and cultures of East Asia. Courses are offered through departments in the humanities and social sciences, as well as in the fields of business, city and regional planning, international and comparative labor relations, and rural sociology. The Department of Asian Studies offers language courses in Mandarin, Cantonese, Korean, and Japanese, in addition to the Full-year Asian Language Concentration (FALCON) in Japanese and Mandarin. Undergraduates major in the Department of Asian Studies and concentrate on the language and culture of one East Asian country, while graduate students may work toward an M.A. in East Asian Studies, a dual M.B.A./M.A., or an M.A./Ph.D. in a discipline such as agricultural economics, anthropology, city and regional planning, government, history, history of art, linguistics, literature, rural sociology, or sociology. Graduate students concentrating on East Asia may apply for a variety of fellowships and travel grants offered by the East Asia Program. The formal program of study is enriched by numerous events and extracurricular activities, including films, workshops, art exhibits, lectures, symposia, and cultural and artistic performances on East Asia. With nearly 600,000 holdings in Chinese, Japanese, Korean, and western languages, the Wason Collection in Kroch Library is a major national resource for research on East Asia. A 5,000-piece collection representing the full range of Chinese, Japanese, and Korean art may be seen at the George and Mary

Rockwell Galleries in the Herbert F. Johnson Museum of Art.

**ECONOMICS**

U. Possen, chair; T. Mitra, director of graduate studies; T. Lyons, director of undergraduate studies; T. Bar, L. Barseghyan, K. Basu, L. Blume, R. Burkhauser, S. Coate, D. Easley, R. Ehrenberg, G. Fields, A. Guerdjikova, G. Hay, Y. Hong, R. Kanbur, N. Kiefer, S. Klonner, T. Lyons, M. Majumdar, T. Mitra, F. Molinari, M. Nielsen, T. O'Donoghue, A. Razin, D. Sahn, R. E. Schuler, K. Shell, H. Y. Wan, Jr., J. Wissink, T. Zhu, A. Zussman. Emeritus: T. E. Davis, W. Isard, A. Kahn, P. D. McClelland, G. Staller, E. Thorbecke, J. Vanek

The study of economics provides an understanding of the way economies operate and an insight into public issues. The department offers a broad range of undergraduate courses in such fields as money and banking; international and comparative economics; econometrics; theory; history; growth and development; and the organization, performance, and control of industry.

**The Major**

**Prerequisites**

ECON 101 and 102 and MATH 111 (or equivalents) are required, all with grades of C or better; MATH 112 (or equivalent) is recommended. For further information, see "Math for Economics 313-314" at the department's web site: [www.arts.cornell.edu/econ/major.html](http://www.arts.cornell.edu/econ/major.html).

ECON 301 with a grade of C or better substitutes for 101; ECON 302 with a grade of C or better substitutes for 102.

**Requirements**

Eight courses listed by the Department of Economics at the 300 level or above, or approved by the student's major advisor, all with grades of C- or better. (S-U grade option is not allowed.)

These eight courses must include:

1. ECON 313 and 314
2. ECON 321, or ECON 319 and 320 (ECON 313, 314, 321 or 319, 320 should be completed before senior year.)
3. at least three courses from the following: ECON 318, 320, 322-399

ECON 301 with a grade of B or better substitutes for both 101 and 313; ECON 302 with a grade of B or better substitutes for both 102 and 314.

If ECON 321 is applied toward the major, neither 319 nor 320 can be applied.

ECON 498 and 499 *cannot* be counted toward the eight-course requirement.

If ECON 313 is applied to the major, ECON 301 cannot be.

If ECON 314 is applied to the major, ECON 302 cannot be.

If both ECON 367 and ECON 368 are taken, only one can be applied to the major.

**Honors Program**

An honors program is currently being offered. Students should consult the director of



undergraduate studies before May of their junior year for more information.

### Recommended Courses

Students planning graduate work in economics should select ECON 319–320 rather than 321 and should consider including some of the following courses in their majors:

ECON 325 (Cross Section and Panel Econometrics) or ECON 327 (Time Series Econometrics)

ECON 337 (Equilibrium and Welfare Economics)

ECON 405 (Auction Seminar)

ECON 367 (Game Theoretic Methods) or ECON 368 (Game Theory)

ECON 416 (Intertemporal Economics)

ECON 419 (Economic Decisions under Uncertainty)

ECON 446 (Topics in Macroeconomic Analysis)

Students planning careers in business management should consider including some of the following courses in their majors:

ECON 333 (Financial Economics)

ECON 351 or 352 (Industrial Organization)

ECON 358 (Behavioral Economics)

ECON 361–362 (International Trade and Finance)

ECON 440–441 (Analysis of Agricultural Markets and Commodity Futures Markets)

ECON 443 (Compensation, Incentives, and Productivity)

In addition to completing the economics major, such students should also consider courses in accounting and subjects such as finance, marketing, entrepreneurship, business administration, and business law. Courses in these subjects are offered by the Department of Applied Economics and Management, the School of Hotel Administration, and the Johnson Graduate School of Management.

Students planning to attend law school should consider including some of the following courses in their majors:

ECON 351 or 352 (Industrial Organization)

ECON 354 (Economics of Regulation)

ECON 361–362 (International Trade and Finance)

ECON 404 (Economics and the Law)

In addition to completing the economics major, such students should inquire at Career Services, College of Arts and Sciences, concerning recommended courses offered by other departments.

### Courses

#### ECON 101(1110) Introductory Microeconomics (SBA)

Fall, spring, winter, and summer. 3 credits. ECON 101 is *not* a prerequisite for 102.

Explanation and evaluation of how the price system operates in determining what goods are produced, how goods are produced, who receives income, and how the price system is modified and influenced by private organizations and government policy.

#### ECON 102(1120) Introductory Macroeconomics (SBA)

Fall, spring, winter, and summer. 3 credits.

ECON 101 is *not* a prerequisite for 102.

Analysis of aggregate economic activity in relation to the level, stability, and growth of national income. Topics may include the determination and effects of unemployment, inflation, balance of payments, deficits, and economic development, and how these may be influenced by monetary, fiscal, and other policies.

#### ECON 204(2040) Networks (also SOC 209(2090)) (SBA)

Spring. 4 credits. Cannot be applied to ECON major.

This interdisciplinary course examines network structures and how they matter in everyday life. The course examines how each of the computing, economic, sociological and natural worlds are connected and how the structure of these connections affects each of these worlds. Tools of graph theory and game theory are taught and then used to analyze networks. Topics covered include the web, the small world phenomenon, markets, neural networks, contagion, search and the evolution of networks.

#### ECON 230(2300) International Trade and Finance (SBA)

Cannot be applied to ECON major.

For description, see AEM 230.

#### ECON 301(3010) Microeconomics (SBA)

Fall. 4 credits. Prerequisite: calculus.

Intended for students with strong analytical skills who have not taken ECON 101, 102. May be used to replace both ECON 101 and 313 (may replace 313 only with grade of B or better). Covers the topics taught in ECON 101 and 313. An introduction to the theory of consumer and producer behavior and to the functioning of the price system.

#### ECON 302(3020) Macroeconomics (SBA)

Spring. 4 credits. May be used to replace both ECON 102 and 314 (may replace 314 only with grade of B or better).

Prerequisite: calculus.

Intended for students with strong analytical skills who have not taken ECON 101, 102. Covers the topics taught in ECON 102 and 314. An introduction to the theory of national income determination, unemployment, growth, and inflation.

#### ECON 307(3070) Introduction to Peace Science (also CRP 495.18[3850]) (SBA)

Winter session. 3 credits. Prerequisites:

ECON 101–102 or permission of instructor.

Introduction to the theories of and research on conflict resolution. Topics include conflict, its role and impact on society; theories of aggression and altruism; causes of war; game theory; conflict management procedures and other analytical tools and methods of peace science; and alternatives to war.

#### ECON 313(3130) Intermediate Microeconomic Theory (SBA)

Fall, spring, and summer. 4 credits.

Prerequisites: ECON 101–102 and calculus.

The pricing processes in a private enterprise economy are analyzed under varying competitive conditions, and their role in the allocation of resources and the functional distribution of national income is considered.

#### ECON 314(3140) Intermediate Macroeconomic Theory (SBA)

Fall, spring, and summer. 4 credits.

Prerequisites: ECON 101–102 and calculus.

Introduces the theory of national income and determination and economic growth in alternative models of the national economy. Examines the interaction and relation of these models to empirical aggregate economic data.

#### ECON 319(3190) Introduction to Statistics and Probability (MQR)

Fall and spring. 4 credits. Prerequisites:

ECON 101–102 and MATH 111–112.

Provides an introduction to statistical inference and to principles of probability. It includes descriptive statistics, principles of probability, discrete and continuous distributions, and hypothesis testing (of sample means, proportions, variance). Regression analysis and correlation are introduced.

#### ECON 320(3200) Introduction to Econometrics (MQR)

Fall and spring. 4 credits. Prerequisites:

ECON 101–102, 319, or equivalent.

Introduction to the theory and application of econometric techniques. How econometric models are formulated, estimated, used to test hypotheses, and used to forecast; understanding economists' results in studies using regression model, multiple regression model, and introduction to simultaneous equation models.

#### ECON 321(3210) Applied Econometrics (MQR)

Fall or spring. 4 credits. Prerequisites:

ECON 101–102 and calculus.

Provides an introduction to statistical methods and principles of probability. Topics include analysis of data, probability concepts and distributions, estimation and hypothesis testing, regression, correlation and time series analysis. Applications from economics are used to illustrate the methods covered in the course.

#### ECON 322(3220) World Economic History # (HA)

Spring. 4 credits. Prerequisites: ECON 101 and 102 or equivalent.

An economist's perspective on the comparative evolution of selected economic and social institutions, with emphasis on trade, finance, population growth and technological change.

#### ECON 323(3230) American Economic History # (SBA)

Fall. 4 credits. Prerequisite: ECON 101–102 or equivalent.

Surveys problems in American economic history from the first settlements to early industrialization.

#### ECON 324(3240) American Economic History # (SBA)

Spring. 4 credits. Prerequisites: ECON 101–102 or equivalent.

Surveys problems in American economic history from the Civil War to World War I.

#### ECON 325(3250) Cross Section and Panel Econometrics (MQR)

Spring. 4 credits. Prerequisite: ECON 320.

Introduction to cross-section and panel econometrics. Topics include multiple-regression analysis with qualitative information to models, simple and advanced panel data methods, informal variable, estimation, simultaneous equation models.

**ECON 327(3270) Time Series Econometrics (MQR)**

Spring. 4 credits. Prerequisite: ECON 320. Introduction to time-series econometrics. Topics include stationary time series, ARMA models, multivariate models, non-stationary models and unit roots, and co-integration.

**ECON 331(3310) Money and Credit (SBA)**

Spring. 4 credits. Prerequisites: ECON 101-102 and 314. A systematic treatment of the determinants of the money supply and the volume of credit. Economic analysis of credit markets and financial institutions in the United States.

**ECON 333(3330) Financial Economics (SBA)**

Fall. 4 credits. Prerequisites: ECON 313 and 314. Examines the theory and decision making in the presence of uncertainty and the practical aspects of particular asset markets.

**ECON 335(3350) Public Finance: The Microeconomics of Government (SBA)**

Fall. 4 credits. Prerequisites: ECON 101-102 and 313, or equivalent, and one semester of calculus. Analyzes the role of government in a free market economy. Topics include public goods, market failures, allocation mechanisms, optimal taxation, effects of taxation, and benefit-cost analysis. Current topics of an applied nature vary from semester to semester.

**ECON 336(3360) Public Finance: Resource Allocation and Fiscal Policy (SBA)**

Spring. 4 credits. Prerequisites: ECON 101-102, 313 or equivalent and one semester of calculus. Covers the revenue side of public finance and special topics. Subjects include the federal debt, the budget, and government regulation and transfers, as well as problems like local public goods, health care, education, the hierarchy of governmental structure, plus a variety of applied problems.

**ECON 337(3370) Equilibrium and Welfare Economics (SBA)**

Fall. 4 credits. Prerequisites: ECON 313, 314, 319. Introduction to the theory of competitive equilibrium and economic efficiency. Begins with a review of the Walrasian model and identify conditions under which a price-guided decentralized competitive economy achieves an optimal allocation of resources. Presents a number of celebrated examples and applications: the standard 2x2x2 model of international trade, Leontief's input-output model, Morishima's interpretation of labor theory of value, Arrow's analysis of uncertainty and Amartya Sen's analysis of famines. Finally, problems of market failure are reviewed.

**[ECON 339(3390) State and Local Public Finance (SBA)]**

Spring. 4 credits. Prerequisite: ECON 313. Next offered 2007-2008. Examines the role of subnational governments and jurisdictions in the economy. Among the broad questions addressed are: what tasks are optimally assigned to local governments? What impact can such assignment have on efficiency and equity? How do inter-government financial relations affect these outcomes? The theory and evidence on these issues are analyzed, with frequent application

to current issues, like debates surrounding local, school district-based provision of education.]

**ECON 341(3410) Economics of Wages and Employment II (SBA)**

For description, see ILRLE 440.

**ECON 342(3420) Economic Analysis of the University**

For description, see ILRLE 648.

**ECON 344(3440) Development of Economic Thought and Institutions**

For description, see ILRLE 344.

**ECON 347(3470) Economics of Education**

For description, see ILRLE 647.

**ECON 351(3510) Industrial Organization I (SBA)**

Fall. 4 credits. Prerequisite: ECON 313 or equivalent. Examines markets with only a few firms (i.e., oligopolies), and the primary focus is the strategic interactions between firms. Topics include static competition in oligopolies, cartels and other forms of collusive behavior, competition between firms producing differentiated products, entry behavior, RD behavior, and government interventions in oligopoly industries (e.g., antitrust laws).

**ECON 352(3520) Industrial Organization II (SBA)**

Spring. 4 credits. Prerequisite: ECON 313 or equivalent. Focuses primarily on the pricing decisions of firms. The course does not consider the strategic response of other firms to these pricing decisions. The pricing decisions include price discrimination, commodity bundling, pricing a product line and pricing a durable good. In addition to pricing decisions, the course considers topics associated with private information such as adverse selection, signaling, and moral hazard. Numerous theoretical models are presented and empirical results are discussed.

**ECON 354(3540) The Economics of Regulation (SBA)**

Fall. 4 credits. Prerequisite: ECON 313 or equivalent. Regulation constrains individual and institutional behavior. These interfaces between the private and public sectors are explored in terms of their rationale, efficacy, and economic consequences. Regulation is examined as a system of incentives that guides the development and efficient functioning of markets, that moulds the behavior of regulated industries like utilities and that elicits socially desirable levels of pollution, congestion, risk and benefits from externality-generating activities. How the various professions (law, accounting and engineering) view and address these challenges are examined in light of their economic effects.

**ECON 358(3580) Behavioral Economics (SBA)**

Spring. 4 credits. Prerequisite: ECON 313. Introduces students to behavioral economics, an emerging subfield of economics that incorporates insights from psychology and other social sciences into economics. Examines evidence on how human behavior systematically departs from the standard assumptions of economics, and also investigates attempts by behavioral economists to improve economic analyses.

**ECON 361(3610) International Trade Theory and Policy (SBA)**

Fall. 4 credits. Prerequisites: ECON 101-102 and 313. Surveys the sources of comparative advantage. Studies commercial policy and analyzes the welfare economics of trade between countries. Some attention is paid to the institutional aspects of the world trading system.

**ECON 362(3620) International Monetary Theory and Policy (SBA)**

Spring and summer. 4 credits. Prerequisites: ECON 101-102 and 314. Surveys the determination of exchange rates and theories of balance of payments adjustments. Also explores open economy macroeconomics and analyzes some of the institutional details of foreign exchange markets, balance of payments accounting, and the international monetary system.

**ECON 367(3670) Game Theoretic Methods (SBA)**

Fall. 4 credits. Prerequisites: ECON 101 or equivalent. ECON 367 is *not* a prerequisite for ECON 368. Introduces students to the use of game-theoretic methods for the social sciences. This leads to an analysis of the social and political foundations of economics that prepares students to think strategically on social and economic matters and thus serves as a background for more advanced courses in economics, game theory, and related social sciences.

**ECON 368(3680) Game Theory (MQR)**

Spring. 4 credits. Prerequisites: ECON 313 and 319. ECON 367 is *not* a prerequisite for ECON 368. Studies mathematical models of conflict and cooperation in situations of uncertainty (about nature and about decision makers).

**ECON 371(3710) Economic Development (SBA)**

Fall. 4 credits. Prerequisite: ECON 313 or equivalent. Studies the problem of sustaining accelerated economic growth in less-developed countries. Emphasizes trade-offs between growth, welfare, and equity; the legacy of colonialism; relevance of history and economic theory; problems of capital formation, economic planning and international specialization; and the interaction of industrialization, agricultural development, and population change.

**ECON 372(3720) Applied Economic Development (SBA)**

Spring. 4 credits. Prerequisite: ECON 101-102. Examines several special topics in the economics of developing countries. Recent topics are the concepts of development and underdevelopment, the debate over development economics, the peasant household and its place in the world economy, the debt crisis, the state vs. market debate and the role of the state in economic development, and the question of sustainable development.

**ECON 404(4040) Economics and the Law (SBA)**

Fall. 4 credits. Prerequisite: ECON 101. Examines, through the lens of economic analysis, of legal principles drawn from various branches of law, including contracts, torts, and property. Cases are assigned for class discussion; in addition, there are several writing assignments.

**ECON 408(4080) Production Economics and Policy (SBA)**

For description, see AEM 608.

**ECON 405(4050) Auction Seminar (MQR)**  
Spring. 4 credits. Prerequisites: ECON 314, 319, 320, and 368.

Uses theoretical and empirical methods to analyze bidding behavior in auctions. The first part of the course studies theoretical models of auctions. The role of private information is discussed in the context of two empirically important auction formats: the first-price-sealed-bid and the open-ascending-bid auction. Bid-shading and the winner's curse are explained in these models. Optimal selling strategies as well as the issue of bidder collusion are analyzed. In the second part, empirical evidence on these topics is discussed in the context of outer continental-shelf oil auctions, Internet auctions, and treasury bill and spectrum auctions. One session is devoted to an auction experiment in class. In the final part of the course, students present and debate the issues of their semester papers. Readings are assigned weekly from the reading packet.

**ECON 409(4090) Environmental Economics (SBA)**

For description, see AEM 451.

**[ECON 416(4160) Intertemporal Economics (SBA)]**

Fall. 4 credits. Prerequisite: ECON 313. Next offered 2007–2008.

Intended for advanced economics majors who are especially interested in economic theory. Topics include (1) review of the one good Ramsey model of optimal savings and accumulation; conditions for intertemporal efficiency in production; comparative dynamics and sensitivity analysis; (2) some earlier models of capital accumulation; the roles of present value and internal rate of return in guiding investment decisions; (3) growth, exhaustible resources; pollution and conservation: discussion of the trade-offs facing a society.]

**ECON 417(4170) History of Economic Analysis # (HA)**

Spring. 4 credits. Prerequisites: ECON 101–102 or permission of instructor.

Covers early writings in economics and their relationship to current economic analysis and policy issues. Examples include: ancient and medieval philosophers on justice in exchange; mercantilist arguments for trade protection; early theories about the effect of monetary expansion (D. Hume); the role of the entrepreneur (Cantillon); and general competitive equilibrium (the Physiocrats). The most recent reading assignment in this course is Adam Smith's *Wealth of Nations* but the emphasis is on the relationship between the precursors of Adam Smith and his *Wealth of Nations* to modern economics analysis and current efforts to answer some of the questions raised in the early writing on economics.

**[ECON 419(4190) Economic Decisions under Uncertainty]**

Fall. 4 credits. Prerequisites: ECON 313 and 319. Next offered 2007–2008.

Provides an introduction to the theory of decision making under uncertainty with emphasis on economic applications of the theory.]

**ECON 430(4300) Policy Analysis: Welfare Theory, Agriculture, and Trade (SBA)**

For description, see AEM 630.

**[ECON 431(4310) Monetary Economics (MQR)]**

Spring. 4 credits. Prerequisites: ECON 313 and 314. Next offered 2007–2008.

Covers monetary theory, history, and policy. Topics include transaction costs, centralized and bilateral trading, media of exchange, international exchange and monetary arrangements, and central bank and its policy.]

**ECON 434(4340) Financial Economics, Derivatives, and Risk Management (SBA)**

Summer only. 4 credits. Prerequisite: ECON 313.

Helps students understand, design, and price derivative contracts. Topics include pricing of forwards, options, and swaps; developing trading strategies with derivatives; using derivatives for financial risk management; and the importance of flexibility in various economic settings.

**ECON 440(4400) Analysis of Agricultural Markets**

ECON 440 and 441 together, count as one course for economics majors.

For description, see AEM 640.

**ECON 441(4410) Commodity Futures Markets**

ECON 440 and 441, together, count as one course for economics majors.

For description, see AEM 641.

**ECON 443(4430) Compensation, Incentives, and Productivity**

For description, see ILRLE 443.

**ECON 444(4440) Evolution of Social Policy in Britain and America**

For description, see ILRLE 444.

**ECON 445(4450) Industrial Policy (SBA)**

Spring. 4 credits. Prerequisite: ECON 313.

Highlights of the course include (1) the role of the state in an industrial society; the drive for industrialization; the prevention of de-industrialization; the views of the Nobelists—Friedman, the Libertarian vs. North, the institutionist; the original intent of *laissez-faire*; (2) the major debates—the pros and cons of the Washington Consensus (“liberalization”); IMF and “conditionality”; market failure vs. government failure as roots for crises; (3) the East Asian episodes; Komiya on the Japanese MITI—early successes/recent problems; Linsu Kim about Korean policy—are subsequent difficulties the necessary price for the early triumphs?; industrial policy without protectionism (the cases of Singapore and Penang, Malaysia)—viable approaches under the WTO rules; (4) present developments and implications; trade frictions (the export expansion of the PRC); environmental concerns.

**ECON 447(4470) Economics of Social Security (SBA)**

For description, see PAM 346.

**ECON 450(4500) Resource Economics (SBA)**

For description, see AEM 450.

**ECON 451(4510) Economic Security (SBA)**

For description, see ILRLE 340.

**ECON 455(4550) Income Distribution (SBA)**

For description, see ILRLE 441.

**ECON 456(4560) The Economics of Employee Benefits (SBA)**

For description, see ILRLE 442.

**ECON 457(4570) Women in the Economy (also FGSS 446(4460)) (SBA)**

For description, see ILRLE 445.

**ECON 458(4580) Topics in 20th-Century Economic History (SBA)**

For description, see ILRLE 448.

**ECON 459(4590) Economic History of British Labor 1750 to 1940 (SBA)**

For description, see ILRLE 446.

**ECON 460(4600) Economic Analysis of the Welfare State (SBA)**

For description, see ILRLE 642.

**ECON 461(4610) The Economics of Occupational Safety and Health (SBA)**

For description, see ILRLE 644.

**[ECON 469(4690) China's Economy under Mao and Deng @ (SBA)]**

Spring. 4 credits. Prerequisite: ECON 101–102 or permission of instructor. Next offered 2007–2008.

Examines the development of the Chinese economy and the evolution of China's economic system between the early 1990s and late 1990s.]

**ECON 473(4730) Economics of Export-Led Development @ (SBA)**

Spring. 4 credits. Prerequisites: ECON 313, 314, or equivalent.

Examines the phenomenon of export-led development from both the theoretical and empirical points of view. Concentration is on experiences within the West Pacific Rim.

**ECON 474(4740) Economics of Hunger and Malnutrition**

For description, see NS 457.

**[ECON 475(4750) The Economy of India @ (SBA)]**

Fall. 4 credits. Prerequisite: ECON 101–102 or equivalent background. Next offered 2007–2008.

Presents the major economics and development problems of contemporary India and examines the country's future economic prospects. The aim is, however, to discuss these problems in their proper historical perspectives. Hence, the course starts with a brief outline of the social and political history of India. It then turns to a more detailed account of the economic history of India in two stages.]

**ECON 476(4760) Decision Theory I (also ECON 676(6760), CIS 576(5846)) (MQR)**

Fall. 4 credits.

Research on decision theory resides in a variety of disciplines including computer science, economics, game theory, philosophy, and psychology. This course attempts to integrate these various approaches. The course is taught jointly by faculty from Game Theory and Computer Science. The course covers several areas: (1) basic decision theory. This theory, sometimes known as “rational choice theory,” is part of the foundation for the disciplines listed above. It applies to decisions made by individuals or by machines; (2) the limitations of and problems with this

theory. Issues discussed here include decision theory paradoxes revealed by experiments, cognitive and knowledge limitations, and computational issues; (3) new research designed in response to these difficulties. Issues covered include alternative approaches to the foundations of decision theory, adaptive behavior and shaping the individual decisions by aggregate/evolutionary forces and more computationally based approaches.

**ECON 477(4770) Decision Theory II (also ECON 677(6770), CIS 577(5847)) (MQR)**

Spring. 4 credits. Prerequisite: ECON 476 or 676 or CIS 576.

A continuation of ECON 476.

**ECON 480(4800) The Family in Asia**

For description, see D SOC 480.

**ECON 494(4940) Economic Methods for Engineering and Management**

For description, see CEE 594.

**ECON 498(4980) Independent Study in Economics**

Fall or spring. Variable credit.

Independent study.

**ECON 499(4990) Honors Program**

Fall and spring. 8 credits. Prerequisites: ECON 313, 314, 321 (or 319-320).

Students should consult the director of undergraduate studies for details. Admission is competitive. Interested students should apply to the program in the spring semester of their junior year.

**Graduate Courses and Seminars**

**ECON 609(6090) Microeconomic Theory I**

Fall. 4 credits.

Topics in consumer and producer theory.

**ECON 610(6100) Microeconomic Theory II**

Spring. 4 credits.

Topics in consumer and producer theory, equilibrium models and their application, externalities and public goods, intertemporal choice, simple dynamic models and resource depletion, choice under uncertainty.

**ECON 613(6130) Macroeconomic Theory I**

Fall. 4 credits.

Covers the following topics: static general equilibrium; intertemporal general equilibrium; infinitely lived agents models and overlapping generations models; welfare theorems; equivalence between sequential markets and Arrow-Debreu Markets; Ricardian proposition; Modigliani-Miller theorem; asset pricing; recursive competitive equilibrium; the Neoclassical Growth Model; calibration; and introduction to dynamic programming.

**ECON 614(6140) Macroeconomic Theory II**

Spring. 4 credits.

Covers the following topics: dynamic programming; stochastic growth; search models; cash-in-advance models; real business-cycle models; labor indivisibilities and lotteries; heterogeneous agents models; optimal fiscal and monetary policy; sustainable plans; and endogenous growth.

**ECON 617(6170) Intermediate Mathematical Economics I**

Fall. 4 credits. Prerequisites: calculus II and intermediate linear algebra.

Covers selected topics in Matrix algebra (vector spaces, matrices, simultaneous linear equations, characteristic value problem), calculus of several variables (elementary

real analysis, partial differentiation, convex analysis), classical optimization theory (unconstrained maximization, constrained maximization).

**[ECON 618(6180) Intermediate Mathematical Economics II]**

Spring. 4 credits. Next offered 2007-2008. Continuation of ECON 617. Develops additional mathematical techniques for applications in economics. Topics may include study of dynamic systems (linear and nonlinear difference equations, differential equation, chaotic behavior), dynamic optimization methods (optimal control theory, nonstochastic and stochastic dynamic programming), and game theory (repeated dynamic and evolutionary games).]

**ECON 619(6190) Econometrics I**

Fall. 4 credits. Prerequisite: ECON 319-320 or permission of instructor.

Gives the probabilistic and statistical background for meaningful application of econometric techniques. Topics include probability theory probability spaces, random variables, distributions, moments, transformations, conditional distributions, distribution theory and the multivariate normal distribution, convergence concepts, laws of large numbers, central limit theorems, Monte Carlo simulation; statistics: sample statistics, sufficiency, exponential families of distributions. Further topics in statistics are considered in ECON 620.

**ECON 620(6200) Econometrics II**

Spring. 4 credits. Prerequisite: ECON 619. A continuation of ECON 619 (Econometrics I) covering statistics: estimation theory, least squares methods, method of maximum likelihood, generalized method of moments, theory of hypothesis testing, asymptotic test theory, and nonnested hypothesis testing; and econometrics: the general linear model, generalized least squares, specification tests, instrumental variables, dynamic regression models, linear simultaneous equation models, nonlinear models, and applications.

**ECON 669(6690) Economics of Information**

Spring. 4 credits. Prerequisite: ECON 609. Classic models of "perfect competition" require that economic agents are fully informed, or at least equally informed, about all relevant economic information: prices, descriptions of commodities, and so forth. This course will study theoretical models that examine the difficulties of resource allocation when this assumption fails. The course will discuss models of: Auctions, adverse selection, bargaining, mechanism design, moral hazard, screening, searching and sorting. The course will begin with a survey of rudimentary incomplete information games that will be useful in reading the literature to follow. Evaluation will be through problem sets and exams.

**ECON 676(6760) Decision Theory I (also ECON 476(4760), CIS 576(5846))**

For description, see ECON 476.

**ECON 677(6770) Decision Theory II (also ECON 477(4770), CIS 577(5847))**

For description, see ECON 477.

**ECON 691(6910) Health Economics I**

For description, see PAM 691.

**ECON 692(6920) Health Economics II**

For description, see PAM 692.

**ECON 699(6990) Readings in Economics**

Fall or spring. Variable credit. Independent study.

**ECON 703(7030) Seminar in Peace Science**

Fall. 4 credits.

Topics covered at an advanced level are: game theory, coalition theory, bargaining and negotiation processes, cooperative procedures, microbehavior models, macrosocial processes, and general systems analysis.

**ECON 710(7100) Stochastic Economics: Concepts and Techniques**

Spring. 4 credits. Prerequisites: ECON 609, 610, 613, 614, 619, and 620.

Reviews a number of techniques that have been useful in developing stochastic models of economic behavior. These include discrete-time Markov processes, dynamic programming under uncertainty, and continuous-time diffusion processes. Examples of economic models are drawn from recent literature on optimal capital accumulation and optimal savings and portfolio selection problems; permanent income hypothesis; and dynamic models of price adjustment. Advanced graduate students contemplating work in economic theory and econometric theory gain exposure to current research.

**ECON 712(7120) Advanced Macroeconomics**

4 credits. Prerequisites: ECON 613, 614.

Introduces students to some of the topics and analytic techniques of current macroeconomic research. The course has three parts: dynamic programming, new Keynesian economics, and recent theories of economic growth. The dynamic programming section includes models of consumption, investment, and real business cycles. The new Keynesian section covers models of wage and price rigidity, coordination failure, and credit markets. The section on endogenous growth looks at recent efforts to add nonconvexities to models of optimal growth. These topics are intended to complement the material on overlapping generations covered elsewhere.

**ECON 713(7130) Advanced Macroeconomics II**

Spring. 4 credits. Prerequisites: ECON 613, 614.

Reviews the most recent research in endogenous growth theory. This theory is little more than a decade old, but it has produced a large number of both empirical and theoretical results that have substantially reshaped the general field of macroeconomics. It is perhaps no exaggeration to say that most of the work at the frontier of today's macroeconomics belongs to this field. An increasing number of papers have been touching important issues such as learning by doing, RD investment, market structure, private and public organization of RD, education financing, human capital accumulation, technological unemployment, growth and business cycles, inequality and growth, political equilibrium, democracy and growth, instability, social conflict, capital accumulation, intergenerational and vested interests and barriers to technology adoption, international transfers of technologies, and sustainable development. This course aims to orient the student in this large and variegated literature consisting of recently published articles and working papers. Understanding this literature is a sound training in the analytical methods used at the frontier of theoretical research, but it also provides a

number of empirical results at the center of the economic debate.

**ECON 714(7140) Empirical Macroeconomics**

Spring. 4 credits. Prerequisites: ECON 613 and 614.

Advanced graduate-level course emphasizing empirical applications. Students learn how to deal with data and how to estimate and test macroeconomic theories, and can develop research topics in applied macroeconomics for their dissertations.

**ECON 717(7170) Mathematical Economics**

4 credits. Prerequisites: ECON 609–610 (or equivalent training in micro theory) and MATH 413–414 (or equivalent training in analysis).

The primary theme of this course is to explore the role of prices in achieving an efficient allocation of resources in dynamic economies. Some of the classical results on static equilibrium theory and welfare economics on attaining optimal allocation through decentralized organizations are examined through an axiomatic approach. Some basic issues on capital theory are also analyzed.

**[ECON 718(7180) Topics in Mathematical Economics**

Spring. 4 credits. Next offered 2007–2008.]

**ECON 719(7190) Advanced Topics in Econometrics I**

Fall. 4 credits. Prerequisite: ECON 619–620 or permission of instructor.

Covers advanced topics in econometrics, such as asymptotic estimation and test theory, robust estimation, Bayesian inference, advanced topics in time-series analysis, errors in variable and latent variable models, qualitative and limited dependent variables, aggregation, panel data, and duration models.

**ECON 720(7200) Advanced Topics in Econometrics II**

Spring. 4 credits. Prerequisite: ECON 619–620 or permission of instructor.

For description see ECON 719.

**ECON 721(7210) Time Series Econometrics**

Spring. 4 credits. Prerequisite: ECON 619–620 or permission of instructor.

Covers traditional and current time series techniques that are widely used in econometrics. Topics include the theory of stationary stochastic processes including univariate ARMA(p,q) models, spectral density analysis, and vector autoregressive models; parametric and semi-parametric estimation; current developments in distributional theory; and estimation and testing in models with integrated regressors including, unit root tests, cointegration, and permanent vs. transitory components.

**ECON 722(7210) Topics in Time Series Econometrics**

Spring. 4 credits. Prerequisite: ECON 721.

Covers topics not treated by ECON 721. These include co-integration, fractional integration, long memory, and ARCH/GARCH models. Other topics may also be considered based on the interests of the students.

**ECON 723(7230) Semi/Non Parametric Econometrics**

Fall. 4 credits. Prerequisite: ECON 619–620 or permission of instructor.

Analyzes the ways identification problems limit the conclusions that may be drawn in empirical economic research and studies how identified and partially identified parameters can be estimated. In the first part of the course, the focus is on nonparametric models. Ways data can be combined with weak assumptions to yield partial identification of population parameters are discussed.

**ECON 731(7310) Monetary Economics**

Spring. 4 credits. Prerequisites: ECON 614 or permission of instructor.

Covers advanced topics in monetary economics, macroeconomics, and economic growth—such as overlapping-generations, taxes and transfers denominated in money, transactions demand for money, multi-asset accumulation, exchange rates, and financial intermediation.

**ECON 732(7320) Monetary Economics**

Fall. 4 credits. Prerequisites: ECON 731 or permission of instructor.

Covers advanced topics in monetary economics, macroeconomics, and economic growth—such as economic volatility, the "burden" of government debt, restrictions on government borrowing, dynamic optimization, endogenous growth theory, technological evolution, financial market frictions, and cyclical fluctuations.

**ECON 735(7350) Public Finance: Resource Allocation and Fiscal Policy (also AEM 735[7350])**

Fall. 4 credits.

Develops a mathematical and highly analytical understanding of the role of government in market economies and the fundamentals of public economics and related issues. Topics include generalizations and extensions of the fundamental theorems of welfare economics, in-depth analysis of social choice theory and the theory on implementation in economic environments, public goods and externalities and other forms of market failure associated with asymmetric information. The theoretical foundation for optimal direct and indirect taxation is also introduced along with the development of various consumer surplus measures and an application to benefit cost analysis. Topics of an applied nature vary from semester to semester depending on faculty research interests.

**ECON 736(7360) Public Finance: Resource Allocation and Fiscal Policy**

Spring. 4 credits.

Spends a large part of the semester covering the revenue side of public finance. Topics include the impact of various types of taxes as well as the determination of optimal taxation. The impact of taxation on labor supply, savings, company finance and investment behavior, risk bearing, and portfolio choice are explored. Other topics include the interaction of taxation and inflation, tax evasion, tax incidence, social security, unemployment insurance, deficits, and interactions between different levels of government.

**[ECON 737(7370) Location Theory and Regional Analysis**

Fall. 4 credits. Prerequisites: ECON 609, 617, and econometrics course. Next offered 2007–2008.

Covers economic principles influencing the location of economic activity, its spatial equilibrium structure, and dynamic forces.

Topics include spatial pricing policies, price competition, and relocation by firms; residential location patterns; patterns of regional growth and decline; and patterns of urbanization.]

**ECON 738(7380) Public Choice**

Spring. 4 credits. Prerequisites: ECON 609, 610.

This course has two parts. It begins with an introduction to economic theories of political decision making. Reviews the theory of voting, theories of political parties and party competition, theories of legislative decision making and interest group influence. Also discusses empirical evidence concerning the validity of these theories. The second part uses these theories to address a number of issues in public economics. Develops the theory of political failure, analyzes the performance of alternative political systems and discusses the problem of doing policy analysis, which takes into account political constraints.

**ECON 739(7390) Advanced Topics in State and Local Public Finance**

Spring. 4 credits. Prerequisites: ECON 609, 620.

Provides an in-depth examination of microeconomic theory surrounding the role of subnational governments and jurisdictions in the economy. Among the broad questions addressed are: What tasks are optimally assigned to local governments? What impact can such assignment have on efficiency and equity? In addition to the theoretical foundations on these issues, the course explores recent empirical evidence in this area, with particular attention to the research designs and data used in relevant papers.

**ECON 741(7410) Seminar in Labor Economics**

For description, see ILRL 744.

**ECON 742(7420) Seminar in Labor Economics**

For description, see ILRL 745.

**ECON 743(7430) Seminar in Labor Economics**

For description, see ILRL 746.

**ECON 746(7460) Economics of Higher Education**

For description, see ILRL 746.

**ECON 747(7470) Economics of Higher Education**

For description, see ILRL 747.

**ECON 748(7480) Applied Econometrics I**

For description, see ILRL 741.

**ECON 749(7490) Applied Econometrics II**

For description, see ILRL 742.

**ECON 751(7510) Industrial Organization and Regulation**

Fall. 4 credits. Prerequisites: ECON 609, 610.

Focuses primarily on recent theoretical advances in the study of industrial organization. Topics include market structure, nonlinear pricing, quality, durability, location selection, repeated games, collusion, entry deterrence, managerial incentives, switching costs, government intervention, and R&D/patents. These topics are discussed in a game-theoretic context.



**ECON 752(7520) Industrial Organization and Regulation**

Spring. 4 credits. Prerequisites: ECON 609, 610, 751.

Rounds out some topics in the theory of industrial organization with the specific intent of addressing the empirical implications of the theory. Reviews empirical literature in the SCP paradigm and in the NEIO paradigm.

**ECON 756(7560) Noncooperative Game Theory**

Fall. 4 credits. Prerequisites: ECON 609-610 and 619.

Surveys equilibrium concepts for noncooperative games. Covers Nash equilibrium and a variety of equilibrium, refinements, including perfect equilibrium, proper equilibrium, sequential equilibrium and more. Pays attention to important special classes of games, including bargaining games, signalling games, and games of incomplete information. Most of the analysis is from the strict decision-theoretic point of view, but also surveys some models of bounded rationality in games, including games played by automata.

**ECON 757(7570) Economics of Imperfect Information**

Spring. 4 credits. Prerequisites: ECON 609-610 and 619.

Considers some major topics in the economics of uncertain information. Although the precise topics considered vary from year to year, subjects such as markets with asymmetric information, signalling theory, sequential choice theory, and record theory are discussed.

**ECON 758(7580) Psychology and Economic Theory**

Fall, spring. 4 credits. Prerequisites: economics graduate core or permission of instructor.

Explores the ways in which insights from psychology can be integrated into economic theory. Presents evidence on how human behavior systematically departs from the standard assumptions of Economics and how this can be incorporated into modeling techniques.

**ECON 760(7600) Topics in Political Economy**

Fall. 4 credits. Prerequisite: economics graduate core or permission of instructor.

Develops critiques and extensions of economic theory, taking into account the political and social moorings of economic activity and equilibria. The formation and persistence of social norms; the meaning and emergence of property rights; the role of policy advice in influencing economic outcomes; and the effect of political power and ideology on economic variables are studied. While these topics were popular in the classic works of political economy, recent advances in game theory and, more generally, game-theoretic thinking allows a new approach to these topics. Hence, the course begins by devoting some lectures to elementary ideas in game-theory and strategic analysis.

**ECON 761(7610) International Economics: Trade Theory and Policy**

Fall. 4 credits. Prerequisites: ECON 609, 610.

Surveys the sources of comparative advantage. Analyzes simple general equilibrium models to illustrate the direction, volume, and welfare effects of trade. Topics in game theory and

econometrics as applied to international economics may be covered.

**ECON 762(7620) International Economics: International Finance and Open Economy Macroeconomics**

Spring. 4 credits. Prerequisite: ECON 761.

Surveys the determination of exchange rates and theories of balance of payment adjustments. Explores open economy macroeconomics by analyzing models of monetary economies. Topics in monetary economics and econometrics as applied to international economics are covered.

**ECON 763(7630) Topics in International Economic History**

Spring. 4 credits. Prerequisite: solid understanding of international trade and finance.

Covers selected topics in modern economic history. Focuses on the process of international economic integration, or globalization. Traces the roots of globalization and its evolution in the last several centuries. Special attention is paid to the relationship between international market integration and economic growth.

**ECON 770(7700) Topics in Economic Development**

For description, see AEM 667.

**ECON 771(7711) Empirical Methods for the Analysis of Household Survey Data: Applications to Nutrition, Health, and Poverty**

Spring. 4 credits. Prerequisites: economics graduate core.

Focuses on empirical methods for the analysis of household survey data. Explores the hands-on use of such data to address policies issues related to welfare outcomes, particularly nutrition, health, education, and poverty. Covers empirical methods as they apply to a series of measurement and modeling issues, as well as the valuation of interventions. While underlying theory is reviewed briefly, the course attempts to bridge the gap between theory and practice, addressing issues such as model identification, functional form, estimation techniques to control for endogeneity and heterogeneity, and so forth. The course grade is based primarily on two empirical exercises, and related write-up, as well as class participation. Students are given actual household data sets and software with which to conduct exercises. These data enable students to apply analytical techniques discussed. Data sets are provided from African, Asian, and Latin American countries.

**ECON 772(7720) Economics of Development (also ILRLE 749[7490])**

Spring. 4 credits. Prerequisites: first-year graduate economic theory and econometrics.

Analytical approaches to the economic problems of developing nations. Topics include old and new directions in development economics thinking, the welfare economics of poverty and inequality, empirical evidence on who benefits from economic development, labor market models, project analysis with application to the economics of education, and development policy.

**ECON 773(7730) Economic Development**

Fall. 4 credits. Prerequisites: ECON 609, 610, and 611.

Concerned with theoretical and applied works that seek to explain economic development,

or lack thereof, in countries at low-income levels. Specific topics vary each semester.

**ECON 774(7740) Economic Systems**

Spring. 4 credits.

Deals with economic systems, formerly centrally planned economies, and economies in transition.

**ECON 775(7750) Development Microeconomics**

Spring. 4 credits. Prerequisites: economics graduate core.

Explores the application of microeconomic analysis to economic issues in developing countries. Focuses on household behavior and the analysis of rural institutions. Covers the neoclassical agricultural household model and recent developments in the theory of the household, topics in rural economies, financial arrangements, program evaluation and the interaction of social norms and economic organization. Designed to prepare students for applied research in micro development economics by giving an overview over the current state of research in that discipline.

**ECON 784(7840) Seminars in Advanced Economics**

Fall and spring. 4 credits.

**ECON 785(7850) Third-Year Research Seminar**

Fall. 4 credits.

**ENGLISH**

M. Hite, chair; D. Mao, director of undergraduate studies (255-3492); J. Adams, director of graduate studies (255-7989); D. Schwarz, director of honors program; K. Biers, F. Bogel, L. Bogel, M. P. Brady, L. Brown, J. Carlacio, C. Chase, E. Cheyfitz, B. Correll, J. Culler, S. Davis, E. DeLoughrey, L. Donaldson, L. Fakundiny, D. Fried, A. Fulton, A. Galloway, R. Gilbert, K. Gottschalk, E. Hanson, T. Hill, M. Hite, P. Janowitz, B. Jeyifo, W. Jones, R. Kalas, M. Koch, J. Lennon, P. Lorenz, B. Maxwell, K. McClane, M. McCoy, M. K. McCullough, S. Mohanty, R. Morgan, T. Murray, R. Parker, E. Quinonez, M. Raskolnikov, N. Saccamano, S. Samuels, P. Sawyer, H. Shaw, S. Siegel, H. Spillers, L. VanClief-Stefanon, S. Vaughn, H. Viramontes, N. Waligora-Davis, S. Wong, D. Woubshet, S. Zacher. Emeriti: M. H. Abrams, B. Adams, J. Bishop, J. Blackall, A. Caputi, D. Eddy, R. Elias, L. Herrin, M. Jacobus, C. Kaske, A. Lurie, P. Marcus, D. McCall, J. McConkey, D. Mermin, S. Parrish, J. Porte, M. Radzinowicz, E. Rosenberg, S. C. Strout, W. Wetherbee.

The Department of English offers a wide range of courses in English, American, and Anglophone literature as well as in creative writing, expository writing, and film analysis. Literature courses focus variously on close reading of texts, study of particular authors and genres, questions of critical theory and method, and the relationship of literary works to their historical contexts and to other disciplines. Writing courses typically employ the workshop method in which students develop their skills by responding to criticism of their work by their classmates as well as their instructors. Many students supplement their formal course work in English by attending public lectures and poetry readings sponsored by the department or by writing for campus literary magazines. The department

seeks not only to foster critical analysis and lucid writing but also to teach students to think about the nature of language and to be alert to both the rigors and the pleasures of reading texts of diverse inspiration.

## First-Year Writing Seminars

As part of the university-wide First-Year Writing Seminars program administered by the John S. Knight Institute for Writing in the Disciplines, the department offers many one-semester courses dealing with various forms of writing (e.g., narrative, autobiographical, and expository), with the study of specific areas in English and American literature, and with the relation of literature to culture. Students may apply any of these courses to their first-year writing seminar requirement. Detailed course descriptions may be found in the first-year writing seminars program listings, available from college registrars in August for the fall semester and in November for the spring semester.

Freshmen interested in majoring in English are encouraged to take at least one of the department's 200-level first-year writing seminars: ENGL 270 The Reading of Fiction, ENGL 271 The Reading of Poetry, and ENGL 272 Introduction to Drama. These courses are open to all second-semester freshmen. They are also open, as space permits, to first-semester freshmen with scores of 700 or above on the CEEB College Placement Tests in English composition or literature, or 4 or 5 on the CEEB Advanced Placement Examination in English, as well as to students who have completed another first-year writing seminar.

## Courses for Nonmajors

For students majoring in fields other than English, the department provides a variety of courses at all levels. A number of courses at the 200 level are open to qualified freshmen, and all are open to sophomores. Courses at the 300 level are open to all sophomores, juniors, and seniors; they are also open to freshmen who have received the instructor's prior permission. The suitability of courses at the 400 level for nonmajors depends in part on the course topics, which are subject to change from year to year. Permission of the instructor is sometimes required; prior consultation is always strongly advised.

## The Major in English

Students who major in English develop their own programs of study in consultation with their major advisors. Some choose to focus on a particular historical period or literary genre or to combine sustained work in creative writing with the study of literature. Others pursue interests in such areas as women's literature, African-American literature, literature and the visual arts, or critical theory.

The department recommends that students prepare themselves for the English major by taking one or more of its preparatory courses, such as ENGL 270 The Reading of Fiction, ENGL 271 The Reading of Poetry, or ENGL 272 Introduction to Drama. (The "ENGL" prefix identifies courses sponsored by the Department of English, all of which appear in the English section of *Courses of Study* or the department's supplementary lists of courses; it also identifies courses sponsored and taught by other academic units and cross-listed with English.) These courses concentrate on the

skills basic to the English major and to much other academic work—responsive, sensitive reading and lucid, strong writing. As first-year writing seminars, any one of them will satisfy one half of the College of Arts and Science's first-year writing requirement. ENGL 280, 281, 288, and 289 are also suitable preparations for the major and are open to students who have completed their first-year writing seminar requirement. ENGL 201 and 202, which together constitute a two-semester survey of major British writers, though not required, are strongly recommended for majors and prospective majors. ENGL 201 and 202 (unlike ENGL 280, 281, 288, and 289) are also "approved for the major" in the special sense of that phrase explained below.

To graduate with a major in English, a student must complete with passing letter grades 10 courses (40 credit hours) approved for the English major. All ENGL courses numbered 300 and above are approved for the major. In addition, with the exception of first-year writing seminars (ENGL 270, 271, and 272), 200-level courses in creative and expository writing (ENGL 280, 281, 288, and 289), and courses designated for nonmajors, all 200-level ENGL courses are also approved for the major. Courses used to meet requirements for the English major may also be used to meet the distribution requirements in the College of Arts and Sciences. Many of these courses may be used to meet the college's "historical breadth" requirement as well.

Of the 40 credits required to complete the major, 8 credits (two courses) must be at the 400 level or above; 12 credits (three courses) must be from courses in which 50 percent or more of the material consists of literature originally written in English before 1800; and another 12 credits (three courses) must form an intellectually coherent "concentration." The 400-level and pre-1800 requirements may be satisfied only with ENGL courses, and ENGL 493–494, the Honors Essay Tutorial, may not be used to satisfy either one. Courses that satisfy the pre-1800 requirement are so designated in *Courses of Study*. Many English majors use ENGL 201 to begin meeting this requirement since it provides an overview of earlier periods of British literature and so enables them to make more informed choices of additional pre-1800 courses. ENGL 202 does not qualify as a pre-1800 course. Neither do courses offered by other departments unless they are cross-listed with English. Advanced courses in foreign literature may not be used to fulfill the pre-1800 requirement, but they may be used for English major credit provided they are included within the 12-credit limit described below. The three-course concentration requirement may be satisfied with any courses approved for the major. The department's "Guide to the English Major" suggests areas of concentration and offers examples of courses that fall within those areas, but majors define their own concentrations in consultation with their advisors.

As many as 12 credits in appropriate courses offered by departments and programs other than English may be used to satisfy English major requirements. Courses in literature and creative writing offered by academic units representing neighboring or allied disciplines (German Studies, Romance Studies, Russian, Asian Studies, Classics, Comparative Literature, Africana Studies, the Society for the Humanities, American Studies, Feminist,

Gender and Sexuality Studies, Religious Studies, Asian American Studies, American Indian Studies, Latino Studies, and Theatre, Film, and Dance) are routinely counted toward the 40 hours of major credit provided they are appropriate for juniors or seniors, as are most courses at the 300 level and above. English majors who are double majors may exercise this option even if all 12 credits are applied to their second major. All English majors are urged to take courses in which they read foreign works of literature in the original language, and for that reason 200-level literature courses for which qualification is a prerequisite (as well as more advanced foreign literature courses) may be counted toward the English major. Credit from other non-ENGL courses may be included within the 12 credits of nondepartmental courses approved for the major only when the student is able to demonstrate to the advisor's satisfaction their relevance to his or her individual program of study.

## Planning a Program of Study

Few students know from the moment they decide to pursue a major in English exactly what they wish to study. Moreover, it is natural for interests to change in the course of time. The effort of creating or discovering a coherent pattern in the courses selected is itself a valuable part of a literary (as well as a liberal) education, and English majors are expected to discuss their overall program of study when seeking their advisors' approval of courses each semester. While the Department leaves a great deal to the discretion of its individual majors and their academic advisers, it expects them to choose courses with an eye to breadth and variety on the one hand and focus and coherence on the other.

Students with a special interest in developing their skills as writers of verse or prose will find a variety of workshop courses in expository and creative writing. As a rule a student may not enroll in more than one such course in any given semester, although exceptions are sometimes allowed where one of these is ENGL 288 or 289.

A number of English majors do part of their coursework at a foreign institution, usually during their junior year; some spend a single semester away from campus, others an entire year. The Cornell Abroad office has information on a variety of programs at universities around the world. Many English majors study abroad in the United Kingdom and other English speaking countries, but some choose other locations. As long as they continue to meet all College and Department requirements or can complete them upon returning to Cornell, studying abroad poses no serious problems. Students spending their entire junior year abroad will be challenged to complete the Department's Honors program since they will be unable to take the required Honors seminar in the junior year and will have to take it when they return as seniors. They must make arrangements with the chair of the Honors Committee before leaving campus.

Credit for literature courses taken abroad can in most instances be applied to the 40-hour minimum for the English major, and to requirements like the concentration and pre-1800 requirements. Approval of requests to apply credit for study abroad to the English major is granted by the DUS rather than the

academic advisor, however, and students must confer with the DUS in advance of going abroad as well as on their return. The first conference includes a review of catalogue descriptions of courses the student expects to take while abroad (along with a few alternatives), the second a presentation of transcripts or equivalent documentation of successful completion of the work proposed, together with papers and exams.

No more than 16 credits per year, or 8 credits per semester, of non-Cornell credit may be applied to the English major. This restriction applies to study abroad even when that study is conducted under Cornell auspices.

### The Major in English with Honors

Second-semester sophomores who have done superior work in English and related subjects are encouraged to seek admission to the departmental program leading to the degree of bachelor of arts with honors in English. Following an interview with the chair of the Honors Committee, qualified students will be admitted provisionally to the program. During their junior year these students complete at least one honors seminar (ENGL 491 or 492) and are encouraged to take an additional 400-level English course in the area of their thesis topic. On the basis of work in these and other English courses, a provisional honors candidate must select a thesis topic and secure a thesis advisor by the end of the junior year. A student who has been accepted by a thesis advisor becomes a candidate for honors rather than a provisional candidate.

During the senior year, each candidate for honors in English enrolls in a yearlong tutorial (ENGL 493-494) with the faculty member chosen as thesis advisor. The year's work culminates in the submission of a substantial scholarly or critical essay to be judged by at least two members of the faculty. More information about the Honors Program may be found in a leaflet available in the English offices.

### First-Year Writing Seminars Recommended for Prospective Majors

#### ENGL 270(2700) The Reading of Fiction

Fall, spring, summer. 3 credits.  
Each section limited to 17 students.  
Recommended for prospective majors in English. *This course does not satisfy requirements for the English major.*

This course examines modern fiction, with an emphasis on the short story and novella. Students write critical essays on authors who flourished between 1870 and the present, such as James, Joyce, Woolf, Hurston, Lawrence, Fitzgerald, Hemingway, Faulkner, Rhys, Welty, Salinger, and Morrison. Reading lists vary from section to section, and some may include a novel, but close, attentive, and imaginative reading and writing are central to all.

#### ENGL 271(2710) The Reading of Poetry

Fall, spring. 3 credits. Each section limited to 17 students. Recommended for prospective English majors. *This course does not satisfy requirements for the English major.*

How can we become more appreciative, alert readers of poetry, and at the same time better writers of prose? This course attends to the rich variety of poems written in English, drawing on the works of poets from William Shakespeare to Sylvia Plath, John Keats to Li-

Young Lee, Emily Dickinson to A. R. Ammons. We may read songs, sonnets, odes, villanelles, even limericks. By engaging in thorough discussions and varied writing assignments, we explore some of the major periods, modes, and genres of English poetry, and in the process expand the possibilities of our own writing.

#### ENGL 272(2720) Introduction to Drama

Fall, spring. 3 credits. Each section limited to 17 students. Recommended for prospective English majors. *This course does not satisfy requirements for the English major.*

Students in this seminar study plays, older and newer, in a variety of dramatic idioms and cultural traditions. Plays being performed by the theatre department are included, if possible. A typical reading list might include works by Sophocles, Shakespeare, Chekhov, Brecht, Miller, Beckett, and Shange. Course work consists of writing and discussion, and the occasional viewing of live or filmed performances.

### Expository Writing

#### ENGL 288-289(2880-2890) Expository Writing (LA)

Fall, spring, summer, and winter. 3 credits. Each section limited to 16 students. Students must have completed their colleges' first-year writing requirements or have the permission of the instructor. S. Davis and staff. Web site: <http://instruct1.cit.cornell.edu/Courses/engl288-289/> *This course does not satisfy requirements for the English major.*

ENGL 288-89 offers guidance and an audience for students who wish to gain skill in expository writing. Each section provides a context for writing defined by a form of exposition, a disciplinary area, a practice, or a topic intimately related to the written medium. Course members will read in relevant published material and write and revise their own work regularly, while reviewing and responding to one another's essays. Since these seminar-sized courses depend on members' full participation, regular attendance and submission of written work are required. Students and instructors will confer individually throughout the semester. ENGL 288-89 does not satisfy requirements for the English major.

Fall 2006 Listing: Section 1. Making the News, D. Pearlstein; Section 2. Endsight: Apocalyptic Fictions, T. Kearns; Section 3. The Reflective Essay, P. Gomez-Ibanez; Section 4. Constitutional Law and the Media: Issues, J. Carello; Section 5. The Essay: Personal to Public, C. Chung; Section 6. Issues, Audiences, and Ourselves, B. LeGendre; Section 7. American Political Satire After 9-11, E. Goode.

See English department course offerings for full fall and spring section descriptions.

#### ENGL 381(3810) Reading as Writing, Writing as Reading (LA)

Fall. 4 credits. Limited to 15 students. Prerequisite: permission of instructor based on a writing sample. S. Davis.

Every reading is a rewriting; arguably, every original imaginative work reads and rewrites itself and its predecessors as it goes along. We'll read 19th- and 20th-century works that illustrate this process while attending to one another's critical writing as collaborators and commentators. This is a course for English

majors and non-majors who wish to extend their mastery of critical and interpretive prose and their understanding of what they do when they write it. Tentatively for 2007: fiction by Vladimir Nabokov, Emily Brontë, Jean Rhys, Joseph Conrad, Tayeb Salih, Oscar Wilde, and Virginia Woolf and poetry by William Wordsworth and Edgar Allan Poe. See <http://instruct1.cit.cornell.edu/~sad4/rw/>.

#### ENGL 386(3860) Philosophic Fictions (LA)

Spring. 4 credits. Limited to 15 students. Prerequisite: permission of instructor based on a writing sample. S. Davis.

"Fictions" of thought and language abound in works that deliberately test and play with ideas: dialogues, satires, parables, philosophic tales, and "thought-experiments." Students will write critically about such works and will experiment with writing in similar forms in order to argue flexibly, ridicule vice and folly, or involve readers in pleasingly or disturbingly insoluble problems. Readings may include Plato's *Republic*, Swift's *Gulliver's Travels*, parables by Jesus and Kafka, dystopias by Ursula Le Guin and Caryl Churchill, science fiction by Philip K. Dick and Octavia Butler, short stories by Jorge Luis Borges and Flannery O'Connor, and essays by Richard Rorty and Jacques Derrida. See <http://instruct1.cit.cornell.edu/~sad4/fpf/>.

#### ENGL 387(3870) Autobiography: Theory and Practice (LA)

Fall. 4 credits. Limited to 15 students. By permission of instructor on the basis of writing samples. K. Gottschalk.

In this seminar, students engage in the study and practice of autobiographical writing through frequent writing assignments (resulting in production of a final portfolio of selected polished work) and through the examination of texts by writers such as Manette Ansay and Henry Louis Gates (both having strong ties to Cornell), Jamaica Kincaid, and Anne Lamott. Course limited to 15 students. Prerequisite: permission of the instructor on the basis of a writing sample, which should reach the instructor before the first day of class.

#### ENGL 388(3880) The Art of the Essay (LA)

Spring. 4 credits. Limited to 15 students. By permission of instructor on the basis of writing samples. Interested students should submit one or more pieces of recent writing (prose) to the instructor before the beginning of the semester, preferably at pre-enrollment. J. Carliacio.

For both English majors and nonmajors who have done distinguished work in first-year writing seminars and in such courses as ENGL 280-281, 288-289, and who desire intensive practice in writing essays as a kind of creative nonfiction. The course assumes a high degree of self-motivation, a capacity for independent work, and critical interest in the work of other writers; it aims for a portfolio of conceptually rich and stylistically polished writing.

### Creative Writing

Students usually begin their work in Creative Writing with ENGL 280 or 281, and only after completion of the First-Year Writing Seminar requirement. Please note that either ENGL 280 or ENGL 281 is the recommended prerequisite for 300-level creative writing courses. ENGL 280 and 281 may satisfy a distribution requirement

in your college (please check with your college advisor). ENGL 382–383, 384–385, and 480–481 are approved for the English major.

#### **ENGL 280–281(2800–2810) Creative Writing (LA)**

Fall, spring, summer, winter. 3 credits. Limited to 18 students. Prerequisite: completion of the First-Year Writing Seminar requirement. **Majors and prospective majors, please note:** Although recommended for prospective English majors, ENGL 280–281 cannot be counted toward the 40 credits required for completion of the English major. It is a prerequisite for 300-level courses in creative writing, which count toward the major. ENGL 280 is not a prerequisite for ENGL 281.)

An introductory course in the theory, practice, and reading of prose, poetry, and allied forms. Students are given the opportunity to try both prose and verse writing and may specialize in one or the other. Many of the class meetings are conducted as workshops.

#### **ENGL 382–383(3820–3830) Narrative Writing (LA)**

Fall, 382; spring, 383. 4 credits each semester. Each section limited to 15 students. Prerequisite: ENGL 280 or 281 and permission of instructor based on submission of a manuscript (bring manuscript to first day of class). Fall: sec 1, H. Varamontes; sec 2, S. Vaughn; sec 3, R. Morgan; Spring: sec 1, M. Koch; sec 2, E. Quinonez; sec 3, M. McCoy.

The writing of fiction; study of models; analysis of students' work.

#### **ENGL 384–385(3840–3850) Verse Writing (LA)**

Fall or summer, 384; spring, 385. 4 credits. Each section limited to 15 students. Prerequisite: ENGL 280 or 281 and permission of instructor based on submission of manuscript (bring manuscript on first day of class). Fall: sec 1, K. McClane; sec 2, L. Van Clief-Stefanon. Spring: sec 1, A. Fulton; sec 2, staff.

The writing of poetry; study of models; analysis of students' poems; personal conferences.

#### **ENGL 480–481(4800–4810) Seminar in Writing (LA)**

Fall, 480; spring, 481. 4 credits each semester. Each section limited to 15 students. Prerequisite: permission of instructor, normally on the basis of a manuscript. The manuscript should be submitted to the instructor no later than the first day of class. Previous enrollment in ENGL 280 or 281 and at least one 300-level writing course recommended. Successful completion of one half of the 480–481 sequence does not guarantee enrollment in the other half; students must receive permission of the instructor to enroll in the second course. Fall: Sec 1, L. Van Clief-Stefanon; sec 2, M. McCoy; spring: K. McClane and J. Lennon.

Intended for those writers who have already gained a basic mastery of technique. Although ENGL 480 is not a prerequisite for ENGL 481, students normally enroll for both semesters and should be capable of a major project—a collection of stories or poems, a group of personal essays, or perhaps a novel—to be completed by the end of the second semester. Seminars are used for discussion of the students' manuscripts and published

works that individual members have found of exceptional value.

#### **Courses for Freshmen and Sophomores**

These courses have no prerequisites and are open to freshmen and nonmajors as well as majors and prospective majors.

#### **Introductions to Literary Studies**

##### **ENGL 200(2000) Introduction to Criticism and Theory (LA)**

Fall. 4 credits. S. Mohanty.

This is an introductory course that explores some of the key concepts and methods used in literary studies. Focusing on a few literary texts and some drawn from popular culture, we will try to answer such basic questions as: what does it mean to read and analyze texts well? What roles do history and social ideology play in our readings? What, after all, is "art"?

We will also focus on literary and cultural theory, examining both contemporary questions and historical ones. Readings on aesthetics and critical theory from a variety of cultural traditions will be analyzed—from classical writings on beauty and the nature of art to contemporary works that focus on such issues as gender, race, and sexuality.

##### **ENGL 201–202(2010–2020) The English Literary Tradition # (LA)**

201, fall; 202, spring. 4 credits each semester. ENGL 201, not a prerequisite for 202, may be used as one of the three pre-1800 courses required of English majors. D. Fried.

201 (fall): An introduction to the study of English literature, examining its historical development and achievements from its beginnings to the middle of the 17th century. Readings will include *Beowulf* and *Sir Gawain and the Green Knight* in modern translation, selections from Chaucer's *Canterbury Tales* and the writings of medieval women, Book I of Spenser's *Faerie Queene*, Elizabethan sonnets, a play by Shakespeare, poems by Donne, Marvell, and Herbert, and selections from Milton's *Paradise Lost*. Lectures are supplemented by small discussion groups once a week.

202 (spring): An introductory survey of English literature from the late 17th century to the 20th century. We begin with the satires of the Restoration and 18th century including Pope's mock epic *The Rape of the Lock*, Swift's *Gulliver's Travels*, and selections from Johnson's poems and criticism. Selections from the Romantic era will include Blake's *Songs of Innocence and Songs of Experience*, poems and prose of Wordsworth, Coleridge, Shelley, and Keats; and a novel by Jane Austen. We will read poetry and prose from the Victorian era by Tennyson, Browning, Arnold, and Hopkins, plus Wilde's play *The Importance of Being Earnest*, and approach early 20th-century literature through Hardy, Forster, and Eliot. Lectures will be supplemented by small discussion groups once a week.

##### **ENGL 203(2030) Introduction to American Literatures: Writing America, from Colonialism to the "American Renaissance" (also AM ST 206[2030]) (LA)**

Fall. 4 credits. A. Galloway.

This course may be used as one of the three pre-1800 courses required of English majors.

This class will explore some of the writing from and about America, from pre-colonial times until about 1850. We will start with writings that defined the terms in which British thinkers and American colonists understood the "New World" and its political possibilities, such as Thomas Paine, Benjamin Franklin and Thomas Jefferson, and some early Native American poetry and stories. Then we will spend the bulk of the term with selected writers from the 17th century into the "American Renaissance": Jonathan Edwards, Charles Brockden Brown, Ralph Waldo Emerson, Margaret Fuller, Nathaniel Hawthorne, Frederick Douglass, Herman Melville, Edgar Allan Poe, Emily Dickinson, and Walt Whitman.

##### **ENGL 204(2040) Introduction to American Literatures: The Making of America: Reconstruction to the Present (also AM ST 207[2040]) (LA)**

Spring. 4 credits. J. Caraccio.

As the Civil War came to an end, the United States attempted to come to terms with its racialized past. America continued to struggle to identify itself broadly as a democratic nation and specifically as a "melting pot" of individuals fighting for their civil and sovereign rights. We will examine texts that exemplify how American writers articulated their desire for citizenship as well as for the right to act out a politics of difference. To this end, we will read texts that engage in a conversation about these issues, such as those authored by Native Americans, African Americans, Asian Americans, Latino/a Americans, and Anglo-Americans. This course will blend lecture with discussion and include both short and long writing assignments.

##### **[ENGL 205(2050) Introduction to World Literatures in English (LA)]**

Spring. 4 credits. Next offered 2007–2008. E. DeLoughrey.]

##### **[ENGL 206(2060) The Great American Cornell Novel (also AM ST 219[2060]) (LA)]**

Fall. 4 credits. Next offered 2007–2008. M. Hite.]

##### **ENGL 207(2070) Introduction to Modern Poetry (LA)**

Spring. 4 credits. R. Gilbert.

This course will survey English-language poetry written in the 20th century, with primary emphasis on American poets. We will consider poems written in traditional verse as well as in innovative forms; short poems and long poems; poems that are relatively easy to read and poems that are extremely challenging; poems that deal with issues of war, race, gender, sex, science, and other topics; important poetic movements like Imagism and the Confessional mode. Poets to be studied may include Yeats, Frost, Pound, H.D., Williams, Stevens, Stein, Eliot, Hughes, Cullen, Bishop, Brooks, Berryman, Ginsberg, Ammons, Plath, Rich, and Fulton. Students will submit weekly reading responses, some of which may take the form of original poems. Two essays and a final exam.

##### **ENGL 208(2080) Shakespeare and the 20th Century (LA)**

Spring. 4 credits. S. Davis.

This course may be used as one of the three pre-1800 courses required of English majors. What can we learn about Shakespeare's plays from their reception in the 20th and 21st centuries? What can we learn about modern cultures from their appropriations of these



texts? We will study four or five plays and their adaptations in film and theater and explore the uses made of Shakespeare in education, advertising, and public culture and by the "Shakespeare industry" itself. For spring 2007, tentatively: *Titus Andronicus*, *Twelfth Night*, *Merchant of Venice*, *Hamlet*, and *Macbeth*, together with Tom Stoppard's *Dog's Hamlet*, *Caboot's Macbeth*, and films directed by Michael Radford, Trevor Nunn, Julie Taymor, Grigori Kozintsev, Michael Almerayda, and Akira Kurosawa. See <http://instruct1.cit.cornell.edu/~sad4/208/>.

**[ENGL 209(2090) Introduction to Cultural Studies (CA)]**

4 credits. Next offered 2007-2008.]

**[ENGL 227(2270) Shakespeare (also THETR 277(2770)) # (LA)]**

Fall. 4 credits. May be used as one of the three pre-1800 courses required of English majors. B. Correll.

A lecture and discussion course that offers students a survey of representative Shakespearean comedies, tragedies, and history plays. Our study will include attention to forms, themes, and historical contexts, including history of the early modern English theater. We read nine plays, including *The Merchant of Venice*, *Twelfth Night*, *The Tempest*, *Othello*, *King Lear*, *Richard II*, *Henry IV Part One*, and *Henry V*.

**[ENGL 295(2950) The Essay in English # (LA)]**

4 credits. Next offered 2007-2008.]

**Major Genres and Areas**

**[ENGL 244(2440) SSP: Studies in Irish Culture (LA)]**

Fall. 4 credits. Limited to 15 students. Next offered 2007-2008. S. Siegel.]

**[ENGL 251(2510) 20th-Century Women Writers (also AM ST 252(2510), FGSS 251(2510)) (LA)]**

Fall. 4 credits. Next offered 2007-2008. E. DeLoughrey.]

**[ENGL 252(2520) SSP: Late 20th-Century Women Writers and Visual Culture (LA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007-2008. S. Samuels.]

**[ENGL 255(2550) African Literature @ (LA)]**

Fall. 4 credits. Next offered 2007-2008. B. Jeyifo.]

**[ENGL 260(2600) Introduction to American Indian Literatures in the United States (also AM ST 260(2600)) (LA)]**

Spring. 4 credits. Next offered 2007-2008. E. Cheyfitz.]

**[ENGL 262(2620) Asian American Literature (also AAS 262, AM ST 262(2620)) (LA)]**

4 credits. Next offered 2007-2008. S. Wong.]

**[ENGL 273(2730) Children's Literature (LA)]**

Spring. 4 credits. Next offered 2007-2008. J. Adams.]

**[ENGL 274(2740) Scottish Literature # (LA)]**

Fall. 4 credits; may be taken for 3 or 4 credits; those choosing 4 credits will complete an additional writing project. May be used as one of the three pre-1800 courses required of English majors. H. Shaw and T. Hill.

Although Scotland, which was long a separate nation, is now politically united with England, it preserves its distinctiveness. This course provides an introduction to Scottish literature, with special emphasis on the medieval period and the 18th through the 20th centuries. The course should appeal to those who wish to learn about their Scottish heritage, and also those who simply wish to encounter a remarkable national culture and the literature it has produced. Some of the texts will be read in Scots, but no familiarity with Scots or earlier English is presumed. We welcome readers of literature who are not English majors.

**[ENGL 276(2760) Desire (also COM L 276(2760), FGSS 276(2760), THETR 278(2780)) (LA)]**

Spring. 4 credits. Letter grades only. E. Hanson.

"Language is a skin," the critic Roland Barthes once wrote: "I rub my language against the other. It is as if I had words instead of fingers, or fingers at the tip of my words. My language trembles with desire." Sexual desire has a history, even a literary history, which we will examine through an introductory survey of European dramatic literature from Plato and Aristophanes to Jean Genet and Caryl Churchill, as well as a survey of classic readings in Western sexual theory from the Ancient Greeks through Freud and Foucault to contemporary feminism and queer theory. Topics for discussion will include pederasty, mysticism, hysteria, sadomasochism, pornography, cybersex, and other performative pleasures.

**[ENGL 277(2770) Literatures of the Black Atlantic: Reading the Contemporary (LA)]**

Spring. 4 credits. D. Woubshet.

This course will examine contemporary African and African Diasporic literatures. Through aesthetic, generic, and contextual approaches we will consider how relationships in the black Atlantic world (Africa, the Caribbean, and the United States) are reconfiguring themselves. We will ask: what are the recurring themes within such literature? Upon what history and what fiction is such a world brought together? How is globalization fueling the intercourse between the various black Atlantic worlds? We will consider literature across genres to bring out some of the central motifs of our contemporary moment: geography, nationality, race, class, gender and sexual difference. Readings may include: Morrison's *Tar Baby*; Kincaid's *A Small Place*; Walcott's "The Antilles: the Fragments of Epic Memory"; and Baldwin's *Just Above My Head*.

**[ENGL 293(2930) Survey in African American Literature (also AM ST 293(2650)) (LA)]**

Fall. 4 credits. The course is designed for majors but will be open to all interested students. Next offered 2007-2008. H. Spillers.]

**Special Topics**

**[ENGL 210(2100) Medieval Romance: Voyage to the Otherworld # (LA)]**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2007-2008. T. Hill.]

**[ENGL 217(2170) History of the English Language (also LING 217(2170))]**

Fall. 4 credits. W. Harbert.

For description, see LING 217.

**[ENGL 263(2630) Studies in Film Analysis: Hitchcock (also FILM 265(2650)) (LA)]**

Fall. 4 credits. Limited to 20 students.

L. Bogel.

Through detailed analysis of at least 15 of Hitchcock's major films—from British silents such as *Blackmail* and the British talkies of the 30s (*The Thirty-Nine Steps*) to the early 40s work in Hollywood (*Spellbound*, *Notorious*), and major American films of his late period (*Rear Window*, *Psycho*) we will consider Hitchcock as a major technical and stylistic innovator in the history of cinema. As texts for psychoanalytic and feminist approaches to study, his films invite questions about film language, the ethics of spectatorship, and the nature of desire and sexuality. Frequent short essays and viewing exercises encourage students to engage through their writing the course's critical concerns. Regular required screenings after class.

**[ENGL 264(2640) The Private I and the Public Eye: Exploring Latino/a Identity in Poetry, Fiction, and Non-Fiction (also LSP 264(2640))]**

Fall. 4 credits. H. Viramontes.

For the most part literary theories have assumed that autobiography (the private) and the political (the public) can be considered as separate or irreconcilable domains. This course, however, will explore ways that private expression can be used to investigate the political. Through studies of personal essays, poetry, and fiction, we'll read and discuss how Latino/a writers succeed in questioning or challenging boundary lines between public and private. We'll ask how they aspire, through their excavation of their own social location, to inspire their work. Using various genres introduced in class, students will have the opportunity to explore and ground their own understanding of identities. Authors may include: Norma Cantú, Alicia Gaspar de Alba, Minnie Bruce Pratt, Judith Ortiz Cofer, Julia Alvarez, Gustavo Fierme, Elias Miguel Munoz, Luis Rodriguez.

**[ENGL 268(2680) Culture and Politics of the 1960s (also AM ST 268(2680)) (CA)]**

Fall. 4 credits. P. Sawyer.

For many people, the sixties were a time of revolutionary hopefulness, when the civil rights movement, the Cold War and the Vietnam War stimulated impassioned critiques and alternative experiments in living that changed American society forever. What can the experiences of young "boomers" and others who lived through the sixties teach a later generation living through similar times? To answer this and other questions, the course combines an historical overview with the close reading of texts, concentrating on the topics of racial justice, the Vietnam War, the counterculture, the New Left, the women's movement, and the movement for gay and lesbian rights. Texts will include



*The Autobiography of Malcolm X, Dispatches, Slaughterhouse-5*, music of Dylan and Joplin, speeches of King, films, manifestos, poetry, and music.

**ENGL 292(2920) Introduction to Visual Studies (also VISST 200[2000]) (LA)**

Spring. 4 credits. T. Murray.  
For description, see VISST 200.

**[ENGL 297(2970) Sophomore Seminar: Sustainable Literature (CA)]**

Fall. 4 credits. Next offered 2008–2009.  
L. Donaldson.]

**Courses for Sophomores, Juniors, and Seniors**

Courses at the 300 level are open to sophomores, juniors, and seniors and to others with the permission of the instructor.

**ENGL 302(3020) Literature and Theory (also ENGL 602[6020], COM L 302/622[3020/6220]) (LA)**

Fall. 4 credits. J. Culler.

Study of issues in contemporary theoretical debates, with particular attention to structuralism, deconstruction, psychoanalysis, and feminism. Readings by Roland Barthes, Judith Butler, Jacques Derrida, Michel Foucault, Barbara Johnson, Jacques Lacan, and others. No previous knowledge of literary theory is assumed.

**[ENGL 308(3080) Icelandic Family Sagas # @ (LA)]**

Spring. 4 credits. Next offered 2007–2008.  
T. Hill.]

**[ENGL 310(3100) Old English in Translation # (LA)]**

4 credits. Next offered 2007–2008. T. Hill.]

**ENGL 311(3110) Old English (also ENGL 611[6110]) # (LA)**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. T. Hill.

The course is intended as an introduction to the Old English language. We will begin with simple prose texts and proceed to poetic texts such as *Maldon*, *The Wanderer*, *The Seafarer* and *The Dream of the Rood*. The primary aim of the course is to learn Old English, but we will discuss the literary issues the texts we cover present. There will be a mid-term and a final exam.

**ENGL 312(3120) Beowulf (also ENGL 612[6120]) # (LA)**

Spring. 4 credits. Recommended: one semester's study of Old English or equivalent. May be used as one of the three pre-1800 courses required of English majors. S. Zacher.

A close reading of *Beowulf*. Attention is given to relevant archaeological, literary, cultural, and linguistic issues.

**[ENGL 316(3160) Beasts, Bodies, and Boundaries # (LA)]**

Spring. 4 credits. Next offered 2007–2008.  
S. Zacher.]

**ENGL 319(3190) Chaucer # (LA)**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. M. Raskolnikov.  
Chaucer became known as the "father of English poetry" before he was entirely cold in his grave. Why is what he wrote more than six hundred years ago still riveting for us today? It's not just because he is the

granddaddy of this language and its literature; it's because what he wrote was funny, fierce, thoughtful, political, philosophical and, oh yes, notoriously bawdy. We'll read some of Chaucer's brilliant early work, and then dig into his two greatest achievements: the epic *Troilus and Criseyde*, and *The Canterbury Tales*, his oft-censored panorama of medieval English life. Chaucer will be read in Middle English, which will prove surprisingly easy and pleasant.

**ENGL 320(3200) Renaissance Literature (also COM L 356[3560])**

Spring. 4 credits. W. Kennedy.

For description, see COM L 362.

**ENGL 321(3210) Spenser and Malory # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Informal lecture and discussion. C. Kaske.

Paired selections covering about half of Malory's *Morte d'Arthur* and half of Spenser's *Faerie Queene*. The French Prose Arthurian Cycle, Chretien's romances, *Sir Gauvain and the Green Knight*, and some of Spenser's minor poems are mentioned occasionally as background. Comparisons assess possible literary influence, the distinctive vision, style, and narrative technique of each author as a writer of romance, and the development of Arthurian romance from the Middle Ages to the Renaissance.

**[ENGL 327(3270) Shakespeare: Staging Women # (LA)]**

Fall. 4 credits. Next offered 2007–2008.]

**[ENGL 328(3280) The Bible in Literary and Cultural Perspective # (LA)]**

Fall. 4 credits. Next offered 2007–2008.  
L. Donaldson.]

**ENGL 329(3290) Milton # (LA)**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. R. Kalas.

An introduction to the poetry and prose of John Milton in light of the political, social, and religious upheavals of the 17th century. Rather than dividing the poetry from the prose, this course will foreground the integration of poetic and polemical concerns in Milton's work. Readings will include selected short poems, *Comus*, *Samson Agonistes*, *Paradise Regained*, all of *Paradise Lost*, *Areopagitica*, *The Doctrine and Discipline of Divorce*, and excerpts from Milton's other prose works.

**ENGL 330(3300) Restoration and 18th-Century Literature # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. F. Bogel.

Close reading of texts in a variety of genres (poetry, fiction, drama, autobiography) will be guided by such topics as: the nature of satire, irony, and mock-forms; the languages of the ridiculous and the sublime; the politics of gender and sexuality; the authority and fallibility of human knowledge; connections among melancholy, madness, and imagination. Works by such writers as Rochester, Behn, Finch, Dryden, Swift, Gay, Defoe, Johnson, Boswell, Sterne, and Cowper.

**[ENGL 333(3330) The 18th-Century English Novel # (LA)]**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2007–2008. F. Bogel.]

**ENGL 335(3350) Modern Western Drama, Modern Western Theater: Theory and Practice (also THETR 335/COM L 335/VISST 335[3350])**

Fall. 4 credits. N. Salvato.

For description, see THETR 335.

**ENGL 340(3400) English Romantic Period # (LA)**

Fall. 4 credits. This course may *not* be used as one of the pre-1800 courses required of English majors. R. Parker.

Readings from early 1790s to early 1820s writers—among them Blake, Wordsworth, Wollstonecraft, Coleridge, Byron, Hazlitt, Mary Shelley, Percy Shelley, and Keats—with major emphasis on poetry but with substantial attention to prose fiction, drama, letters, and political and literary essays. The course is concerned with close reading of formal experiments in narrative, lyric, and dramatic representation and with analysis of political and cultural issues and contexts in an age of national reform and international revolution and conflict.

**ENGL 345(3450) Victorian Controversies # (LA)**

Fall. 4 credits. S. Siegel.

This course explores the questions that men and women in England and Ireland asked about themselves and their time: Was their century marked by progress or decline? Would machines degrade or ennoble workers? Did aesthetic experience complement or compete with religious doctrine? Were art and science dependent upon or opposed to each other? Should all forms of expression be permitted or should certain forms be censored? Should the colonies be permitted to rule themselves or remain dependent on England? Would prestige be gained if institutions of higher learning awarded degrees to women? Was "manliness" revealed through "character" or through "behavior"? Authors include Arnold, Barrett Browning, Carlyle, Gregory, Hyde, Hoyer, Mill, Morris, Parnell, Pater, Ruskin, Wilde, and Yeats.

**ENGL 348(3480) Studies in Women's Literature: The Feminist Literary Tradition (also FGSS 348[3480]) (LA)**

Spring. 4 credits. K. McCullough.

Is there a feminist literary tradition and if so what might it look like? In this class we will examine a range of texts, primarily but not exclusively fiction, texts that explore questions of female subjectivity and creativity. What issues have been most pressing for feminist writers? What political questions most vexing? We will read primarily British and U.S. writers and will examine what use they make of both canonical and experimental literary forms. To what extent, that is, does the need to tell a new story force or enable a writer to develop a new form in which to write?

**ENGL 349(3490) Shakespeare and Europe (also COM L 348[3480]) (LA)**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. W. Kennedy.

For description, see COM L 348.

**ENGL 350(3500) The Modern Tradition (LA)**

Spring. 4 credits. D. Schwarz.

Critical study of major works by Hardy, Conrad, Lawrence, Joyce, Woolf, Eliot, Yeats, Hopkins, Wilde, Wallace Stevens, and others. While the emphasis will be on close reading of individual texts, we shall place the authors and works within the context of literary, political, cultural, and intellectual history. The course will seek to define the development of literary modernism (mostly but not exclusively in England), and relate literary modernism in England to that in Europe and America as well as to other intellectual developments. We shall be especially interested in the relationship between modern literature and modern painting and sculpture; on occasion, we shall look at slides. Within the course material, students will be able to select the topics on which they write essays.

**[ENGL 353(3530) The Modern Indian Novel @ (LA)]**

4 credits. Next offered 2007-2008.]

**ENGL 354(3540) The British Modernist Novel (LA)**

Fall. 4 credits. D. Mao.

In the first years of the 20th century, British and Irish writers were able to wrest out of the chaos of their times some of the most inventive, troubling, and beautiful novels ever composed in English. This course considers not only how the British and Irish modernist novel broke new ground in literary form, but also how and why it said things about art, love, politics, empire, terror, imagination, and desire not said before and perhaps never said so well again. Authors studied may be drawn from among Woolf, Conrad, Ford, Joyce, Lawrence, Forster, Bowen, Beckett, Wyndham Lewis, and Rebecca West.

**ENGL 355(3550) Decadence (also COM L/FGSS 355(3550)) (LA)**

Fall. 4 credits. E. Hanson.

"My existence is a scandal," Oscar Wilde once wrote, summing up in an epigram the effect of his carefully cultivated style of perversity and paradox. Through their valorization of aestheticism and all that was considered artificial, unnatural, or perverse, the so-called "Decadent" writers of the late-19th century sought to free the pleasures of beauty, spirituality, and sexual desire from their more conventional ethical moorings. We will discuss literary and visual texts by Charles Baudelaire, Edgar Allan Poe, J.-K. Huysmans, Leopold von Sacher-Masoch, A. C. Swinburne, Walter Pater, René Vivien, James McNeill Whistler, and Aubrey Beardsley, with a particular focus on Oscar Wilde. Students may read French and German texts in the original or in English translation.

**[ENGL 361(3610) Studies in the Formation of U.S. Literature: Emerson to Melville (also AM ST 361(3610)) # (LA)]**

Spring. 4 credits. Next offered 2007-2008. D. Fried.]

**ENGL 362(3620) Studies in U.S. Literature after 1850: Reconstructing America (also AM ST 364(3640)) (LA)**

Fall. 4 credits. N. Waligora-Davis.

Taking up his turn of the century argument that the problem of the 20th century will be the problem of the color-line, this course reads W.E.B. DuBois' articulation backwards and forwards, tracing shifting representations

of race and American identity from the Civil War through the beginning of WWII. Topics range from abolitionism to race science, from circus "freaks" to "diseased" immigrants, from negrophobia to negrophilia. This course studies constitutional, immigration, marriage, and seduction law; World Fairs and circuses; eugenics and baby contests; boxing and baseball, jazz and blues, and lynchings and chain gangs. Our readings include but will not be limited to Stowe, Delany, James, Fitzgerald, Stoddard, DuBois, Faulkner, Larsen, Lee, *The Jazz Singer*, *Flying Down to Rio*, *King Kong*, and *Legends of the Fall*.

**[ENGL 363(3630) Studies in U.S. Literature Before 1950: The American 1920s—Literature and Culture (LA)]**

4 credits. Next offered 2007-2008.]

**ENGL 364(3640) Studies in American Literature After 1950: American Literature, the 1980s (also AM ST 373(3730)) (LA)**

Fall. 4 credits. D. Woubshet.

This course will explore literature of the 1980s against the broader cultural and historical landscape of 80s America. In many ways, we live in the immediate shadow of the 1980s, but our slight remove from the decade affords us a chance to look back at the literature and culture of the 80s with some distance (and familiarity). In this course, we will give particular emphasis to the following themes: postmodernism, the blurring of literary genres, the blurring of taste (high vs. low culture), the emphasis on (racial, gender, and sexual) difference, pop culture, and history. Authors may include: Don DeLillo, Kurt Vonnegut, Maxine Hong Kingston, Thomas Pynchon, Toni Morrison, Norman Mailer, Ishmael Reed, Audre Lorde, and Gloria Anzaldúa.

**[ENGL 365(3650) American Literature Since 1945 (also AM ST 365(3650)) (LA)]**

Fall. 4 credits. Next offered 2007-2008. B. Maxwell.]

**ENGL 366(3660) Studies in U.S. Fiction Before 1900: The 19th-Century American Novel (also AM ST 366(3660)) # (LA)**

Spring. 4 credits. S. Samuels.

Reading carefully some of the most fascinating novelists in the 19th-century United States, we examine patterns of social and political awareness in these writers. In particular, we think about the relations among stylistic concerns in fiction and the construction of identities formed by national, racial, gendered, and sexual allegiances. Writers may include Mark Twain, Charles Chesnut, Nathaniel Hawthorne, Henry James, Edith Wharton, Pauline Hopkins, Harriet Wilson, Herman Melville, E.D.E.N. Southworth, and Stephen Crane.

**ENGL 367(3670) Studies in U.S. Fiction After 1900: The Literature of the Stranger (also AM ST 367(3670)) (LA)**

Spring. 4 credits. S. Wong.

What is a stranger? How is the category of the "stranger" to be marked off from, for example, that of the foreigner, outsider, refugee, exile, wanderer, pariah, or barbarian? Who is a stranger? What is the social function of the stranger? How has the idea of the "stranger" shaped, or been shaped by, 20th-century U.S. fiction? What can we learn about the stranger as sociological type and as literary type? These are some of the questions that will serve as

points of departure for our discussions of the literature. We'll be reading widely across the landscape of 20th-century U.S. fiction. We'll also be reading a number of articles that take up the idea of the stranger from a variety of disciplinary viewpoints.

**[ENGL 368(3680) Faulkner (LA)]**

4 credits. Next offered 2007-2008. H. Spillers.]

**ENGL 369(3690) Fast-Talking Dames and Sad Ladies: 1940s and Now (also FILM 369(3690), FGSS 369(3690)) (LA)**

Spring. 4 credits. Limited to 15 students. Students must be able to attend Mon. and/or Tues. late-afternoon screenings. Film fee: \$20. L. Bogel.

Focusing on sassy or subdued heroines of Hollywood's 1940s films and current films, this seminar works to define romantic comedy and melodrama as genres; as vehicles for female stars; as ways of viewing the world. Psychoanalytic and feminist analyses of these films will help us pose questions about gender and culture, about gendered spectatorship, about Hollywood's changing constructions of "woman," the "maternal," and the "feminine," and about representations of desire, pleasure, fantasy, and ideology. Required twice-weekly screenings of such films as *Gilda*, *The Lady Eve*, *Notorious*, *The Women*, *The Philadelphia Story*, *His Girl Friday*, *Mrs. Dalloway*, *The Hours*, *First Wives' Club*, *All About My Mother*, *Silence of the Lambs*, and *Far from Heaven*.

**ENGL 370(3700) The 19th-Century Novel # (LA)**

Spring. 4 credits. J. Adams.

A survey of representative works by major British novelists from Austen to Hardy. These works exemplify the great variety of "realism" in the novel, developing a range of distinctive styles and narrative structures in efforts to represent the interplay of personal identity and society at large. They are particularly engaged by the conflicts between traditional social forms (class, gender, marriage) and new forms of mobility and self-determination that emerge within the most dynamic economy the world had yet seen. We'll be especially interested in the novel's preoccupation with domestic life, and reshaping of the familiar "marriage plot" in a world of great social and sexual anxiety. In short: love and money. The readings will include works by Austen, Thackeray, Dickens, C. Brontë, Trollope, George Eliot, and Hardy.

**[ENGL 372(3720) Medieval and Renaissance Drama (also THETR 372(3720)) # (LA)]**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2007-2008. M. Raskolnikov.]

**[ENGL 373(3730) English Drama from 1700 to the Present # (LA)]**

Spring. 4 credits. Next offered 2008-2009.]

**ENGL 374(3740) Slavery in 20th-Century Film and Fiction (also AM ST 374(3681)) (LA)**

Spring. 4 credits. N. Waligora-Davis.

This course explores 20th-century preoccupations and reconstructions of slavery, examining the ways slavery continues to define and impact sexuality, racial identities and their popular representations, our sense of public and private spaces, legal discourse, and our national identity. What does it mean

to be a black or white man or woman in America? Who does law, history, and society concede as legitimate witness? How should we craft our histories? Who is a subject of, and who is subjected to law? How are privacy interests diffused against social interests? Our readings will place in close proximity not only historical writings on slavery (slave history and slave narratives) and these 20th-century revisionist slave stories, but slave law and contemporary immigration, property, reproduction, criminal, and privacy legislation.

**ENGL 375(3750) Studies in Drama and Theatre: "Enemies, A 'Love' Story?" (also THETR 375(3750)) (LA)**

Fall. 4 credits. P. Lorenz.

The birth of modern drama has been linked to the staging of interpersonal relationships, and in particular to relations of conflict, struggle, and hostility. Very often the hero of drama is at odds with an enemy. But what is an enemy? Is he personal or political, racial or religious? Is he a he, and if so, is there any escaping him? The course focuses on the figure of the enemy in plays by Shakespeare, Marlowe, Kyd, Brecht, Ibsen, Bruckner, Miller, and Wilson, while considering various conceptual models of enmity, from the Bible through Marx and Freud. How are these models responded to or resisted in drama from the Renaissance through the 20th century?

**[ENGL 378(3780) American Poetry Since 1950 (also AM ST 372(3780)) (LA)]**

Spring. 4 credits. Next offered 2008–2009. R. Gilbert.]

**ENGL 379(3790) Reading Nabokov (also RUSSL 385(3850)) (LA)**

Fall. 4 credits. G. Shapiro.

For description, see RUSSL 385.

**ENGL 381(3810) Reading as Writing (LA)**  
See complete course description in section headed "Expository Writing."

**ENGL 382–383(3820–3830) Narrative Writing (LA)**

See complete course description in section headed "Creative Writing."

**ENGL 384–385(3840–3850) Verse Writing (LA)**

See complete course description in section headed "Creative Writing."

**ENGL 386(3860) Philosophic Fictions (LA)**

See complete course description in section headed "Expository Writing."

**ENGL 387(3870) Autobiography: Theory and Practice (LA)**

See complete course description in section headed "Expository Writing."

**ENGL 388(3880) The Art of the Essay (LA)**

See complete course description in section headed "Expository Writing."

**[ENGL 390(3900) Autobiography: The Politics of History, Memory, and Identity (LA)]**

Spring. 4 credits. Next offered 2008–2009. J. Carlacio.]

**ENGL 391(3910) Studies in African American Literature (also AM ST 387(3910)) (LA)**

Fall. 4 credits. H. Spillers.

This course offers an introduction to the study of African American literature and culture; open to English majors, as well as any student

interested in the subject, the course adopts its readings from a range of genres and writers from the early eras of the literature to the contemporary period.

**[ENGL 395(3950) Video: Art, Theory, and Politics (also FILM 395(3950))]**

4 credits. Next offered 2008–2009.

T. Murray.]

**[ENGL 396(3960) Introduction to Global Women's Literature @ (LA)]**

4 credits. Next offered 2008–2009.

E. DeLoughrey.]

**ENGL 397(3970) Policing and Prisons in American Culture (also AM ST 395(3970)) (CA)**

Spring. 4 credits. B. Maxwell.

Having attained the highest number of incarcerated persons of any nation on earth, while subjecting the populace to ordeals marked by the names Rodney King, Abner Louima, and Amadou Diallo, United States regimes of policing and imprisonment compel historical and critical attention. This course considers policing and imprisonment in United States culture, stressing prisoners' writing, song, raps, slang, and graphic art. In addition to work by imprisoned people, readings will draw on carceral theory, activist documentation, and the history of criminal justice. Finally, we will consider questions raised by non-criminal confinement in U.S. history: slavery, indentured servitude, the reservation system for indigenous peoples, prisoners of war in the Civil War, the wartime internment of Japanese Americans, and carceral and punitive operations of the former Immigration and Naturalization Service, now part of the Department of Homeland Security.

**ENGL 398(3980) Latino/a Popular Culture (also AM ST 396(3981), LSP 398(3980)) (CA)**

Spring. 4 credits. U.S. Latino/a history is strongly recommended as a prerequisite, but not required. M. P. Brady.

This course will explore Latino/a cultural work ranging from 'zines to comic books, architecture to film, music to sculpture, musicals to spoken word, theater to internet sites. We will consider how this work emerges in the context of U.S. engagements with Latin America and in the context of struggles for social and economic equality among ethnoracial groups in the United States. We will consider therefore the production of stereotypes (particularly in the 19th century) and the ongoing efforts of contemporary artists to dispel such stereotypes, to work along side them and to rework them. We will also consider the relationship between cultural production, representation, and public policy. U.S. Latino/a history is strongly recommended as a prerequisite, but not required.

**Courses for Advanced Undergraduates**

Courses at the 400 level are open to juniors and seniors and to others by permission of instructor unless other prerequisites are noted.

**[ENGL 402(4020) Literature as Moral Inquiry (KCM)]**

Spring. 4 credits. Next offered 2008–2009.

S. Mohanty.]

**ENGL 403(4030) Advanced Seminar in Poetry: Studies in American Poetry, 1955–1980 (also AM ST 403(4030)) (LA)**

Fall. 4 credits. R. Gilbert.

The period between 1955 and 1980 was an especially exciting one in American poetry, as a younger generation of poets struggled to break away from the high Modernists and establish their own voices. This course will explore the wide range of styles and projects that emerge during this period. We'll focus on important individual books of poetry, beginning with two seminal volumes: Allen Ginsberg's *Howl* (1956) and Robert Lowell's *Life Studies* (1959). Other poets to be studied may include John Berryman, Gwendolyn Brooks, Elizabeth Bishop, Robert Duncan, Robert Creeley, Frank O'Hara, James Wright, A. R. Ammons, John Ashbery, James Merrill, W. S. Merwin, Adrienne Rich, Gary Snyder, Sylvia Plath, and Audre Lorde. In-class presentations will focus on the critical reception of individual volumes. Three essays.

**[ENGL 404(4040) Paleography, Bibliography, and Reception History (also ENGL 604(6040)) # (LA)]**

Spring. 4 credits. Next offered 2008–2009.

A. Galloway.]

**[ENGL 405(4050) The Politics of Contemporary Criticism (LA)]**

Fall. 4 credits. Next offered 2008–2009.

S. Mohanty.]

**ENGL 408(4080) Society for the Humanities**

Spring. 4 credits.

Sec 1 Modernization and Fiction. A. Hoberek. For description, see S HUM 421.

Sec 2 Caribbean Popular Literature.

B. Edmondson.

For description, see S HUM 423.

**[ENGL 413(4130) Middle English (also ENGL 613(6130)) # (LA)]**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2008–2009. T. Hill.]

**ENGL 414(4140) Bodies of the Middle Ages: Embodiment, Incarnation, Performance (also FGSS 414(4140)) # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors.

M. Raskolnikov.

How can the sort of bodies (female, heroic, monstrous, martyred and/or divine) found in medieval works represent, or fail to represent, the "real" of lived experience? To study the Middle Ages is to study the writings of people centuries dead. Reaching back in time, we find disembodied words. Yet these words speak to us about the very stuff of embodied life: love, sex, hunger, dirt, death, decay. This course is designed to expose students to a wide range of medieval genres and authors (like a "Middle English Literature survey"), and to an array of contemporary critical methodologies for considering the meaning of life in a body then and now.

**ENGL 419(4190) The Old English Laws and Their Politico-Cultural Context (also ENGL 609(6090), HIST 469/669(4691/6691))**

Fall. 4 credits. P. Hyams and T. Hill.

For description, see HIST 469.

**ENGL 421(4210) Advanced Seminar in the Renaissance: Literature, Science, and Renaissance Curiosities**

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. J. Mann.

Francis Bacon, the first philosopher of English science, vowed "to trust nothing but on the faith of my eyes." Bacon's declaration became a central tenet of philosophical inquiry during the 17th century, as gentlemen began to collect specimens, dissect bodies, and survey the physical universe. This course will explore how the methods of the new experimental "science" reverberated in—and were challenged by—literary productions in the age of Shakespeare and Milton. We will also consider the representation of figures subject to the developing scientific gaze: curiosities such as the hermaphrodite, the Amazon, and the African. Our syllabus will include works of imaginative literature (Golding, Shakespeare, Beaumont, Donne, Wroth, Milton) as well as medical texts and works of natural philosophy (Paré, Duval, Bacon, Harvey, Cavendish).

**ENGL 422(4220) Renaissance "Traffic" # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. R. Kalas.

This course looks at the various forms of traffic and exchange—in words, books, goods, and persons—that shaped the literary culture of the Renaissance in Britain. How did writers respond to new modes of mercantile exchange; new forms of commercial theater and print culture; and new ideas about the transmission of property? And what is the role of literary innovation in these kinds of social and historical transformations? We'll be asking, ultimately, how a notion of literary traffic might refine our understanding of the foundations of transatlantic Anglo-American culture. Readings will include plays by Shakespeare, Massinger, and Jonson; Marlowe's *Hero and Leander*; Milton's *Samson Agonistes*; and other poems by Donne, Marvell, and Isabella Whitney; and prose selections from Bacon, Bradford, Rowlandson, and Coryat's *Crudities*.

**ENGL 423(4230) Renaissance Lyric # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. B. Correll.

This course is about Renaissance poetry and the issues of studying it, including forms like sonnets and psalms, techniques, influences, cultural contexts. Reading covers major authors such as Surrey, Wyatt, Sidney, Spenser, Shakespeare, and Donne, and others, including women writers, who also participated in developing early modern poetry. We look at rhetoric handbooks, debates on poetry, and important scholarship. While the topic of 16th-century lyric is historically specific, this seminar is aimed at anyone with an interest in lyric poetry, regardless of background or preparation, willing to work collectively to talk about lyric, interested in what might be at stake in reading early modern lyric.

**ENGL 428(4280) Problem Poems: Close Reading and Critical Debate # (LA)**

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. F. Bogel.

A number of English and American poems have generated long-standing—sometimes dramatic—controversy, much of it still unresolved. We'll study closely a variety of these poems and their "problems," paying attention to the texts, to the disagreements, and to what criticism can tell us about how those disagreements have been produced and addressed. What can such critical controversy tell us about poetic meaning, or critical authority? Some supplementary readings in criticism and theory will be made available. Poems will be drawn from a wide range of authors and periods. Authors may include Shakespeare, Marvell, Rochester, Swift, Gray, Wordsworth, Keats, Robert Browning, Dickinson, Christina Rossetti, Lawrence, Millay, and Roethke. This is an appropriate course for anyone interested in poetry and different ways of reading it.

**[ENGL 429(4290) Adam's Rib and Other Divine Signs: Reading Biblical Narrative (also RELST 429[4290]) # (LA)]**

Spring. 4 credits. Next offered 2008–2009. L. Donaldson.]

**ENGL 430(4300) Topics in American Studies (also AM ST 430[4303], AAS 430[4301], HIST 448[4480])**

Spring. 4 credits. S. Wong.  
The Rabinor Seminar. For description, see AM ST 430.

**ENGL 431(4310) Of Machines and Men: Gender, Technology, and Literature 1880–1940**

Spring. 4 credits. K. Biers.

This course examines the close relationship between humans and machines in British and American literature from the fin de siècle to World War II. Reading various genres—including novels, short stories and essays—we will explore how the machine became a highly gendered object of fear, fascination, and fantasy in the context of industrialization and urbanization; mass culture; war; changing gender roles; and new theories of perception, consciousness, sexuality, and the body. Our main focus will be how machines influenced representational practices, giving rise to different styles and movements—including realism and modernism—and opening up the possibility for representing distinctly "modern" conceptions of gender and sexuality. Authors may include Stephen Crane, Henry Adams, Bram Stoker, Henry James, Virginia Woolf, Gertrude Stein, Mina Loy, and Wyndham Lewis.

**[ENGL 434(4340) Electronic Art and Culture (LA)]**

4 credits. Next offered 2007–2008.  
T. Murray.]

**[ENGL 437(4370) Fiction(s) of Race, Fact(s) of Racism: Perspectives from South African and Afro-American Literatures @ (LA)]**

4 credits. Next offered 2008–2009.  
B. Jeyifo.]

**[ENGL 440(4440) Romantic Drama (also ENGL 644[6440], THETR 440[6444/4400/6440]) (LA)]**

Fall. 4 credits. Next offered 2007–2008.  
R. Parker.]

**[ENGL 443(4430) The Dandy in London and Dublin # (LA)]**

Spring. 4 credits. Next offered 2008–2009.  
S. Siegel.]

**ENGL 444(4441) Text Analysis for Production: How to Get from the Text onto the Stage (also THETR 445[4450], VISST 445[4455])**

Fall. 4 credits. B. Levitt.  
For description, see THETR 445.

**ENGL 446(4660) Comedy and Satire: The 19th Century**

Spring. 4 credits. P. Sawyer.  
From the sophisticated and witty to the obscene and grotesque, 19th-century English writers confronted their society, aroused their readers, and changed the shape of literature through the forms of mockery and laughter. In sharing the laughter, we'll also explore how comic forms articulate serious concerns—about class and sexual identity, injustice, utopias, love, and death. Topics will include parody, the grotesque, the emergence of urban satire, and the Dickensian comedy of manners. Texts will include *Northanger Abbey*, *Don Juan*, *Vanity Fair*, *Pickwick Papers*, and *The Importance of Being Earnest*; poems by Robert Browning and Christina Rossetti; a comic opera by Gilbert and Sullivan; caricatures and epigrams; and theoretical works by Bakhtin and Frye.

**[ENGL 450(4500) History of the Book # (LA)]**

Spring. 4 credits. Next offered 2007–2008.  
K. Reagan.]

**ENGL 452(4520) Wilde and Woolf (LA)**

Spring. 4 credits. S. Siegel.  
This seminar considers the question of style: what does the word mean; why has it claimed attention; how has it behaved in the work of two authors whose writings among their contemporaries marked distinctive departures? We explore Oscar Wilde and Virginia Woolf as readers of literary and social texts. Along the way, we direct our attention to the implicit expectations brought to the understanding of "Victorians" and "Modernists." Selections are drawn from the full range of Wilde's and Woolf's work. Our principal texts, however, are limited to a few essays by each author.

**[ENGL 453(4530) 20th-Century Women Writers of Color (also AAS/FGSS 453[4530]) (LA)]**

Fall. 4 credits. Course requirements include presentations, short responses to readings, and a longer research essay. Next offered 2007–2008. S. Wong.]

**ENGL 455(4550) Metafiction (also COM L 446[4460])**

Fall. 4 credits. W. Cohen.  
For description, see COM L 446.

**[ENGL 456(4560) Postmodern Novel (LA)]**

4 credits. Next offered 2007–2008. M. Hite.]

**ENGL 458(4580) Imagining the Holocaust (also COM L 483[4830], GERST 457[4570]) (LA)**

Spring. 4 credits. D. Schwarz.  
What is the role of the literary imagination in keeping the memory of the Holocaust alive for our culture? We shall examine major and widely read Holocaust narratives that have shaped the way we understand and respond to the Holocaust. We shall begin with first person reminiscences—Wiesel's *Night*, Levi's *Survival at Auschwitz*, and *The Diary of Anne Frank*—before turning to realistic fictions such as Kineally's *Schindler's List* (and Spielberg's film), Kertesz's *Fateless*, Kosinski's *The Painted Bird*, and Ozick's "The Shawl." We shall also read the mythopoeic vision of Schwarz-Bart's

*The Last of the Just*, the illuminating distortions of Epstein's *King of the Jews*, the Kafkaesque parable of Appelfeld's *Badenheim 1939*, and the fantastic cartoons of Spiegelman's *Maus* books.

**[ENGL 460(4601) Riddles of Rhythm (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
D. Fried.]

**[ENGL 462(4620) Senior Seminar in Latina/o Studies: Chicana Feminisms in a Globalizing World (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
M. Brady.]

**[ENGL 465(4650) American Violence (LA)]**  
Fall. 4 credits. Next offered 2007–2008.  
S. Samuels.]

**[ENGL 466(4660) James on Film (LA)]**  
4 credits. Next offered 2007–2008.  
D. Fried.]

**[ENGL 468(4680) Baldwin and Brooks (LA)]**  
4 credits. Next offered 2007–2008.  
K. McClane.]

**[ENGL 470(4700) Senior Seminar in the Novel: Austen and the Psychological Novel (LA)]**  
Spring. 4 credits. Next offered 2008–2009.  
A.-L. François.]

**[ENGL 471(4710) Humor in Literature (LA)]**  
Fall. 4 credits. Next offered 2007–2008.  
A. Lurie.]

**[ENGL 472(4720) Islands of Globalization (also ENGL 672(6720)) (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
E. DeLoughrey.]

**[ENGL 474(4740) Senior Seminar on Major Authors: Hemingway, Fitzgerald, and Faulkner (LA)]**  
Spring. 4 credits. Next offered 2007–2008.]

**ENGL 475(4750) Senior Seminar in the 20th Century: Narratives of Loss—AIDS**  
Fall. 4 credits. D. Woubshet.  
AIDS is one of the hallmarks of our contemporary world, and the loss endured due to this pandemic has been of epic proportions. In this seminar, we will consider literary and other responses to this cataclysmic event. We will give particular attention to the following questions: How do artists rely on, dilate, or overhaul antecedent conventions to express AIDS loss? What are the insights and limitations of particular stylistic and formal choices? How do artists balance consolation in the face of compounded crises? How are their creative responses shaping our interpretation of the history and memory of AIDS? Authors may include: Melvin Dixon, Tony Kushner, Paul Monette, Jamaica Kincaid, Susan Sontag, Essex Hemphill, Marlon Riggs, Larry Kramer, Thomas Glave, and Michael Cunningham.

**[ENGL 476(4760) Global Women's Literature (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
E. DeLoughrey.]

**ENGL 477(4600) Melville # (LA)**  
Fall. 4 credits. B. Maxwell.  
An American whose life and writing ranged over the globe, Herman Melville (in the estimation of C.L.R. James) "saw the tendency of things." Our study of his fiction, journals, and poetry will turn on some of those things

of modernity that most obsessively engaged Melville's representational and critical capacities: slavery; capitalism; illegitimate authority; exterminationist policy directed against American Indians; orphanhood and homelessness; imperialism; the attempted occultation of women; the shifting terrain of male comradeship; and the ambivalent resort to religion. We will be interested in testing the premise that Melville charted the faultlines of his world with an unorthodox critical acuity unparalleled in United States literature.

**[ENGL 478(4780) Intersections in Lesbian Fiction (also AM ST 468(4780), FGSS 477(4770)) (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
K. McCullough.]

**ENGL 479(4790) Advanced Seminar in American Literature: Visual Culture and Women's Literature (also FGSS 479(4790), VISST 480(4800)) (LA)]**  
Fall. 4 credits. S. Samuels.

This course will explore a concern shared by contemporary women writers and artists. In their works, bodily visibility raises questions about sexuality, race, and mother-daughter relations. They also use fiction and visual culture to show ingestion and forced incorporation. For example, many works emphasize scenes of eating and, contrarily, refusing to eat. Texts may include novels by Dorothy Allison, Tsitsi Dangaremba, Edwidge Danticat, Oonya Kempadoo, Jamaica Kincaid, Maxine Hong Kingston, Toni Morrison, Marilynne Robinson, and Leslie Marmon Silko. Artists examined may include Renee Cox, Mary Kelly, Shirin Neshat, Jolene Rickard, Cindy Sherman, Sally Mann, Bernie Searle, and Kara Walker. Course requirements: Two class presentations, three essays.

**ENGL 480-481(4800-4810) Seminar in Writing (LA)]**  
480; fall; 481, spring. 4 credits.  
For description, see section "Creative Writing."

**[ENGL 483(4601) Seminar in Comparative 20th-Century Anglophone Drama (also THETR 483(4830)) (LA)]**  
Fall. 4 credits. Some knowledge of classical and avantgarde theories of drama and theatre would be useful, but is not a prerequisite for this course. Next offered 2007–2008.]

**[ENGL 486(4860) American Indian Women's Literature (also AIS 486(4860)) (LA)]**  
Spring. 4 credits. Next offered 2007–2008.  
L. Donaldson.]

**[ENGL 487(4870) Writing About Literature (LA)]**  
Fall. 4 credits. Next offered 2007–2008.  
F. Bogel.]

**[ENGL 490(4900) Literatures of the Archipelagoes: Caribbean and Pacific "Tidalectics" @ (LA)]**  
4 credits. Next offered 2008–2009.  
E. DeLoughrey.]

**ENGL 491(4910) Honors Seminar I**  
Fall. 4 credits. Open to students in the Honors Program in English or related fields, or by permission of instructor.  
Sec. 1: Defoe and His Contemporaries—N. Saccamano.  
This course may be used as one of the three pre-1800 courses required of English majors. This course will examine a broad selection

of the poetry, novels, and journalism of Daniel Defoe in relation to other writers in the early 18th century. The multidisciplinary diversity of Defoe's work will allow us to investigate the connection of literature with economics and politics and, as we read some of his contemporaries, will furnish us with a rich understanding of 18th-century culture in general. Topics will include: newspapers and novels as "modern" genres; intellectual property and the legality of authorship; literary and financial speculation; the education of women; religion, satire, and sedition. Other writers will include Joseph Addison, Mary Astell, John Dryden, Eliza Haywood, Jonathan Swift.

Sec. 2: Black American Imaginary—N. Waligora-Davis.

This course studies the key figures and questions that have shaped black writings and expressive culture in the United States from the late 18th century. It opens with readings of slave petitions, fugitive slave narratives, and the central questions configuring Enlightenment discourse and the Haitian Revolution. Our treatment of the 19th and early 20th century engages the "Negro Problem" and the ideology of racial uplift, and moves into the black radicalisms and black nationalisms of the 1920s. This course engages the central tenets of the Civil Rights, Black Nationalist, and Black Arts movements, while moving forward to study the war on drugs and Hip Hop culture. Our readings include David Walker, Martin Delany, Frederick Douglass, W.E.B. DuBois and early 20th century and contemporary films and music.

**ENGL 492(4920) Honors Seminar II**  
Spring. 4 credits. Open to students in the Honors Program in English or related fields, or by permission of instructor.

Sec 1: Women and the Novel Form—L. Brown. This course raises questions about the role of gender in the study of literature by exploring the development of the female-authored novel from the 17th to the 20th century. Readings include Burney's *Evelina*, Austen's *Emma*, Brontë's *Jane Eyre*, Woolf's *Room of One's Own* and *Mrs. Dalloway*, Morrison's *Sula*, and Silko's *Gardens in the Dunes*. These novels engage ideas about race and slavery, love and marriage, culture and difference, sexuality, and history. We will work together to develop close readings of the texts, and in each case we will experiment with a particular theoretical or critical perspective, including cultural studies, gender studies, poststructuralism, and postcolonialism. Requirements: participation in discussion, three in-class exercises, a take-home final, and a research paper preceded by a prospectus.

Sec 2: Arguments of Style in Poetry and Fiction—D. Fried. How does the most compelling commentary about literature achieve its force? How can critical style shed light on literary eloquence? How can the clarities of critical prose serve the stylistic indirections of poetry and fiction? How can writers of English Honors Theses find an individuating voice while attending to the voices of the works and writers they care about? Through a close study of several exemplary kinds of scholarly and critical writing about poetry and fiction notable for stylistic extravagance, we will consider how the claims of criticism are imminent in its language, syntax, and structure. Writers such as Hopkins, Hardy, Dickinson, Thoreau,



Ashbery, Austen, Henry James; critics such as: William Empson, Geoffrey Hartman, Christopher Ricks, Helen Vendler, Stanley Cavell, and others.

**ENGL 493(4930) Honors Essay Tutorial I**  
Fall or spring. 4 credits. Prerequisites: senior standing and permission of director of the Honors Program.

**ENGL 494(4940) Honors Essay Tutorial II**  
Fall or spring. 4 credits. Prerequisites: ENGL 493 and permission of director of the Honors Program.

**ENGL 495(4950) Independent Study**  
Fall or spring. 2-4 credits. Prerequisites: permission of departmental advisor and director of undergraduate studies.

**ENGL 497(4970) Terrorism and Its Representations (also COM L 421[4210])**

Fall. 4 credits. E. Hyman.  
For description, see COM L 421.

**ENGL 499(4990) Studies in Irish Culture: Caricature # (LA)**

Fall. 4 credits. S. Siegel.  
This seminar explores Irish views of England during the long 19th century. Material will be drawn largely from the periodical press, non-fictional prose, and representations of England on the London and Dublin stage. Selected readings on the theory and practice of visual and verbal caricature as well as texts by, among others, Joyce, Shaw, Wilde, and Yeats.

### Courses Primarily for Graduate Students

Permission of the instructor is a prerequisite for admission to courses numbered in the 600s. These are intended primarily for graduate students, although qualified undergraduates are sometimes admitted. Undergraduates seeking admission to a 600-level course should consult the instructor. The list of courses given below is illustrative only; a definitive list, together with course descriptions and class meeting times, is published in a separate department brochure before course enrollment each semester.

### Graduate Courses in English 2006-2007

Fall

**ENGL 600(6000) Colloquium for Entering Students**  
R. Kalas.

**ENGL 602(6020) Literature and Theory (also ENGL 302[3020], COM L 302/622[3020/6220])**  
J. Culler.

**ENGL 607(6070) Medieval Psychology: Dream Visions**  
M. Raskolnikov.

**ENGL 609(6090) The Old English Laws (also ENGL 419[4190], HIST 469/669[4691/6691])**  
P. Hyams and T. Hill.

**ENGL 611(6110) Old English (also ENGL 311[3110])**  
T. Hill.

**ENGL 627(6270) Studies in Shakespeare: Shakespeare and Marlowe (also THETR 627[6270])**  
B. Correll.

**ENGL 632(6320) Studies in the 18th Century: Key Texts of Modernity**  
L. Brown.

**ENGL 633(6330) Satire, Sentiment, Imitation, and Mechanism in 18th-Century Literature**  
F. Bogel.

**ENGL 635(6350) Seminar in Dramatic Theory; Theatre and Social Change (also THETR 637, FGSS 638[6380])**  
S. Warner.

**ENGL 639(6390) Studies in Romantic Literature: Byron, Hazlitt, Percy and Mary Shelley, Keats, and the Issues of Romanticism**  
R. Parker.

**ENGL 667(6670) 19th-Century American Poetry: Dickinson and Her Others**  
D. Fried.

**ENGL 670(6700) Joyce's *Ulysses***  
D. Schwarz.

**ENGL 691(6910) Postcolonial America**  
L. Donaldson.

**ENGL 696(6960) Digital Bodies, Virtual Identities (also COM L 692[6920], THETR 638[6380])**  
T. Murray.

**ENGL 710(7100) Advanced Old English: Wisdom and Law**  
T. Hill.

**ENGL 780.01 MFA Seminar: Poetry**  
A. Fulton.

**ENGL 780.02 MFA Seminar: Fiction**  
A. Lurie.

**ENGL 785(7850) Reading for Writers**  
S. Vaughn.

Spring

**ENGL 606(6060) Alliterative Tradition**  
A. Galloway.

**ENGL 612(6120) Beowulf (also ENGL 312[3120])**  
S. Zacher.

**ENGL 622(6220) Renaissance Poetry (also COM L 450/650, ITALL 450/650[4500/6500])**  
T. Hill.

**ENGL 657(6570) 20th-Century Experimental Fiction**  
M. Hite.

**ENGL 660(6660) Cinematic Desire (also COM L 662[6620])**  
E. Hanson.

**ENGL 661(6610) Colonial American Literatures**  
E. Cheyfitz.

**ENGL 676(6760) Theory and Poetics of Narrative**  
H. Shaw.

**ENGL 677(6770) Seminar in Theatre: The Question of Sovereignty: Theater, Theory, Form**  
P. Lorenz.

**ENGL 682(6820) Baudelaire and the Lyrics**  
J. Culler.

**ENGL 697(6970) Cosmopolitanism (also COM L 697[6970])**  
N. Saccamano.

**ENGL 699(6990) Studies in African American Literature**  
H. Spillers.

**ENGL 741(7410) Wordsworth and Rousseau**  
C. Chase.

**ENGL 781.01(7810.01) MFA Seminar: Poetry**  
P. Janowitz.

**ENGL 781.02(7810.02) MFA Seminar: Fiction**  
M. McCoy.

**ENGL 792(7920) Prospectus Seminar**  
J. Culler.

## ENGLISH AS A SECOND LANGUAGE

See "English for Academic Purposes."

## ENGLISH FOR ACADEMIC PURPOSES

D. Campbell, director; S. Schaffzin, I. Arnesen, K. (Priscilla) Kershaw

Note: Courses and credits do not count toward the A.B. degree.

**ENGLF 205(1005) English as a Second Language**

Fall. 4 credits. Prerequisite: placement by exam. S. Schaffzin.

All-skills course emphasizing listening and speaking, with some writing practice. Students also meet individually with the instructor.

**ENGLF 206(1006) English as a Second Language**

Spring. 3 credits. Prerequisite: ENGLF 205 or placement by exam. S. Schaffzin.

Writing course for those who have completed ENGLF 205 and need further practice, or for those who place into the course. Individual conferences are also included.

**ENGLF 209(1009) English as a Second Language**

Fall or spring. 1 credit. Prerequisite: permission of instructor. S. Schaffzin.  
Practice in classroom speaking and in informal conversational English techniques for gaining information. Students also practice giving informal presentations. Individual conferences with the instructor supplement class work.

**ENGLF 210(1010) English as a Second Language**

Spring. 1 credit. Prerequisite: permission of instructor. S. Schaffzin.

Practice in academic speaking. Formal classroom discussion techniques and presentation of information to a group. Presentations are videotaped and reviewed with the instructor. Individual conferences supplement class work.

**ENGLF 211(1011) English as a Second Language**

Fall, spring, or summer. 3 credits.  
Prerequisite: placement by exam.  
D. Campbell.

Academic writing with emphasis on improving organization, grammar, vocabulary, and style through the writing and revision of short papers relevant to students' fields. Frequent individual conferences supplement class work.

**ENGLF 212(1012) English as a Second Language**

Spring, 3 credits. Limited to 12 students on first-come, first-served basis. Prerequisite: permission of instructor. D. Campbell.

Research paper writing. For the major writing assignment of this course, students must have a real project that is required for their graduate work. This can be a thesis proposal; a pre-thesis; part of a thesis, such as the literature review or discussion section; a paper for another course or a series of shorter papers (by permission of the other instructor); or a paper for publication. Time limitations make it difficult to deal with work over 20 pages in length. Course work involves practice in paraphrase, summary, the production of cohesive, coherent prose, vocabulary use, and grammatical structure. Frequent individual conferences are a necessary part of the course. Separate sections for social sciences/humanities and for science/technology.

**ENGLF 213(1013) Written English for Non-Native Speakers**

Spring, 3 credits. Prerequisite: permission of instructor. S. Schaffzin.

Designed for those whose writing fluency is sufficient for them to carry on regular academic work but who want to refine and develop their ability to express themselves clearly and effectively. Individual conferences supplement class work.

**First-Year Writing Seminar****ENGLB 115-116(1050-1060) English for Later Bilinguals**

For description, see First-Year Writing Program brochure.

**FALCON PROGRAM (INDONESIAN)**

See "Department of Asian Studies."

**FEMINIST, GENDER, AND SEXUALITY STUDIES**

Core faculty: A. Basu, S. Bem, L. Beneria, L. Bogel, J. Brumberg, D. Castillo, S. Correll, E. DeLoughrey, I. DeVault, S. Feldman, J. Fortune, J. E. Gainor, K. Haines-Eitzen, E. Hanson, M. Hite, M. Katzenstein, K. Long, T. Loos, K. March, C. A. Martin, S. Martin, S. McConnell-Ginet, K. McCullough, M. B. Norton, J. Peraino, D. Reese, S. Samuels, D. Schrader, A. M. Smith, A. Villarejo, R. Weil

Cross-listing faculty: E. Baptist, D. Bem, A. Berger, J. Bernstock, F. Blau, L. Bogel, L. Carrillo, D. Chang, K. Cohen, M. Evangelista, M. Fernandez, D. Ghosh, K. Graubart, S. Haenni, C. Howie, P. Hyams, E. Hyman, W. Jacob, P. Janowitz, C. Lazzaro, P. Liu, M. Migiel, A. Parrot, J. Peraino, L. Ramberg, M. Raskolnikov, Q. Roberson, M. Rossiter, N. Russell, S. Sangren, R. Savin-Williams, S. Seth, N. Sethi, P. Tolbert, M. Warner, S. Warner, M. Washington, L. Williams, L. Wilton, S. Wong, D. Woubshet

**Introduction to the Program**

The Feminist, Gender, & Sexuality Studies Program is an interdisciplinary program in the College of Arts and Sciences that seeks to deepen our understanding of gender

and sexuality. Since its founding in 1972 (see below), the Program has integrated the study of gender with complex structures of power and inequality including race, sexuality, class, and nation. Over the past several decades, the curriculum has also increasingly broadened its scope theoretically and methodologically to encompass cultural, historical, literary, scientific, and quantitative analysis. Students find that these innovative methods and theories enhance their lifelong personal and intellectual growth, as well as their professional development insofar as they prepare students for future study or work in a wide variety of fields: law, medicine, social policy, art, psychology, literature, and so on.

The Program is built around several assumptions about the study of gender and sexuality. First, understandings of sex, sexuality, and gender are neither universal nor immutable; to study them is to gain a fuller understanding of human behavior, culture and society across times and places as well as to gain a sense of how these social constructions shape us as individuals. Second, gender and sexuality are best understood when examined in relation to one another by learning about women and men of different economic classes, sexual orientations, and cultural and racial backgrounds. Third, even the most current knowledge derived from the humanities, social sciences and natural sciences is not as impartial, objective, or neutral but instead emerges out of particular historical and political contexts. Students, as a consequence, transfer the critical and analytical skills they acquire in FGSS courses to other courses and activities beyond Cornell.

**A historical footnote:** Established in 1972 as one of the by-products of the Women's Liberation Movement, the Cornell Feminist, Gender, & Sexuality Studies Program was initially called *Women's Studies* so as to explicitly name the group rendered invisible by (what was then almost always referred to as) the "patriarchy"—and also so as to highlight that it would be speaking from the perspective of the traditionally marginalized Other rather than from the perspective of the group presumed by the dominant paradigm to neutrally represent humankind (i.e., men). But the name quickly became controversial, not only because it suggested that the objects of study, as well as those undertaking the studies, were exclusively women, but also because it did nothing to discourage the common assumption that the women in question were white, middle-class, and heterosexual. To expand and institutionalize the sexuality component of the Program, a minor in Lesbian, Bisexual, & Gay Studies was established at both the graduate and undergraduate levels in the early 1990s. To shift the emphasis of the Program even further toward the intertwining of gender and sexuality with structures of power and inequality, in 2002 the program changed its name from Women's Studies to Feminist, Gender, & Sexuality Studies.

**Program Offerings**

Feminist, Gender, and Sexuality Studies offers an undergraduate major, an undergraduate concentration, and a graduate minor. Undergraduate students in the College of Arts and Sciences who want to major in FGSS may apply directly to the program. Undergraduate students in other colleges at Cornell will need to work out special arrangements and should

speak to FGSS's director of undergraduate studies (DUS).

**The Undergraduate Major: FGSS**

- 1. Prerequisite courses:** Before applying to the major, the student must complete any two FGSS courses with a grade of B- or better. For FGSS courses that are cross-listed with another department, students may register through FGSS or the cross-listing department. Suggested entry-level courses include any FGSS course at the 200 level, especially 201 and 202, both of which are required for completion of the major. FGSS courses at the 200 level or above may count as both prerequisites and as part of the FGSS major. First-year writing seminars may count as prerequisites but not as part of the major.
- 2. Required course work:**
  - a. A minimum of 36 credits in FGSS courses with a grade of C- or higher is required for the major. For FGSS courses that are cross-listed, students may register through FGSS or the cross-listing department.
  - b. These 36 credits must include the following three courses:
    - FGSS 201 Introduction to FGSS Studies
    - FGSS 202 Introduction to FGSS Theories
    - FGSS 400 Senior Seminar in FGSS Studies
  - c. The 36 credits must also include at least one FGSS course with a significant focus on each of the following three categories: (Note: Although a given course may satisfy one, two, or even three of these categories, a given student must take at least two courses to fulfill this requirement):

- LBG studies
- Intersecting structures of oppression: race, ethnicity, and/or class
- Global perspectives: Africa, Asia, Latin America, or Middle East, by itself or in a comparative or transnational framework. Students may choose from the list in the course catalog or at FGSS office.

A student with a double major may count up to three FGSS courses toward the FGSS major that she/he is simultaneously counting toward a second major.

**The Honors Program:** To graduate with honors, a student majoring in FGSS must complete a senior thesis under the supervision of a FGSS faculty member and defend that thesis orally before an honors committee. To be eligible, a student must have at least a cumulative 3.0 GPA in all course work and a 3.3 GPA in all courses applying to their FGSS major. Students interested in the honors program should consult the DUS late in the spring semester of their junior year, or very early in the fall semester of their senior year.

**The FGSS Concentration**

Undergraduate students in any college at Cornell may concentrate in Feminist, Gender, & Sexuality Studies in conjunction with a major defined elsewhere in the university. The concentration consists of five FGSS courses with a grade of C- or higher, through FGSS or the cross-listing department that are completed with a grade of C- or above, none

of which may be counted toward the student's non-FGSS major. An exception to this rule may be made for students in the contract colleges, who may petition the FGSS DUS to count one course from their major toward the FGSS concentration. First-year writing seminars may not be included within the five required courses. Students wishing to concentrate in FGSS should see the DUS. The five courses required for the FGSS Undergraduate Concentration must include:

FGSS 201 Introduction to FGSS Studies

FGSS 202 Introduction to FGSS Theories

Any FGSS course that satisfies at least one of the three categories required for a major as defined above.

Any two additional FGSS courses of the student's choice.

### The LBG Concentration

FGSS serves as home to the Lesbian, Bisexual, and Gay Studies Program, which offers an undergraduate concentration as well as a graduate minor. The LBG undergraduate concentration consists of four courses. For a complete listing of all courses that will fulfill this concentration please see the LBG Studies portion of this catalog.

### 1. First-Year Writing Seminars

**FGSS 106(1060) FWS: Women and Writing (also ENGL 105[1060])**

Fall and spring. 3 credits. Staff.

### 2. Courses

**FGSS 201(2010) Introduction to Feminist, Gender, and Sexuality Studies (CA)**

Fall and spring. 4 credits. S. Martin and K. McCullough.

Feminist, Gender, & Sexuality Studies is an interdisciplinary program focused on understanding the impact of gender and sexuality on the world around us and on the power hierarchies that structure it. This course focuses mainly on the experiences, historical conditions, and concerns of women as they are shaped by gender and sexuality both in the present and the past. Students read a variety of texts, personal narratives, historical documents, and cultural criticism across a range of disciplines. In doing so students consider how larger structural systems of both privilege and oppression affect individuals' identities, experiences, and options, and simultaneously examine forms of agency and action taken by women in the face of these larger systems.

**FGSS 202(2020) Introduction to Feminist, Gender, and Sexuality Theories (also VISST 203[2020]) (CA)**

Spring. 4 credits. D. Reese.

Introduces students to critical approaches in feminist scholarship to the cultural, socioeconomic, and political situation(s) of women. Particular attention is paid to the conceptual challenges and dangers posed by attempts to study women without taking account of relations between race, class, and gender in ideological and social formations. Readings draw on work in various disciplines and include literary texts and visual images.

**[FGSS 205(2050) Introduction to World Literatures in English (also ENGL 205[2050])**

4 credits. Next offered 2007-2008.  
E. DeLoughrey.]

**FGSS 209(2090) Seminar in Early American History (also HIST 209[2090], AM ST 209[2090])**

Fall. 4 credits. M. B. Norton.

For description, see HIST 209.

**[FGSS 212(2120) African American Women: 20th Century (also HIST/AM ST 212[2120])**

4 credits. Next offered 2007-2008.

M. Washington.]

**FGSS 214(2140) Biological Basis of Sex Differences (also BIOAP 214[2140], B&SOC 214[2141])**

Fall. 3 credits. Offered alternate years.

J. Fortune.

For description, see BIOAP 214.

**[FGSS 216(2160) Gender and Colonization in Latin America (also HIST 216[2160], LAT A 216[2161])**

4 credits. Next offered 2008-2009.

K. Graubart.]

**[FGSS 217(2170) Gender, Sex, Empire: Modern Middle East**

4 credits. Next offered 2007-2008.

W. Jacob.]

**[FGSS 219(2190) Women in South Asia (also HIST 219[2190], ASIAN 219[2191])**

4 credits. Next offered 2008-2009.

D. Ghosh.]

**FGSS 244(2440) Language and Gender Relations (also LING 244[2444])**

Spring. 4 credits. S. McConnell-Ginet.

For description, see LING 244.

**FGSS 246(2460) Contemporary Narratives by Latina Writers (also SPANL/LSP 246[2460])**

Fall. 3 credits. L. Carrillo.

For description, see SPANL 246.

**FGSS 249(2490) Feminism and Philosophy (also PHIL 249[2490])**

Fall. 4 credits. N. Sethi.

For description, see PHIL 249.

**[FGSS 251(2510) 20th-Century Women Writers (also ENGL 251[2510])**

4 credits. Next offered 2007-2008.

E. DeLoughrey.]

**FGSS 261(2610) SSP: Feminist Theory/State Theory (also GOVT 261[2615])**

Spring. 4 credits. A. M. Smith.

For description, see GOVT 261.

**[FGSS 263(2630) Studies in Film Analysis: Monsters and Misfits: Hollywood's Misogynist Myths of Women (also ENGL 263[2630], FILM 265[2650])**

4 credits. Next offered 2007-2008.

L. Bogel.]

**FGSS 270(2700) Gender: Meanings and Practice (also SOC 270[2700])**

Spring. 3 credits. S. Correll.

For description, see SOC 270.

**[FGSS 273(2730) Women in American Society, Past and Present (also HIST 273[2730])**

4 credits. Next offered 2007-2008.

M. B. Norton.]

**FGSS 276(2760) Desire (also ENGL 276[2760], THETR 278[2780])**

Spring. 4 credits. E. Hanson.

For description, see ENGL 276.

**FGSS 304(3040) Women and Politics (also GOVT 304[3043])**

Spring. 4 credits. S. Martin.

For description, see GOVT 304.

**FGSS 305(3050) Questioning Kin, Queering Family (also ANTHR 304[3104]) (SBA)**

Fall. 3 credits. L. Ramberg.

As a symbolic system and field of practice, kinship produces configurations of sexuality, gender, race and power embodied by persons. This recognition is indebted to critical race, feminist, postcolonial and queer interventions in the field of kinship studies. In this course we will review key texts in this field beginning with classic anthropological theories of kinship. We will consider the variability of sanctioned arrangements of sexuality, procreation, household labor and economy across the historical and ethnographic record. Focusing on this variation, we will pose relatedness as a question. Which lives, forms of desire, modes of embodiment are enabled, and which are abjected through the grammar of kinship at work in a particular place and time? What possibilities of life lie outside dominant kinmaking practices?

**[FGSS 307(3070) African American Women in Slavery and Freedom (also HIST/AM ST 303[3030])**

4 credits. Next offered 2007-2008.

M. Washington.]

**FGSS 321/631(3210/6310) Sex and Gender in Cross-Cultural Perspective (also ANTHR 321/621[3421/6421])**

Fall. 4 credits. K. March.

For description, see ANTHR 321/621.

**FGSS 325(3250) Queer Performance (also THETR 326[3260])**

Spring. 4 credits. S. Warner.

For description, see THETR 326.

**FGSS 341(3410) Objects on Objects: Women Writers and the Aesthetics of the Modern (also COM L 319[3190]) (LA)**

Fall. 4 credits. D. Reese.

As we have so often heard, "women are objects," are ever on the verge of being objectified," but what happens when the objects take to the typewriter or pen? In this course we will read women authors from Europe and America writing in the first half of the 20th century. Companion readings will include analyses of the spread of commodity culture, early 20th century anthropology which theorizes "the exchange in women," social histories of things and essays on modernist aesthetics. How do these works encode social configurations of space, violence of class, race and gender, technologies of war or possibilities of communicable experience within a poetics of things?

**FGSS 344(3440) Male and Female in Chinese Culture and Society (also ANTHR 344[3554])**

Fall. 4 credits. S. Sangren.

For description, see ANTHR 344.

**FGSS 347(3470) Asian American Women's History (also HIST 347[3470], AM ST 351[3470])**

Spring. 4 credits. D. Chang.

For description, see HIST 347.

**FGSS 348(3480) Studies in Women's Literature (also ENGL 348[3480])**

Spring. 4 credits. K. McCullough.

For description, see ENGL 348.

**FGSS 350(3500) Contemporary Issues in Women's Health (also PAM 350[3500])**

Fall. 3–5 variable credits. A. Parrot.  
For description, see PAM 350.

**FGSS 353(3530) Monsters A–Z (Aristotle–X-files) (also FRLIT/COM L 353[3530])**

Fall. 4 credits. K. Long.  
For description, see FRLIT 353.

**FGSS 355(3550) Decadence (also ENGL 355[3550])**

Fall. 4 credits. E. Hanson.  
For description, see ENGL 355.

**FGSS 356(3560) He Said, She Said: The Battle of the Sexes in Medieval and Renaissance Writing (also FRLIT/ITAL 355[3550])**

Spring. 4 credits. K. Long and M. Miguel.  
For description, see FRLIT 355.

**[FGSS 358(3580) Theorizing Gender and Race in Asian Histories and Literatures (also ASIAN 388/688[3880/6880])**

Spring. Next offered 2007–2008. N. Sakai.]

**[FGSS 360(3600) Gender and Globalization (also CRP 395[3950]) (SBA)**

3 credits. Next offered 2007–2008.  
L. Beneria.

This course invites students to think globally about gender issues and to trace the connections between global, national and local perspectives. Emphasis will be given to: understanding processes of globalization (economic, political, cultural); discussing ways in which these processes interact with the dynamics of gender differentiation; understanding how globalization affects women's and men's paid and unpaid work; discussing the significance of women's location in global markets; looking at the importance of culture and social construction of gender in shaping the ways in which globalization affects people's lives and gender relations; introducing regional differences and similarities; discussing the gender dimensions in the debates on "the clash of civilizations"; introducing questions of global governance and examining cases that illustrate women's role in the shaping of international debates.]

**FGSS 368(3680) Marriage and Sexuality in Medieval Europe (also HIST/RELST 368[3680])**

Fall. 4 credits. P. Hyams.  
For description, see HIST 368.

**FGSS 369(3690) Fast-Talking Dames and Sad Ladies (also ENGL 369[3690], FILM 369[3690])**

Spring. 4 credits. L. Bogel.  
For description, see ENGL 369.

**[FGSS 370(3700) Gender and Age in Archeology (also ANTHR/ARKEO 369[3269])**

4 credits. Next offered 2007–2008.  
N. Russell.]

**FGSS 381(3810) 19th-Century French Women Writers (also FRLIT 381[3810])**

Fall. 4 credits. A. Berger.  
For description, see FRLIT 381.

**FGSS 385(3850) Gender and Sexual Minorities (also HD 384[3840])**

Fall. 3 credits. K. Cohen.  
For description, see HD 384.

**FGSS 399(3990) Undergraduate Independent Study**

Fall and spring. 1–4 credits. Prerequisites: one course in Feminist, Gender, and Sexuality Studies and permission of a Feminist, Gender, and Sexuality Studies faculty member. Staff.

**FGSS 400(4000) Senior Seminar in Feminist, Gender, and Sexuality Studies**

Fall. 4 credits. Prerequisite: requirement for and limited to Feminist, Gender, and Sexuality Studies majors. A. Villarejo.  
Although the topic/focus of this course surely varies with the instructor, it is always treated as a broad capstone course for majors.

**[FGSS 404(4040) Women Artists (also ART H 466[4610])**

4 credits. Next offered 2008–2009.  
J. Bernstock.]

**FGSS 406(4060) The Culture of Lives (also ANTHR 406[4406])**

Spring. 4 credits. K. March.  
For description, see ANTHR 406.

**FGSS 410(4100) Health and Survival Inequalities (also SOC 410[4100])**

Fall. 4 credits. A. Basu.  
For description, see SOC 410.

**FGSS 411/611(4110/6110) Seminar: Devolution and Privatization: Challenges for Urban Public Management (also CRP 412/612 [4120/6120], AEM 433/633 [4330/6330])**

Fall. 4 credits. M. Warner.  
For description, see CRP 412.

**FGSS 414(4140) Bodies in the Middle Ages: Embodiment, Incarnation, Performance (also ENGL 414[4140])**

Spring. 4 credits. M. Raskolnikov.  
For description, see ENGL 414.

**[FGSS 416(4160) Gender and Sex in South East Asia (also HIST 416[4160], ASIAN 416[4416])**

4 credits. Next offered 2008–2009. T. Loos.]

**FGSS 420/620(4200/6200) Government Policy Workshop (also CRP 418/618[4180/6180], AEM 634[6340])**

Spring. 4 credits. M. Warner.  
For description, see CRP 418/618.

**FGSS 421(4210) Theories of Reproduction (also SOC 421[4210], D SOC 421[4210])**

Spring. 4 credits. A. Basu.  
For description, see SOC 421.

**FGSS 422(4220) New York Women (also S&TS 422[4221], HIST 445[4451])**

Fall. 4 credits. M. Rossiter.  
For description, see S&TS 422.

**FGSS 429(4290) The Sexual Politics of Religion (also RELST 424[4240])**

Spring. 4 credits. L. Ramberg.  
Drawing on feminist and queer theory and ethnographic studies of ritual and devotional practices around the world this course will consider the relationships among the social organization of sexuality, embodiment of gender, nationalisms and everyday forms of worship. In addition to investigating the norms of family, gender, sex and the nation embedded in dominant institutionalized forms of religion we will study such phenomena as ritual transgenderism, neo tantrism, theogamy (marriage to a deity), priestly celibacy and

temple prostitution. The disciplinary and normalizing effects of religion as well as the possibilities of religiosity as a mode of social dissent will be explored through different ethnographic and fictional accounts of ritual and faithful practices in Africa, Asia and the Americas.

**FGSS 444(4440) Historical Issues of Gender and Science (also S&TS 444[4441])**

Spring. 4 credits. M. Rossiter.  
For description, see S&TS 444.

**[FGSS 445(4450) American Men (also HIST/AM ST 444[4440])**

4 credits. Next offered 2008–2009.  
E. Baptist.]

**FGSS 446(4460) Women in the Economy (also ILRLE 445[4450], ECON 457[4570])**

Fall. 4 credits. F. Blau.  
For description, see ILRLE 445.

**FGSS 447(4470) Gender, Sexuality, and the Body in Late Antiquity (also NES 445[4450], RELST 445[4545])**

Fall. 4 credits. K. Haines-Eitzen.  
For description, see NES 445.

**FGSS 448(4480) Global Perspectives on Violence against Women (also PAM 444[4440])**

Spring. 3 credits. A. Parrot.  
For description, see PAM 444.

**FGSS 449(4490) Mystics and Mystique (also FGSS 649[6490], FRLIT 449/649[4490/6490])**

Fall. 4 credits. C. Howie.  
For description, see FRLIT 449.

**FGSS 451(4510) Women in Italian Renaissance Art (also ART H 450[4450])**

Spring. 4 credits. C. Lazzaro.  
For description, see ART H 450.

**FGSS 461(4610) Sexuality and the Law (also GOVT 462[4625], GOVT 762[7265], FGSS 726[7620])**

Spring. 4 credits. A. M. Smith.  
For description, see GOVT 762.

**FGSS 462(4620) Diversity and Employee Relations (also ILRHR 463[4630])**

Fall. 4 credits. Q. Roberson.  
For description, see ILRHR 463.

**[FGSS 467(4670) Sexual Minorities and Human Development (also HD 464[4640])**

3 credits. R. Savin-Williams.]

**FGSS 474(4740) Exoticism and Eroticism: Figures of the Other in the French Enlightenment (also FRLIT 475[4750])**

Fall. 4 credits. A. Berger.  
For description, see FRLIT 475.

**[FGSS 475/675(4750/6750) Advanced Undergraduate Seminar in Global Feminisms: Naming Women and Globalization**

3 credits. Next offered 2007–2008.  
D. Reese.

International treaties have designated a "trade barrier" as a primary semester in legislative negotiations between nation-states. This course explores the implications of this economic form of valuation.]

**[FGSS 476(4760) Global Women's Literature: (En) Gendering Space (also ENGL 476(4760))**

4 credits. Next offered 2007-2008.  
E. DeLoughrey.]

**[FGSS 477(4770) Intersections in Lesbian Fiction (also ENGL 478(4780), AM ST 468(4780))**

4 credits. Next offered 2007-2008.  
K. McCullough.]

**FGSS 478(4780) Senior Seminar in the 20th Century: Narratives of Loss (AIDS) (also ENGL 475(4750))**

Fall. 4 credits. D. Wouhshet.  
For description, see ENGL 475.

**FGSS 479(4790) Advanced Seminar in American Literature: Gender and Visual Culture in Women's Literature (also ENGL 479(4790), VISST 480(4800), ART H 479(4799))**

Fall. 4 credits. S. Samuels.  
For description, see ENGL 479.

**[FGSS 480(4800) Studies in Gender Theory: Kinship and Embodiment (also COM L 481(4810))**

4 credits. Next offered 2007-2008. P. Liu.]

**FGSS 488(4880) Beliefs, Attitudes, and Ideologies (also PSYCH 489/689(4890/6890))**

Fall. 4 credits. D. Bem.  
For description, see PSYCH 489.

**FGSS 497(4970) Sexual Citizenship (also COM L 497(4970))**

Spring. 4 credits. E. Hyman.  
For description, see COM L 497.

**FGSS 499(4990) Senior Honors Thesis**  
Fall and spring. 1-8 credits. Prerequisite: FGSS seniors only. Staff.

To graduate with honors, FGSS majors must complete a senior thesis under the supervision of a FGSS faculty member and defend that thesis orally before an honors committee. To be eligible for honors, students must have at least a cumulative GPA of 3.0 in all course work and a 3.3 average in all courses applying to their FGSS major. Students interested in the honors program should consult the DUS late in the spring semester of their junior year or very early in the fall semester of their senior year.

**[FGSS 610(6100) Sexuality and the Politics of Representation (also FILM 610(6100))**

Spring. 4 credits. Next offered 2008-2009.  
A. Villarejo.

Seminar exploring contexts for critical work on sexuality and film/video. Course examines the uses and abuses of psychoanalytic theory and the regulation of sexuality.]

**[FGSS 612(6120) Population and Development in Asia (also D SOC 612(6120))**

3 credits. Next offered 2007-2008.  
L. Williams.]

**FGSS 614(6140) Gender and International Development (also CRP 614(6140))**

Spring. 3 credits. L. Beneria.  
For description, see CRP 614.

**FGSS 617(6170) Feminist Methodology (also GOVT 642(6423))**

Spring. 4 credits. S. Martin.  
A feminist lens of analysis disrupts traditional categories that frame the questions we ask with implications for the answers that we find and how we find them. A sample of readings across the disciplines will allow us to explore how feminist scholarship has led to the reframing of big questions while stretching the boundaries of traditional methodological frontiers. This course seeks to familiarize students with primarily qualitative methodological tools to be applied to individual research questions.

**FGSS 620(6200) Government Policy Workshop (also CRP 618(6180), AEM 634(6340))**

Spring. 4 credits. M. Warner.  
For description, see CRP 618.

**FGSS 621(6210) Black Communities and the Politics of Health (also AS&RC 620(6602), HD 622(6220))**

Fall. 4 credits. L. Wilton.  
For description, see AS&RC 620.

**FGSS 622(6220) Gender and Slavery in the Americas (also AS&RC 612(6203))**

Spring. 4 credits. W. Battle-Baptiste.  
For description, see AS&RC 612.

**FGSS 624(6240) Epistemological Development and Reflective Thought (also EDUC 614(6140))**

Fall. 3 credits. D. Schrader.  
For description, see EDUC 614.

**FGSS 629(6290) The Sexual Politics of Religion**

Spring. 4 credits. L. Ramberg.  
For description, see FGSS 429.

**FGSS 631(6210) Sex and Gender in Cross-Cultural Perspective (also FGSS 321(3210), ANTHR 321/621(3421/6421))**

Fall. 4 credits. K. March.  
For description, see ANTHR 321.

**[FGSS 636(6360) Comparative History of Women and Work (also ILRIC 636(6360))**

4 credits. I. DeVault.]

**FGSS 638(6380) Seminar in Dramatic Theory: Theater and Social Change (also THETR 637(6370))**

Fall. 4 credits. S. Warner.  
For description, see THETR 637.

**[FGSS 640(6400) Historical Issues of Gender and Science (also HIST 641(6410), S&TS 640(6401))**

4 credits. Next offered 2007-2008. S. Seth.]

**[FGSS 644(6440) Topics in the History of Women in Science (also S&TS 644(6441))**

4 credits. Next offered 2008-2009.  
M. Rossiter.]

**FGSS 649(6490) Mystics and Mystique (also FRLIT 449/649(4490/6490))**

Fall. 4 credits. C. Howie.  
For description, see FRLIT 449/669.

**[FGSS 658(6580) Theorizing Gender and Race in Asian Histories and Literatures (also ASIAN 388/688(3880/6880))**

4 credits. Next offered 2007-2008.  
N. Sakai.]

**FGSS 673(6730) Exoticism & Eroticism: Figures of the Other in 18th Century Literature (also FRLIT 673(6730))**

Fall. 4 credits. A. Berger.  
For description, see FRLIT 474.

**FGSS 674(6740) Cyberfeminism (also ART H 674(6104))**

Spring. 4 credits. M. Fernandez.  
For description, see ART H 674.

**FGSS 692(6920) Hispanic Feminisms (also SPANL 690(6900))**

Spring. 4 credits. D. Castillo.  
For description, see SPANL 690.

**FGSS 695(6950) Topics in Music: Gender, Sexuality, and Glam Rock (also MUSIC 695(7311))**

Fall. 4 credits. J. Peraino.  
For description, see MUSIC 695.

**FGSS 699(6990) Topics in Feminist, Gender, & Sexuality Studies**

Fall and spring. Variable credit. Staff.  
Independent reading course for graduate students on topics not covered in regularly scheduled courses. Students develop a course of readings in consultation with a faculty member in the field of Feminist, Gender, and Sexuality Studies who has agreed to supervise the course work.

**FGSS 762(7620) Sexuality and the Law (also GOVT 462(4625), FGSS 461(4610), 762(7625))**

Spring. 4 credits. A. M. Smith.  
For description, see GOVT 762.

## FILM

See "Department of Theatre, Film, and Dance."

## FIRST-YEAR WRITING SEMINARS

For information about the requirements for writing seminars and descriptions of seminar offerings, see the John S. Knight Institute web site: [www.arts.cornell.edu/knight\\_institute](http://www.arts.cornell.edu/knight_institute).

## FRENCH

See "Romance Studies."

## GERMAN STUDIES

L. Adelson; D. Bathrick, acting chair; M. Briggs (Dutch); B. Buettner, associate language program director; P. Gilgen, director of undergraduate studies (fall); A. Groos, acting director of graduate studies (fall); P. U. Hohendahl; G. Lischke, language program director and director of undergraduate studies (spring); B. Martin; U. Maschke, associate language program director; D. Reese, A. Schwarz, director of graduate studies (spring); L. Trancik (Swedish); G. Waite, Emeritus; H. Deinert.

The Department of German Studies offers students a wide range of opportunities to explore the literature and culture of German-speaking countries, whether as part of their general education, a major in German Studies, or a double major involving another



discipline, or as preparation for graduate school or an international professional career. Courses are offered in German as well as in English; subjects range from medieval to contemporary literature and from film and visual culture to intellectual history, music, history of psychology, and feminist, gender, and sexuality studies.

The course offerings in German begin with GERST 121–122, 123 (introductory language level). Students then continue with intermediate-level courses, which provide further grounding in the language and in German literature and cultural studies. GERST 206 provides instruction for German in the culture of business, leading to certification. On the advanced level (300 level or above), we offer thematically oriented courses that include intensive language work (301, 302, 306, 310); literature and culture study courses in German, including the senior seminar; and seminars of interdisciplinary interest taught in English. Addressing a broad spectrum of topics in German culture, our courses appeal to German majors and other qualified students alike.

The department's offerings in English begin with a series of first-year writing seminars introducing various aspects of German literature (e.g., the fairy tale and Romantic consciousness or 20th-century writers such as Kafka, Hesse, Mann, Brecht), theorists such as Marx, Nietzsche and Freud, issues in mass culture and modernity, problems of German national identity/ies, and cinema and society. Courses in German and English at the 300 and 400 levels explore such topics as the Faust legend, aesthetics from Kant to Heidegger, city topographies, Freud and his legacy, opera from Mozart to Strauss, the German novel, literature and philosophy, political theory and cinema, the Frankfurt School, migration and globalization, and feminist theory. It may be possible to arrange a German section for courses taught in English, either informally or formally (for credit). Students are encouraged to discuss this possibility with instructors.

## Sequence of Courses

Courses in German:

Introductory level: GERST 121–122, after completion, placement into GERST 123 or 200

Intermediate level: GERST 200, 202, 204, and 206

Advanced level: GERST 301, 302, 306, 307, 310, and 410

Courses taught in German that are numbered 300 through 320 focus on intensive language study; courses taught in German that are numbered 321 through 350 focus on studying literature and other forms of cultural expression.

Courses in German or English: further 300- and 400-level literature and culture courses (see course descriptions)

## Advanced Standing

Students with an AP score of 4 or better are automatically granted 3 credits in German. Students with an AP score of 4 or better, an LPG score of 65 or higher, or an SAT II score of 690 or higher must take the CASE exam for placement in courses above GERST 200. Students coming to Cornell with advanced standing in German and/or another subject are encouraged to consider a double major

and to discuss the options with the director of undergraduate studies as early as possible.

## Certificate in German Language Study

The Certificate in German Language Study is issued to recognize substantial language study beyond the GERST 200 level in the Department of German Studies. Students are awarded the certificate after passing three German Studies courses held in German with a grade of B or above. Two of these courses must be at the 300 level or above. Applications for the language certificate may be picked up in the Department of German Studies (183 Goldwin Smith Hall) in February.

## Internships

The department works with the USA-Interns program to provide summer internships to qualified students with German companies and agencies. Interested students should contact the language program director, Gunhild Lischke (gl15@cornell.edu, G75 Goldwin Smith Hall, 255-0725), early in the fall semester.

## The Majors

The department offers two options for the major: German literature and culture, and German area studies. The latter is a more broadly defined sequence that includes work in related disciplines. The course of study in either major is designed to give students proficiency in reading, speaking, and writing in German, to acquaint them with German culture, and to help them develop skills in reading, analyzing, and discussing German texts in relevant disciplines with those goals in mind. The department also encourages study abroad. For both majors, there is a wide variety of courses co-sponsored with other departments (Comparative Literature; Government; History; Music; Theatre, Film, and Dance; Feminist, Gender, and Sexuality Studies).

The department encourages double majors and makes every effort to accommodate prospective majors with a late start in German. Students interested in a major should consult the director of undergraduate studies, Professor Peter Gilgen, 192 Goldwin Smith Hall (fall) or Gunhild Lischke, G75 Goldwin Smith Hall (spring).

## German (Literature and Culture)

Students in this major select courses from the Department of German Studies and may use them to pursue individual interests in literature, film and visual culture, theater and performing arts, music, intellectual and political history, and gender studies, for example. Please consult with the director of undergraduate studies.

Admission: By the end of their sophomore year, prospective majors should have successfully completed GERST 202, 204, or 206.

To complete the major, a student must:

1. Demonstrate competence in the German language by successful completion of two 300-level courses with intensive language work (GERST 301, 302, 306, 310) or the equivalent.
2. Complete six courses in the Department of German Studies at the 300 level or

above. One of these must be GERST 410 Senior Seminar.

3. Select a faculty advisor from the department.

## German Area Studies

Students select courses from the Department of German Studies as well as courses with a substantial German component from other departments, such as Comparative Literature; Government; History; Music; Theatre, Film, and Dance; and Feminist, Gender, and Sexuality Studies.

Admission: By the end of their sophomore year, prospective majors should have successfully completed GERST 202, 204, or 206.

To complete the major, a student must:

1. Demonstrate competence in the German language by successful completion of two 300-level courses with intensive language work (GERST 301, 302, 306, 310) or the equivalent.
2. Complete six courses with a substantial German component at the 300 level or above. Three of these must be in the Department of German Studies, including GERST 410 Senior Seminar.
3. Select a committee of one or more faculty advisors to help formulate a coherent program of study. One of the advisors must be from the Department of German Studies.

## Honors

Honors in German Studies are awarded for excellence in the major, which includes overall grade point average and completion of the honors thesis. Students are awarded either honors (*cum laude*), high honors (*magna cum laude*), or the highest honors (*summa cum laude*) in the program based on the honors advisors' evaluation of the level and the quality of the work completed toward the honors degree. The honors distinction will be noted on the student's official transcript and will also be indicated on the student's diploma.

**Prerequisites for admission.** Students must have upperclass standing, an overall GPA of a B or higher, and a GPA of 3.5 or higher in the major. Students must first consult with the director of undergraduate studies in German Studies regarding eligibility for the honors program.

**Procedure.** Students who wish to be considered for honors ideally should apply to the director of undergraduate studies no later than the second term of the junior year. Students who are off campus in their junior year must apply by the third week of classes in the first semester of their senior year. Students should secure the consent of a faculty member to serve as the director of both the reading course (GERST 453) and the writing of a thesis (GERST 454). With the help of their thesis advisor, students choose an area of special interest and identify at least one other faculty member who is willing to serve on the honors committee. An oral thesis defense concludes the process.

## Study Abroad in a German-Speaking Country

The Department of German Studies strongly supports study abroad as an opportunity for students to live and study in the German cultural context. The experience of living abroad promotes enduring personal growth, provides new intellectual perspectives through cultural immersion, and opens up academic and professional opportunities.

Students interested in studying abroad are encouraged to consider the Berlin Consortium, of which Cornell is a member. The program is run in conjunction with the Free University of Berlin and is of very high caliber. Six weeks of an intensive language practicum held at the Berlin Consortium center are followed by one or two semesters of study at the university. Participants enroll in regular courses at the university. Assistance in finding internships between semesters may be available to students staying for an entire academic year. Four semesters of German language study are prerequisite for participating in the program; ideally the last of these courses should be at the 300 level.

Students interested in this or other study abroad options in Germany, Austria, or Switzerland should consult the language program director, Gunhild Lischke (G75 Goldwin Smith Hall, 255-0725, gl15@cornell.edu).

## First-Year Writing Seminars

Consult the John S. Knight Institute brochure for course times, instructors, and descriptions.

## Courses Offered in German

### GERST 121(1210) Exploring German Contexts I

Fall or spring, 4 credits. Intended for students with no prior experience in German or language placement test (LPG) below 37, or SAT II below 370. G. Lischke, U. Maschke, and staff.

Students develop basic abilities in listening, reading, writing, and speaking German in meaningful contexts through interaction in small group activities. Course materials including videos, short articles, poems, and songs provide students with varied perspectives on German language, culture, and society.

### GERST 122(1220) Exploring German Contexts II

Fall or spring, 4 credits. Prerequisite: GERST 121, LPG 37-44, or SAT II 370-450. U. Maschke, G. Lischke, and staff.

Students build on their basic knowledge of German by engaging in intense and more sustained interaction in the language. Students learn more advanced language structures allowing them to express more complex ideas in German. Discussions, videos, and group activities address topics of relevance to the contemporary German-speaking world.

### GERST 123(1230) Expanding the German Dossier

Fall or spring, 4 credits. *Successful completion of GERST 121, 122, and 123 satisfies Option 2.* Prerequisite: study of German and LPG 45-55 or SAT II 460-580. U. Maschke and staff.

Students continue to develop their language skills by discussing a variety of cultural topics and themes in the German-speaking world. The focus of the course is on expanding

vocabulary, reviewing major grammar topics, developing effective reading strategies, improving listening comprehension, and working on writing skills. Work in small groups increases each student's opportunity to speak in German and provides for greater feedback and individual help.

### GERST 200(2000) Germany: Intercultural Context (CA)

Fall or spring, 3 credits. *Satisfies Option 1.* Prerequisite: GERST 123 or LPG 56-64 or SAT II 590-680, or placement by exam. B. Buettner and staff.

Content-based language course on the intermediate level. Students examine important aspects of present-day German culture while expanding and strengthening their reading, writing, and speaking skills in German. Materials for each topic are selected from a variety of sources (fiction, newspapers, magazines, and the Internet). Units address a variety of topics including studying at a German university, modern literature, Germany online, and Germany at the turn of the century. Oral and written work and individual and group presentations emphasize accurate and idiomatic expression in German. Successful completion of the course enables students to continue with more advanced courses in language, literature, and culture.

### GERST 202(2020) Literary Texts and Contexts (LA)

Fall or spring, 3 credits. *Satisfies Option 1.* Prerequisite: GERST 200 or equivalent or placement exam. Conducted in German. D. Reese.

Students in this intermediate course read and discuss a number of works belonging to different literary genres by major German-speaking authors such as Kafka, Walser, Brecht, Mann, Frisch, Dürrenmatt, Bachmann, and others. They explore questions of subjectivity and identity in modern society, of human existence as existence in language, and of the representation of history in literary texts. Activities and assignments focus on the development of reading competency in different literary genres, the improvement of writing skills including the accurate use of idiomatic expressions, the expansion of students' German vocabulary, and the systematic review of select topics in German grammar.

### GERST 204(2040) Working with Texts (CA)

Fall or spring, 3 credits. *Satisfies Option 1.* Prerequisite: GERST 200 or placement by exam (placement score and CASE). Staff.

Emphasis is on improving oral and written expression of idiomatic German. Enrichment of vocabulary and appropriate use of language in different conversational contexts and written genres. Material consists of readings in contemporary prose, articles on current events, videos, and group projects. Topics include awareness of culture, dependence of meaning on perspective, interviews with native German speakers, German news broadcasts, reading German newspapers on the Internet.

### GERST 206(2060) German in Business Culture (CA)

Spring, 3 credits. *Satisfies Option 1.*

Prerequisite: GERST 200 or placement by examination placement score and CASE. Students without previous knowledge of business German are welcome. G. Lischke. Students learn German and understand German business culture at the same time.

This German language course examines the German economic structure and its major components: industry, trade unions, the banking system, and the government. Participants learn about the business culture in Germany and how to be effective in a work environment, Germany's role within the European Union, the role of the Bundesbank, the importance of trade and globalization, and current economic issues in Germany. The materials consist of authentic documents from the German business world, TV footage, and a business German textbook. At the end of the course, the external Goethe Institut exam "Deutsch für den Beruf" is offered.

### GERST 301(3010) Scenes of the Crime: German Mystery and Detective Fiction (LA)

Fall, 4 credits. *Satisfies Option 1.* May be counted toward requirement for 300-level language work in the major. Prerequisite: GERST 202, 204, 206 or equivalent, or placement by exam, or permission of instructor. Taught in German. P. Gilgen.

Exploration of German crime, detective, and mystery writing in texts ranging from the early 19th century to contemporary fiction. Authors studied may include: Kleist, E. T. A. Hoffmann, Dürrenmatt, Schatten, Süskind, Handke, Oren, Arjouni, Ani, and Glauser. In addition to exercising hermeneutic skills (and, by extension, that gray matter of which Sherlock Holmes and Hercule Poirot were so fond), this course aims at improving proficiency in aural and reading comprehension, as well as speaking and writing skills, with emphasis on vocabulary expansion, advanced grammar review, and stylistic development. Recommended to students interested in a combined introduction to literature and high-level language training. The sister course GERST 302 Youth/Adolescence is taught in the spring semester.

### GERST 302(3020) Youth Culture: Adolescence in German Fiction (LA)

Spring, 4 credits. *Satisfies Option 1.*

Prerequisite: GERST 202, 204 or 206 or equivalent or placement exam, permission of instructor. Taught in German.

B. Buettner.

Examination of literary and cultural approaches to childhood, youth, and adolescence in texts ranging from the late 18th century to the present. Authors may include Bernhard, Musil, Zweig, von Horvath, Mann, Goethe, Kaschnitz, and Schlink. Aimed at improving students' proficiency in aural and reading comprehension, as well as in speaking and composition skills. Focus on high-level grammar review, stylistic and expository refinement and vocabulary expansion. Recommended for students wishing to combine intensive language training with reading and discussion of short fiction.

### GERST 306(3060) German Media (CA)

Fall, 4 credits. Taught in German. *Satisfies Option 1.* Prerequisites: GERST 202, 204 or 206 or equivalent or permission of instructor. U. Maschke.

The course explores the German media landscape through analysis of print, film, and digital media. We will investigate different styles of writing and presentation to unravel culturally specific discourses of communication. Intensive language study will enable the students to develop their own projects in the media of choice.

**GERST 310(3100) Berlin: Where the Wild Things Are (CA)**

Spring. 4 credits. *Satisfies Option 1.*

Prerequisite: GERST 202, 204, 206, or equivalent or permission of instructor.

Taught in German. U. Maschke.

Berlin has recently been declared the city of the world: Berlin as the place to be for politicians and profit-seekers, architects and artists, the rich and famous, but also for those seeking new thrills. Is this new Berlin pulsing once again with the vibrant energy of the 1920s or overwhelmed by the historical legacy of fascism and the divisions of the Cold War? With a focus on a wide variety of media, such as literature, film, architecture, music, political documents, the Internet, and MIT's hypermedia program Berliner Sehen, this course investigates the emergence and life of contemporary Berlin in the context of its history as the capital of Germany. Differing and sometimes contradictory representations of this unique city form the thematic core of this course, which stresses the refinement of critical reading skills in German in addition to advanced writing, listening, and speaking skills in German. Especially suitable for students interested in study abroad, this course is open to all qualified students interested in high-level development of their German-language skills in the context of cultural studies.

**[GERST 321(3210) After the Fires: Divided Germany, 1945 to 1989 (CA)]**

Formerly GERST 307. Next offered 2007–2008. L. Adelson.]

**[GERST 325(3250) The Age of Goethe # (LA)]**

Fall. 4 credits. *Satisfies Option 1.* Next offered 2008–2009. A. Groos.]

**GERST 410(4100) Senior Seminar (also GERST 610(6100))**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: adequate command of German; any 300-level course taught in German, or equivalent, or permission of instructor. Readings and discussions in German. A. Groos.

Topic: Early Modern City Culture. An introduction to city culture in the 15th and 16th centuries, with emphasis on the significance of Nuremberg and other early modern urban centers such as Strassburg and Augsburg. Topics include the city's development and social structure, pre- and post-Reformation constructions of its image and history, public spectacle and imperial entries, print culture and humanism, social order and social conflict (the Fastnachtsspiel, anti-Semitism). Readings will include texts/images by Hans Sachs, Conrad Celtis, Sebastian Brant, Albrecht Dürer, Hans Rosenplüt and Hans Folz. The last part of the course will deal with the reception of early modern Nuremberg from Goethe through the Romantics, including *Die Meistersinger von Nürnberg*.

**[GERST 442(4420) Changing Worlds: Migration, Minorities, and German Literature (LA)]**

4 credits. *Satisfies Option 1.* Next offered 2008–2009. L. Adelson.]

**GERST 443(4430) Love as Fiction. German Novellas from Three Centuries**

Spring. 4 credits. *Satisfies Option 1.*

Conducted in German. Prerequisite: any

course at 300 level taught in German or equivalent or permission of instructor.

Readings and discussions in German.

A. Schwarz.

Examination of love as a literary motif in texts ranging from the 18th to the 20th century. Special attention to the following questions: love as indicator for changing social attitudes toward family and kinship; love as a literary expression of emotion; love as aesthetic theory. Authors: Goethe, Schiller, Schlegel, Kleinst, Stifter, Fontane, Storm, Mann, Strauß, and Böll.

**Courses conducted in English**

It may be possible to arrange a German section for courses conducted in English, either informally or formally (for credit). Students are encouraged to discuss this possibility with instructors.

**[GERST 360(3600) Words and Music (also MUSIC 272(2245)) # (LA)]**

Formerly GERST 342. Next offered 2008–2009. A. Groos.]

**[GERST 374(3740) Opera and Culture (also MUSIC 374(3222)) # (LA)]**

Next offered 2008–2009. A. Groos.]

**Advanced Undergraduate and Graduate Courses****GERST 405(4050) Introduction to Medieval German Literature I # (LA)**

Fall. 4 credits. Prerequisite: reading knowledge of German. A. Groos.

After a brief introduction to basic aspects of the medieval universe, ranging from cosmology to psychology, readings will focus on introductory texts of late 12th-century courtly culture. Using the predominant genres of aristocratic self-representation, the heroic epic (Nibelungenlied), Arthurian romance (Hartmann's Erec or Iwein), and Minnesang, discussions will investigate the court as the locus of conflicting forces in the rise of the secular culture in Germany, examining such issues as the first vernacular construction of social and sexual identity, generational conflicts within the communal-dynastic order, the rise of individualism (the knightly quest), and subjectivity (the love lyric).

**GERST 406(4060) Introduction to Medieval German Literature II # (LA)**

Spring. 4 credits. Prerequisite: GERST 405 or equivalent or permission of instructor.

Anchor course for the medieval period.

A. Groos.

Political lyrics by Walther von der Vogelweide will introduce agendas of conflict in 13th-century German culture, ranging from crusades to civil war. Against this background, we will examine the utopian quest to win the Holy Grail and heal the Fisher King in Wolfram's Parzival, using Bakhtin's approach to pre-novelistic discourse. Readings from the love lyric trace representation of gender across emerging class differences, the increasing complexity of self, and instabilities of the performance text. Concluding topics may include women mystics and late medieval narratives of socio-sexual violence, anti-Semitism, and urban Angst.

**GERST 407(4070) Teaching German as a Foreign Language**

Fall. 4 credits. G. Lischke.

Designed to familiarize students with current ways of thinking in the field of applied linguistics and language pedagogy. Introduces different concepts of foreign

language methodology as well as presents and discusses various techniques as they can be implemented in the foreign language classroom. Special consideration is given to topics such as planning syllabi, writing classroom tests, and evaluating students' performance. Participants conduct an action research project.

**GERST 420(4200) Faust: Close Reading (LA)**

Fall. 4 credits. Conducted in English.

Limited to 15 students. G. Waite.

This is a close reading of Goethe's Faust (Parts I and II). Although our reading of Goethe's masterpiece inevitably is informed by contemporary theoretical concerns (including poststructuralism, deconstruction, psychoanalysis, feminism, gender and sexuality studies, and Marxism) our approach will be primarily that of close reading. Each week the amount of reading will be very small (sometimes only 10 or 15 lines at most) but these lines we will read carefully. Problems of translation will be crucial: annotated editions of the text will be available in German and in English.

**[GERST 424(4240) The Totalitarian Order: Vision and Critique (also GOVT 425(4255)) (CA)]**

Fall. 4 credits. Next offered 2007–2008.

P. U. Hohendahl.]

**[GERST 430(4300) Brecht, Artaud, Müller, Wilson (also FILM 420(4200))]**

Next offered 2007–2008. D. Bathrick.]

**GERST 433 History of Modern Jewry (also HIST 433)**

Fall. 4 credits. Limited to 15 students.

V. Caron.

For description, see HIST 433.

**[GERST 441(4410) Introduction to Germanic Linguistics (also LING 441(4441)) (HA)]**

Next offered 2008–2009. W. Harbert.

For description, see LING 441.]

**[GERST 449(4490) Rescreening the Holocaust (also COM L 453(4530), FILM/RELT 450(4500)) (LA)]**

Next offered 2008–2009. D. Bathrick.]

**GERST 451–452(4510–4520) Independent Study**

451, fall; 452, spring. 1–4 credits each semester. Prerequisite: permission of instructor.

**GERST 453(4530) Honors Research**

Fall. Staff.

**GERST 454(4540) Honors Thesis**

Spring. 8 credits. Prerequisite: GERST 453. Staff.

**GERST 457(4570) Imagining the Holocaust (also COM L 483(4830), ENGL 458(4580)) (LA)**

Spring. 4 credits. D. Schwartz.

For description, see ENGL 458.

**GERST 471(4710) Critical Reason, The Basics: Kant, Hegel, Marx, Adorno (also GOVT 471(4715)) (KCM)**

Fall. 4 credits. Limited to 15 students.

S. Buck-Morss.

For description, see GOVT 471.

**[GERST 496(4960) Theorizing the Public Sphere]**

Next offered 2008–2009. P. U. Hohendahl.]

**Graduate Courses**

**Note:** For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

**GERST 610(6100) Early Modern City Culture (also GERST 410[4100])**

Fall. 4 credits. A. Groos.  
For complete description, see GERST 410.

**[GERST 615(6150) Jews in German Culture Since 1945]**

Next offered 2008-2009. L. Adelson.]

**[GERST 616(6160) Spaces of Literature]**

Next offered 2007-2008. A. Schwarz.]

**GERST 620(6200) Faust: Close Reading (also GERST 420[4200])**

Fall. 4 credits. Limited to 15 students.  
G. Waite.  
For description, see GERST 420.

**GERST 627(6270) Baroque (also COM L 657[6570])**

Fall. 4 credits. Anchor course. Conducted in English. G. Waite.

This graduate seminar focuses on the "baroque" (or "early radical enlightenment") in two basic ways: (1) as a period of cultural production in 17th-century Europe (including Germany, the Netherlands, and Spain); (2) and as a problem in current aesthetic, philosophical, and political theory. Topics may include: allegory and drama of mourning (Benjamin); action from a distance and absent or immanent cause (Spinoza, Althusser); order of things (Foucault), fold (Leibniz, Deleuze); savage anomaly (Negri), guided culture (Maravall), death of painting (Marin).

**[GERST 630(6300) Classicism and Idealism]**

Next offered 2008-2009. P. U. Hohendahl.]

**GERST 631-632(6310-6320) Academic German I and II**

631, fall; 632, spring. 3 credits each semester. Prerequisites: graduate standing; for GERST 632, GERST 631 or equivalent. Staff.

Intended primarily for beginners with little or no previous German knowledge. Emphasis in 631 on acquiring basic German reading skills. Emphasis in 632 on development of the specialized vocabulary of student's field of study.

**GERST 636(6360) Kleist and Kafka: Prose Works**

Spring. 4 credits. D. Reese.  
Reading Kleist and Kafka together, we will endeavor to strike upon our own vocabulary for describing the peculiar temporal qualities of their narratives and short prose works. Rather than beginning with a particular understanding of narratology, we will attempt to elaborate one by attending to what might be called narrative speed—an attention to the significance of lapses and accelerations in the art of storytelling. How is the description of space conditioned by the becoming of the description in time? How, in turn, is this reconstitution of space within the temporal development of the narrative related to the arrival of judgment? We will pay close attention to the variation between the random detail, what might be called narrative caprice, and recuperative, retrospective assertions of necessity—between the absurd and the demonstrable. Of particular concern will be the persistent dislocation of epistemological certainty in the unfolding of the texts and

how it bears on issues of law. In keeping with this, we will consider the density of the bodies which cross the thresholds of judgment, swallow prophecies, move through border patrols and succumb to or exceed the narrative logic which brings them forth. Selected prose works by Kleist and Kafka will be read alongside writings by Barthes, Benjamin, Bloch, Freud, and Nietzsche.

**[GERST 637(6370) 19th-Century Fiction: The Realist Project]**

Next offered 2007-2008. A. Schwarz.]

**GERST 638(6380) Readings of Recollection (also COM L 601[6010])**

Fall. 4 credits. P. Gilgen.  
This course examines the emergence of a veritable philosophy of recollection around 1800. The decline of the *ars memoriae* and the temporalization of knowledge in the course of the 18th century made possible a new semantics of "recollection" (*Erinnerung*) in German culture. In the process, a number of canonical statements in the history of philosophy by the likes of Plato, Aristotle, and Augustine were thoroughly re-read and re-written. A new mode of reading was of central importance for this development. Primary readings may also include Cicero, Herder, Leibniz, Lessing, Kant, Goethe, Schiller, Hegel, Hölderlin.

**GERST 639(6390) Walter Benjamin: Constellations of Thought (also COM L 623[6230])**

Spring. 4 credits. Texts in English and German. Discussions in English.  
A. Schwarz.

Considering the entire work of Walter Benjamin this seminar will explore this author's unique contributions to the fields of literature, philosophy and politics. Beginning with an analysis of Benjamin's notion of language as a fundamental premise of his analytic approach we shall expand the focus to include his studies of specific literary genres, authors and issues (Tragic drama, narrative, novel, translation, Schlegel, Baudelaire, Kraus, Kafka, Modernism) as well as his many contributions to political and cultural discussions (state of emergency, shock, youth movements). Benjamin's manifold status as literary critic, philosopher, political theorist and historian of culture reflects methodological constellations of thought and ideas that have set this author apart from any other critical school within the 20th century.

**GERST 647(6470) German Literature from 1949 to 1989**

Fall. 4 credits. Prerequisite: reading knowledge of German. D. Bathrick.  
This seminar/anchor course will focus on German literature during the period of the cold war between 1949 and 1989. The point of the course will be to trace major themes and styles in German-speaking literature, East and West, in light of contemporaneous events of broad cultural and political significance. While individual texts will be examined within their specific historical (temporal, geopolitical, aesthetic) contexts, the course will also be organized comparatively around critical debates concerning such topics as fictional representations of the immediate past; attempts by minority/majority voices to challenge and change the canon; writing and social change; questions concerning a national cultural identity; the politics of postmodernity and postcolonialism; etc. Readings will be

taken from authors such as H. Böll, G. Grass, I. Bachmann, W. Koeppen, A. Andersch, P. Handke, F. Dürrenmatt, C. Wolf, P. Weiss, H. Müller, V. Braun, C. Hein, I. Morgner, J. Becker, H. Enzensberger, P. Schneider, V. Stefan, B. Strauss, A. Duden, M. Maron, and E. Özdamar.

**[GERST 650(6500) Culture in the Weimar Period]**

Next offered 2007-2008. D. Bathrick.]

**[GERST 652(6520) Culture in Germany 1933-1945]**

Next offered 2008-2009. D. Bathrick.]

**[GERST 653(6530) Opera]**

Next offered 2008-2009. A. Groos.]

**GERST 658(6580) Old High German, Old Saxon (also LING 646[646])**

Spring. 4 credits. W. Harbert.  
For description, see LING 646.

**[GERST 668(6680) Literature and the Uncanny]**

Next offered 2008-2009. A. Schwarz.]

**GERST 669(6690) Modern Social Theory I (also GOVT 669[6695])**

Fall. 4 credits.  
For description, see GOVT 669.

**[GERST 670(6700) Modern Social Theory II (also GOVT 670[6705], VISST 670[6470])]**

Next offered 2007-2008. S. Buck-Morss.]

**[GERST 671(6710) Postcolonial Theory and German Studies]**

Next offered 2007-2008. L. Adelson.]

**GERST 689(6890) The Aesthetic Theory of Adorno (also COM L 689[6890])**

Fall. 4 credits. P. U. Hohendahl.  
The seminar will focus on the aesthetic writings of Adorno, beginning with relevant chapters from *Dialectic of Enlightenment* as well as selected essays on European literature and music. The emphasis then will be placed on Adorno's major posthumous work: *Aesthetic Theory* (1970). The aim is a close reading of Adorno's theory in the context of the Kantian and Hegelian tradition.

**[GERST 696(6960) Conceptualizing Cultural Contact]**

Next offered 2007-2008. L. Adelson.]

**GERST 753-754(7530-7540) Tutorial in German Literature**

Fall and spring. 1-4 credits each semester.  
Prerequisite: permission of instructor.

**Dutch****DUTCH 121-122(1210-1220) Elementary Dutch**

121, fall; 122, spring. 4 credits each semester. Prerequisite: permission of instructor. M. Briggs.

Intensive practice in listening, speaking, reading, and writing basic Dutch in meaningful contexts. The course also offers insight into Dutch language, culture, and society.

**DUTCH 203(2030) Intermediate Composition and Conversation**

Fall. 3 credits. *Satisfies Option 1.*  
Prerequisite: DUTCH 122 or permission of instructor. Offered in Dutch. M. Briggs.  
Improved control of Dutch grammatical structures and vocabulary through guided conversation, discussions, compositions,

reading, and film, drawing on all Dutch-speaking cultures.

### **DUTCH 300(3000) Directed Studies**

Spring. 1-4 credits, variable. Prerequisite: permission of instructor. Conducted in Dutch. M. Briggs.

Individualized advanced Dutch studies.

Provides students with individualized programs which can be anything from advanced mastery in any or all skills to the mastery of Dutch for research, literature, and history in support of all disciplines.

### **Swedish**

#### **SWED 121-122(1210-1220) Elementary Swedish**

121, fall; 122, spring. 4 credits each semester. Prerequisite: for SWED 122, SWED 121 or equivalent. L. Trancik.

Students develop abilities in listening, speaking, reading, and writing within Sweden's cultural context. Work on the Internet, interactive computer programs, and a virtual textbook are used in these courses.

#### **SWED 203(2030) Intermediate Swedish** Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: SWED 122 or permission of instructor. L. Trancik.

Intermediate to advanced-level instruction using audiovisual material and text to enhance language comprehension.

#### **SWED 300(3000) Directed Studies**

Fall. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. L. Trancik.

Taught on a specialized basis to address particular student needs.

## **GOVERNMENT**

V. Bunce, chair; C. Way, director of graduate studies; A. Carlson, director of undergraduate studies; C. Anderson, R. Bensel, S. Buck-Morss, M. Evangelista, J. Frank, L. Frasure, B. Hendrix, R. Herring, M. Jones-Correa, M. Katzenstein, P. Katzenstein, J. Kirshner, I. Kramnick, T. J. Lowi, S. Martin, L. Maxwell, W. Mebane, D. Moehler, D. Patel, J. Rabkin, K. Roberts, D. Rubenstein, E. Sanders, M. Shefter, J. Shields, A. M. Smith, J. J. Suh, N. Tannenwald, S. G. Tarrow, N. T. Uphoff, N. van de Walle, R. Weiner, H. Zimmermann.

Web site: [falcon.arts.cornell.edu/Govt](http://falcon.arts.cornell.edu/Govt)

"Government" is what Cornell calls a department that elsewhere might be termed political science. The focus of this discipline is power applied to public purposes. Some faculty concentrate on purposes, some on applications. Some engage in the close reading of great texts of political philosophy, while others analyze the behavior of power-wielders and publics in this and other societies. Government is divided into four subfields: U.S. politics, comparative politics (other nations), political theory (philosophy), and international relations (transactions between nations).

### **The Major**

To be admitted to the major, a student must pass two government courses.

To complete the major, a student must:

1. pass two of the introductory government courses (GOVT 111, 131, 161, 181);

2. pass an additional course in one of the remaining subfields (American government, comparative government, political theory, or international relations). This course may be any course offered in the government department, including introductory courses, upper-level courses or seminars but must be a minimum of 3 credits. Students are strongly advised to take at least one course in each of the four subfields;
3. accumulate an additional 28 credits of government course work at the 300 level or above;
4. complete at least one seminar-style course in government that may be applied toward the 28 credits. These courses include those numbered 400.XX to which students are admitted by application only; or other 400-level GOVT courses in which no more than 15 students are enrolled.
5. accumulate 11 credits in upper-level courses in related fields (e.g., anthropology, economics, history, science and technology studies, psychology, and sociology). Upper-level courses are usually courses numbered at the 300 level or above (200-level courses are not considered upper-level). Students should consult with their major advisor to choose appropriate courses. All choices of related courses must be approved by the major advisor or the director of undergraduate studies;
6. all courses used to fulfill a government major must be passed with a letter grade. No S-U grades accepted.

To summarize, a total of 10 government courses and three additional courses (11 credits) of upper-level related courses are required to complete the major. For more information about the government major, please visit our web site: <http://falcon.arts.cornell.edu/Govt>.

**Cornell in Washington Program.** Government majors may apply to the Cornell in Washington program to take courses and undertake a closely supervised externship during a fall or spring semester.

**European Studies Concentration.** Government majors may elect to group some of their required and optional courses in the area of European studies, drawing from a wide variety of courses in relevant departments. Students are invited to consult Professors P. Katzenstein and S. G. Tarrow for advice on course selection and foreign study programs.

#### **Model European Community Simulation.**

Undergraduates with an interest in the European Union, public affairs, or debating may participate in an annual European Union simulation held, on an alternating basis, in April at SUNY Brockport or in January in Brussels. The simulation provides an opportunity for participants, representing politicians from the members states, to discuss issues and resolutions of current concern to the European Union.

To prepare for the simulation, a 2-credit course is offered by the Department of Government each year (GOVT 431 or 432). Participation in the simulation is open only to those who register for this course. Anyone interested in participating or finding out more information should contact the Institute for European Studies at 120 Uris Hall, 255-7592.

**International Relations Concentration.** See the description under "Special Programs and Interdisciplinary Studies."

**Honors.** Application to the honors program is made in the early spring of the junior year. For more information about the honors program and an application form, please visit [falcon.arts.cornell.edu/Govt](http://falcon.arts.cornell.edu/Govt).

**First-Year Writing Seminars.** Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

**Major Seminars.** Fall or spring. 4 credits. These seminars, emphasizing important controversies in the discipline, cap the majors' experience. Thus preference in admission is given to majors over nonmajors and seniors over juniors. Topics and instructors change each semester. To apply, students should pick up an application in 210 White Hall during the pre-enrollment period.

**Course Subfields.** Courses in the Department of Government are broken down into four subfields: American government, political theory, international relations, and comparative government. To determine in which category (or subfield) the following courses fall, please note the two-letter reference at the end of the descriptions. The key is as follows: AM = American, PT = theory, IR = international relations, and CO = comparative.

#### **GOVT 111(1111) Introduction to American Government and Politics (SBA)**

Fall and summer. 3 credits. T. Lowi. Introduction to government through the American experience. Concentrates on analysis of the institutions of government and politics as mechanisms of social control. (AM)

#### **GOVT 131(1313) Introduction to Comparative Government and Politics (also LAT A 131[1310]) (SBA)**

Spring and summer. 3 credits. K. Roberts. Provides a survey of the institutions, political processes, and policies of contemporary states. Focuses on the conditions for and workings of democracy. Looking at Western Europe, students analyze institutional variations among liberal democracies, and their political implications. Then they probe the origins of democracy in Western societies and the reasons why communism and other forms of authoritarian rule have prevailed elsewhere. Finally, they explore the impetus behind and the obstacles to democratization in the Third World and the erstwhile Communist Bloc. Throughout this survey, problems of democracy are related to problems of economic development, efficiency, and equality. (CO)

#### **GOVT 161(1615) Introduction to Political Philosophy # (HA)**

Spring. 3 credits. B. Hendrix. Survey of the development of Western political theory from Plato to the present. Readings from the works of the major theorists. Examination of the relevance of their ideas to contemporary politics. (PT)

#### **GOVT 181(1817) Introduction to International Relations (SBA)**

Fall and summer. 3 credits. P. Katzenstein. Introduction to the basic concepts and practice of international politics. (IR)



**GOVT 182(1827) WIM Section:  
Introduction to International  
Relations**

Fall. 1 credit. Prerequisite: permission of instructor; GOVT 181. Staff.

Special, writing-intensive section of GOVT 181, designed to provide a small number of students the opportunity to practice and improve their writing skills as they learn about world politics. Students complete a series of papers and are expected to take an active part in class discussion. (IR)

**GOVT 202(2021) Honor and Obligation in  
Conflict (HA)**

Spring. 4 credits. J. Rabkin.

Explores a key question in political life—why obey the law? Examines the question where answers are most difficult: in the extreme setting of international conflict in war and commerce, where normal policing is not available. Looks at ancient and medieval answers, as portrayed in literature of those eras. Then it highlights changes in successive modern—and now, perhaps, post-modern—efforts to sustain legal restraints beyond the reach of ordinary state controls, as illustrated in formal treaties and accounts of actual conflicts. (AM)

**GOVT 227(2273) SSP: The Atomic Age  
(SBA)**

Fall. 4 credits. Limited to 15 students.  
C. Way.

How has the advent of nuclear weapons changed world politics? In exploring this general question, this course addresses a wide range of issues: How do nuclear weapons work, and how difficult are they to obtain? Do nuclear weapons keep the peace by rendering war obsolete, or do they make the world a more dangerous place? What are the psychological effects of living with the specter of nuclear conflict? Are strategies of nuclear deterrence, which entail targeting civilians, ethically justified? Does the Nuclear Non-Proliferation Treaty (NPT) work, and what are the prospects for future proliferation? How likely is nuclear terrorism, and what can be done to prevent it? Students reflect on these issues theoretically and historically, but also in the context of particular current events, such as the nuclearization of South Asia, the 2005 Review Conference of the NPT, and the unraveling of the A.O. Khan network. Texts include film and literature as well as international relations literature, and writing assignments offer students the opportunity to explore a number of genres: policy memo, political research, film interpretation, fiction, and editorial. (CO)

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**GOVT 248(2485) Ethics and International  
Relations (also PHIL 248(2480))  
(KCM)**

Spring. 4 credits. R. Miller.  
For description, see PHIL 248. (PT)

**GOVT 261(2615) SSP: Feminist Theory/  
State Theory (also FGSS 261(2610),  
AM ST 263(2615)) (CA)**

Spring. 4 credits. A. M. Smith.  
Feminist theory presents unique challenges to the student of politics interested in state structures, legal systems and public policy. While liberal democratic state theory takes for granted the separation between the "private" and "public" spheres, feminist theory submits that distinction to a thorough interrogation. Through the feminist theory lens, we can appreciate the way in which public policy not only impacts the domestic household, but actually shapes and defines the family itself through mechanisms such as family law, welfare policy, labor market regulation, and even residential zoning by-laws. Feminists also insist that the "personal" is "political." An individual woman might decide to use contraception or to practice safer sex in a highly intimate context, but feminist theory brings to light the fact that social movements, governmental agencies, and legal doctrine have set the stage for that personal decision. Feminist theory is therefore situated in a privileged position to shed new light on some of the most interesting issues in contemporary politics, such as same-sex marriage, abortion, the HIV and AIDS epidemic, stem cell research, access to health care, discrimination in the workplace, and poverty policy. This seminar explores feminist theory's interrogation of state theory. Pays particularly close attention to the feminist theory that explores the intersection between racism and sexism in America today. (PT)

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**GOVT 282(2827) China and the World  
(also CAPS 282(2827)) @ (CA)**

Spring. 3 credits. A. Carlson.  
Study of the dramatic rise of China through reviewing major developments in contemporary Chinese foreign policy since the establishment of the People's Republic of China (PRC), and concentrating more specifically on major developments in Chinese foreign policy during the 1980s and 1990s. Such a wide-ranging survey of Chinese foreign policy involves not only a consideration of the evolution of China's relations with its major bilateral partners but also an investigation of how China has defined its broader relationship with the international system. In addition, students are asked to consider which causal factors have been of primary importance in motivating Chinese behavior. (IR)

**GOVT 294(2947) Global Thinking @ (KCM)**

Fall. 4 credits. H. Shue.  
Existing nation-states face many challenges that cross their borders, including

environmental degradation, international terrorism, and global market forces. This course considers the possibility and desirability of a world government. Students evaluate the practical achievability of different world-level political structures, paying particular attention to contemporary theories of international relations, and to related questions of social-scientific evidence. Students also evaluate the ethical status of potential world-level political structures, evaluating the normative value of existing states compared to the likely dangers and benefits of several visions of world government. (IR)

**[GOVT 302(3021) Social Movements  
in American Politics (also AM ST  
302(3021)) (HA)]**

Fall. 4 credits. Next offered 2007–2008.  
E. Sanders.

Analyzing a variety of movements from the late 19th century to the present, this course seeks answers to the following questions: What social and political conditions gave rise to these movements? What determined success or failure (and how should those terms be defined)? How do social movements affect political processes and institutions (and vice versa)? What is their legacy in politics and in patterns of social interaction? The major movements analyzed are populism; progressivism; labor; socialism; women's suffrage, the contemporary gender equality movement; protest movements of the 1930s; civil rights; SDS and antiwar movements of the 1960s; environmentalism; the 1980s anti-nuclear (weapons) movement; gay rights; and the new religious right. Some theoretical works are used, but most of the theoretical explorations are derived inductively, from studies of actual movements and the difficulties they faced. (AM)

**GOVT 303(3031) Imagining America (also  
AM ST 326(3031), COM L 341(3410),  
FRLIT 324(3240)) (CA)**

Fall. 4 credits. D. Rubenstein.  
For description, see AM ST 326.

**GOVT 304(3043) Women and Politics  
(also FGSS 304(3040)) (SBA)**

Spring. 4 credits. S. Martin.  
Relies on case studies to examine gender and politics from a comparative perspective. Explores how political and economic transformations impact gender norms and family structures, thereby posing new challenges for governments in the ongoing tasks of nation-building and construction of a national identity. Topics include, but are not limited to (1) the changing social constructions of family; (2) families as agents of socialization; (3) government efforts to control women's re/productive capacities; (4) women's political mobilization; and (5) policy instruments used to re/produce ideal families. (CO, AM)

**GOVT 306(3063) Society and Party  
Politics (also SOC 307(3070)) (SBA)**

Spring. 4 credits. S. Van Morgan.  
For description, see SOC 307.

**GOVT 307(3071) Introduction to Public  
Policy**

Summer. 4 credits. S. Jackson.  
Public policy is shaped by many forces. This course will enhance your ability to understand those forces and the policies that they produce. It will provide you with tools for thinking about, assessing, and evaluating

those policies. And it will introduce you to the substantive core of several major issues in America today. The course will have three segments. In the first, we will examine the relevant institutions, interests, and ideologies which operate in the policy arena and the debates about the impact of these forces which engage students of the policy process. In the second, we will consider two different lenses through which we might peer to evaluate policies. In the third, we will discuss the main lines of debate in contemporary American politics concerning four substantive issues: crime and punishment, education, the economy and foreign trade, and foreign policy. The course will meet four days a week for one hour. Based on assigned readings, the class sessions will mix lectures, discussions, group activities, and guest speakers.

**GOVT 309(3091) Science in the American Polity (also AM ST 389[3911], S&TS 391[3911]) (SBA)**

Spring. 4 credits. S. Hilgartner.  
For description, see S&TS 391.

**[GOVT 311(3111) Urban Politics (also AM ST 311[3111]) (SBA)]**

Fall. 4 credits. M. Shefter.  
The major political actors, institutions, and political styles in large American cities: mayors, city councils, bureaucracies, ethnic and racial minorities, urban machine politics and the municipal reform movement. The implications of these political forces for policies pertaining to urban poverty, homelessness, and criminal justice.

**GOVT 312(3128) America's Changing Faces (also AM ST 301[3121])**

Summer. 2 credits. S. Jackson.  
A new generation of leaders has emerged in America's political, economic, educational and cultural institutions. Those leaders employ and explore in their work modern communications technologies such as the Internet. Thereby, they are changing both what is done, and how things are done in the respective life spheres. This course explores the resulting changes in the nature of American life and asks questions about the interactions among the different realms of life. (AM)

**GOVT 313(3131) The Nature, Functions, and Limits of Law (CA)**

Spring. 4 credits. Prerequisite: undergraduate standing. R. Hilman.  
General education course for students at the sophomore and higher levels. Law is presented not as a body of rules but as a set of varied techniques for resolving conflicts and dealing with social problems. The roles of courts, legislatures, and administrative agencies in the legal process is analyzed, considering also the constitutional limits on their power and practical limits of their effectiveness. Assigned readings consist mainly of judicial and administrative decisions, statutes and rules, and commentaries on the legal process. Students are expected to read assigned materials before each class and to be prepared for participation in class discussion. (AM)

**[GOVT 314(3141) Prisons (also AM ST 315[3141]) (SBA)]**

Fall. 4 credits. M. Katzenstein.  
The focus of the course is on the politics of incarceration and the relationship of incarceration to our understanding of citizenship. Within this framework, we will look at questions about the influence of race on incarceration; how public opinion shapes

penal policies; how profits and the prison-industrial complex operate; and how political activism—both reformist and radical—engages with issues of criminal justice policy. Sections are a requirement of the course in addition to twice a week lectures; Requirements of the course will be largely essay and writing-based.

**[GOVT 316(3161) The American Presidency (SBA)]**

Spring. 4 credits. Next offered 2007–2008.  
E. Sanders.]

**GOVT 317(3171) Campaigns and Elections (SBA)**

Fall. 4 credits. W. Mebane.  
Examines campaigns and elections, focusing primarily on national elections in the United States. Topics include the relationship between elections and the economy, the weakness of the American party system, voter turnout, individual voting decisions, negative campaigning, and the noncompetitiveness of congressional elections. Examines several theories that explain these phenomena, including in particular the theory of rational choice. Course requirements include one or two papers based on original analysis of election survey data. (AM)

**GOVT 318(3181) U.S. Congress (also AM ST 319[3181]) (SBA)**

Spring. 4 credits. M. Shefter.  
The role of Congress in the American political system. Topics include: the political setting within which Congress operates, the structure of Congress, the salient features of the legislative process, and recent congressional behavior in a number of policy areas. (AM)

**GOVT 319(3191) Racial and Ethnic Politics (also AM ST 313[3191], LSP 319[3191]) (SBA)**

Spring. 4 credits. M. Jones-Correa.  
In 1965 the landscape of American politics changed dramatically with the passage of the Voting Rights Act. That same year, Congress passed the Immigration Reform Act, which though little heralded at the time, arguably has had equally profound effects. This course provides a general survey of minority politics in the United States, focusing on the effects of these two key pieces of legislation. The course highlights the relationships between immigrants and minorities, electoral politics and protest politics, and between cooperation and competition within and among minority groups. The purpose of the course is not only to pinpoint the similarities and differences in the agendas and strategies adopted by minority groups, but to indicate the interaction between "minority" politics and American politics as a whole. (AM)

**GOVT 320(3201) Public Opinion and Public Choice (SBA)**

Spring. 4 credits. Prerequisite: GOVT 111 or permission of instructor. W. Mebane.  
A fundamental paradox in democracy is that a government the people control is only rarely a government that does what the people want. This is not to say that government *not* by the people is better (it is usually worse). This course explores this problem, contrasting the answers given by the concept of public opinion and the formal theory of social choice. The paradox is encountered in several American political institutions, including elections, legislatures, and bureaucracy. (AM)

**[GOVT 326(3263) Building Better Democracies]**

Fall. 4 credits. Next offered 2007–2008.  
R. Weiner.]

**[GOVT 327(3271) Civil Liberties in the United States (also AM ST 310[3271]) (KCM)]**

Spring. 4 credits. Next offered 2007–2008.  
J. Rabkin.]

**[GOVT 328(3281) U.S. Supreme Court (also AM ST 328[3281]) (HA)]**

Fall. 4 credits. Next offered 2007–2008 on Cornell campus. J. Rabkin.

Investigates the role of the Supreme Court in American politics and government. Traces the historical development of constitutional doctrine and the institutional role the court has played in American politics. (AM)]

**[GOVT 329(3293) Comparative Politics of Latin America (also LAT A 329[3290]) @]**

Fall. 4 credits. K. Roberts.  
Provides an overview of political development in Latin America, emphasizing the interrelationships between socioeconomic and political change. Different theoretical perspectives are used to interpret national experiences and regional patterns of authoritarianism, populism, revolution, and democratization.

**GOVT 330(3303) Politics of the Global North (also ILRIC 333[4330])**

Fall. 4 credits. L. Turner.  
For description, see ILRIC 333. (CO)

**GOVT 332(3323) Modern European Politics (SBA)**

Fall. 4 credits. H. Zimmermann.  
Introduction to politics and political systems in Western Europe. Starts with a brief history of the consolidation of West European democracies before and after World War II. Next discusses core theoretical concepts guiding the comparative analysis of political systems. The main part of the course consists of a discussion of the political cultures, parties, electoral systems, and current problems confronting the political systems of Britain, France, Germany, and Italy. Italy and Germany are treated in depth. Hotly debated issues in European politics are presented by students in class and in a short research paper, before the course conclude with an analysis of the European Union (EU) as political system. (CO)

**[GOVT 338(3383) Comparative Political Economy (SBA)]**

Spring. 4 credits. Next offered 2007–2008.  
C. Way.

Examines the juncture of politics and the economy in the advanced industrial democracies. Why do some countries have large, inclusive welfare states while others have minimal social programs? Is the welfare state in decline, and if so why? What difference does it make for the economy whether parties of the Left or Right govern? Are strong unions bad for the economy, or can they actually boost economic performance? What does increasing globalization of the world economy mean for the constraints and opportunities facing governments in managing the economy and providing social welfare? Are all market economies pretty much the same, or are there varieties of capitalism that differ in important ways—and can they survive in the face of globalization? This course uses a variety

of theoretical perspectives to investigate these and other questions, paying particular attention to evaluating the theoretical arguments with both systematic and historical evidence. (CO)

**[GOVT 339(3393) Political Economy of Development @ (SBA)]**

Spring. 4 credits. Next offered 2008-2009.  
D. Moehler.]

**[GOVT 341(3413) Modern European Society and Politics (also SOC 341(3410)) (SBA)]**

Fall. 4 credits. S. Van Morgan.

A trip to the past and the future that examines the main economic and political transformations in Europe over the course of more than 600 years. Integrates theoretical and analytical insights from history, sociology, and political science to describe and interpret the rise and relative decline of Europe as a world actor. In particular, emphasizes the role of state competition and the drive toward capital accumulation, first within Europe and then on a global scale, in providing the impetus for Europe's political and economic dynamics. During this period, Europe invented and eventually transcended the nation-state. Simultaneously, its economy moved from agrarian to industrial, and then to postindustrial, from self-sufficiency to integration into global exchange networks encompassing populations, goods, services, and capital. At the formal level, the course combines lectures with multimedia materials. (CO)

**[GOVT 342(3427) Germany and Europe]**

Fall. 4 credits. P. Katzenstein.

German unification in 1990 and the accelerating movement toward European integration have created new political conditions for our understanding of German and European politics. The end of the Cold War has brought forth old fears about the domination of Europe by an unpredictable German giant. Alternatively, these changes have also fueled new hopes for Germany and Europe as models of political pluralism in a more peaceful and prosperous world. This course will thus reflect on two kinds of politics: the specter of the "Germanization" of Europe and the vision of the "Europeanization" of Germany. Liebert description for Fall 95: German unification, the collapse of the Soviet bloc and the accelerating movement towards European unification have focussed attention on the shape and significance of the "New Europe." These changes have fueled both new hope for European democracy and new problems for European integration, as new states join the Union and new strains emerge within it. The course will focus on intergovernmental comparisons of EU member states, on the emerging weight of Germany as the strongest state in the Union, as well as on supranational institutional and political developments in the 1990s.

**[GOVT 343(3437) The Politics of European Union (SBA)]**

Spring. 4 credits. H. Zimmermann.

Despite recent bad feelings, the countries constituting the European Union (EU) still remain the most important partners for the United States in the world. And despite the rise of China and other Asian countries, the EU, together with the United States, still calls the tune in the international economy. However, even citizens of the European

Union generally know very little about how this complex structure works. This course explores the policies and policy-making of the European Union against the backdrop of the postwar history of European integration and the institutional framework of the EU. Also considers the external dimension of the EU and explore current debates about the emerging European polity, in particular the European constitution. Throughout the course students reflect on parallels with the American political system and on the state of current transatlantic relations. (IR)

**[GOVT 346(3463) Modern Japanese Politics (also ASIAN 346(3346)) @ (SBA)]**

Spring. 4 credits. Next offered 2007-2008.  
R. Weiner.]

**[GOVT 351(3513) Politics of South Asia (also GOVT 735(7353))]**

Spring. 4 credits. R. Herring.

How well do India's political institutions function in the face of the social and economic challenges of the 1990s? We will take up a range of issues that have been hotly debated in India over the last 10 years—economic restructuring, Hindu nationalism, child labor, gender inequality, among others—considering what these controversies reveal about the character of the Indian state. Each week will be organized around a controversial question as presented in articles, books, and films. (CO)

**[GOVT 354(3549) Capitalism, Competition, and Conflict in the Global Economy (SBA)]**

Fall. 4 credits. Next offered 2007-2008.  
P. Katzenstein.

Unemployed autoworkers in Detroit and the wood stoves in New England signal an important change in America's relation to the world economy. This course characterizes these changes in a number of fields (trade, money, energy, technology), explains them as the result of the political choices of a declining imperial power that differs substantially for the choices of other states (Japan, Germany, Britain, France, the small European states, and Korea), and examines their consequences for America and international politics. (AM, CO, IR)

**[GOVT 360(3605) Ideology (CA)]**

Spring. 4 credits. D. Rubenstein.

Focuses on critical approaches to the study of ideology in order to understand the role of ideology in political subject formation. After an initial presentation of the classical Marxist texts on ideology, examines 20th-century reworkings of hegemony theorist Antonio Gramsci and the critical structuralist approaches of Roland Barthes, Jean Baudrillard and Dick Hebdige. Concentrates on the "lived relation" to ruling ideas in the form of ideologies of everyday life. The second part of the course is devoted to psychoanalytically oriented theories (Freud, Lacan) which address the internalization of belief, both in relation to the intrapsychic and in the interaction between psychic and state apparatuses. Concludes with Louis Althusser's notion of interpellation, which resumes the Marxist, structuralist and psychoanalytic objectives of the course material. The theorists in the second part of the course are contextualized within the experience of the historical traumas of fascism and French decolonization. Throughout the semester, students reflect on the continued relevance of

historic ideologies, centered around notions of class interest, to late 20th-century ideologies' attachments to national, religious, gendered, ethnic, technological identity. (PT)

**[GOVT 361(3615) Liberalism and Its Critics # (KCM)]**

Fall. 4 credits. B. Hendrix.

The term "Liberalism" refers to a broadly allied set of political theories and practices that focus on maximizing individual liberty, generally through the protection of personal rights. This course will consider both competing views within the liberal tradition, and challenges made by those outside it. The course begins with the historical origins of liberalism in European religious wars and changing coalitions of power, and moves forward through its major theorists (including Thomas Hobbes, John Locke, and John Stuart Mill) to the present day. We will then consider a variety of objections to liberalism, ranging from the very old (lodged by Plato) to the contemporary (by for example Michael Sandel and Michel Foucault). (PH)

**[GOVT 362(3625) Modern Political Philosophy (also PHIL 346(3460)) (KCM)]**

Fall. 4 credits. R. Miller.

For description, see PHIL 346. (PT)

**[GOVT 363(3633) Politics and Culture (also SOC 248(2480)) (HA)]**

Spring. 4 credits. M. Berezin.

For description, see SOC 248. (CO)

**[GOVT 364(3645) Politics of "Nations Within" (also AIS 364(3640)) (SBA)]**

Spring. 4 credits. B. Hendrix.

This political theory course will consider the political status of Native Americans in the United States, as well as the status of indigenous peoples in Canada, Australia, and New Zealand. We will begin with brief overviews of native peoples in the countries considered, with special attention to the history of their interactions with the states that now rule them, and their contemporary legal status. The course will consider the ideologies used to justify conquests and displacements by European colonists, particularly as illustrated in historical works of political theory and key court cases. The latter half of the course will consider the possible futures of these "nations within" by considering normative arguments about assimilation, cultural rights, treaty federalism, and full sovereign statehood. (PH)

**[GOVT 365(3655) Politics and Literature (also AM ST 362(3655)) (LA)]**

Fall. 4 credits. Next offered 2007-2008.

J. Frank.

What is political authority and how is it constituted? How do we judge and act when torn by conflicting obligations? How do political actors in the present negotiate the legacies of past injustice (e.g., slavery, colonialism, state violence)? To what extent does the past shape and determine our political present (our sense of self, our relations with others)? And where might we find the cultural resources for resistance and/or political transformation? These are some of the ethical and political questions pursued in this course through the study of prominent (and diverse) works of literature. This course examines the important contributions of literature to the study of politics, and to the formation of a more thoughtful, critical citizenship. (PT)

**GOVT 366(3665) American Political Thought from Madison to Malcolm X (also HIST 316[3160], AM ST 376[3665]) # (HA)**

Fall. 4 credits. I. Kramnick.

Survey of American political thought from the 18th century to the present. Particular attention is devoted to the persistence of liberal individualism in the American tradition. Politicians, pamphleteers, and poets provide the reading. Insightful historical and social context is offered.

**[GOVT 375(3755) Visual Culture and Social Theory (CA)]**

Fall. 4 credits. Next offered 2007–2008. S. Buck-Morss.]

**GOVT 385(3857) American Foreign Policy (also CAPS 385[3857]) (SBA)**

Spring. 4 credits. J. J. Suh.

Introduction to several aspects of U.S. foreign policy, emphasizing current concerns and organized in terms of several principal functions and regions of interest to U.S. foreign policy. Examines theories of foreign policy as well as specific historical/contemporary cases. This course has three basic goals: (1) to familiarize students with the importance of theory for describing, understanding, and explaining foreign policy decision making behavior; (2) to sensitize students to the complex constraints under which foreign policy is made, the margins of choice that statesmen have in shaping policy, and the intended and unintended consequences that a chosen policy has on international as well as domestic life; and (3) to help students develop a critical, in-depth understanding of some of the foreign policy issues that face the United States today and to encourage them to think creatively about alternatives. (IR)

**GOVT 386(3867) The Causes of War (SBA)**

Spring. 4 credits. C. Way.

Surveys leading theories of the causes of interstate war—that is, large-scale organized violence between the armed forces of states. Why is war a recurring feature of international politics? Are democracies more peaceful than other types of states, and if so what explains this “democratic peace”? Why do democratic publics seem to reward threats to use force by “rallying around the flag” in support of their governments? Does the inexorable pattern of the rise and fall of nations lead to cycles of great power wars throughout history? These and other questions are examined in this survey of theories of war at three levels of analysis: the individual and small groups, domestic politics, and the international system. Topics include: theoretical explanations for war; evaluation of the evidence for the various explanations; the impact of nuclear weapons on international politics; ethics and warfare; the uses and limitations of air power; international terrorism. (IR)

**GOVT 389(3898) International Law (HA)**

Fall. 4 credits. Taught in Washington, D.C. Is international law a pious delusion, helpless in the face of real power? Or is public policy becoming so entangled in international standards that international law is now eroding national sovereignty? This course surveys the theoretical foundations and general history of international law since the 17th century to highlight what is new in the doctrines and institutions by which it operates in the contemporary world. The course gives special

attention to the relation between international and U.S. law and to the workings of international law in particular fields—including environmental and human rights protection, trade regulation, and control of terrorism. (IR)

**GOVT 393(3937) Introduction to Peace Studies (SBA)**

Fall. 4 credits. M. Evangelista.

This course serves as an introduction to the study of war, peace, and peacemaking. We will study different theories of peace and war from a variety of disciplinary perspectives. The course will cover definitions of peace and war, causes of conflict, and modes of conflict prevention and resolution. The concepts will be applied to a range of historical and current conflicts. Students will prepare analyses of specific conflicts or instances of peacemaking for class presentation. (IR)

**[GOVT 404(4041) American Political Development in the 20th Century (also AM ST 404[4041], GOVT 612[6121]) (HA)]**

Fall. 4 credits. Next offered 2008–2009. E. Sanders.]

**GOVT 405(4051) The Postmodern Presidency: 2004 (CA)**

Spring. 4 credits. D. Rubenstein.

Examines the presidencies of Reagan, G. H. W. Bush, Clinton, and G. W. Bush in relation to what scholars have called “the postmodern presidency.” While this term has been used by institutionalist students of the presidency as a periodizing hypothesis, this course emphasizes the work of cultural critics and historians. Addresses the slippage between fact and fiction in cinematic and popular representations of the presidency (biography, novels, television). The construction of gender normativity (especially masculinity) is an attendant subtheme. The postmodern presidency is read as a site of political as well as cultural contestation. The larger question of this approach to the presidency concerns the relationship between everyday life practices and citizenship as well as the role of national fantasy in American political culture today. (AM)

**GOVT 406(4061) Politics of Slow-Moving Crisis (also GOVT 616[6161], AM ST 406/616[4061/6161])**

Fall. 4 credits. M. Jones-Correa.

An interdisciplinary seminar focusing on three interrelated “slow-moving policy crises”—population growth/change (aging, immigration), water availability and global warming—to introduce the concepts sketched out above. Each of these areas involved a policy area where the need for policy coordination is clear but the pressures for coordination are often somewhat removed, since the consequences of policy action or inaction may be felt only years down the road. There may also be a segment of the course on planning for, and the response to, low probability, high-risk events like Hurricane Katrina (and/or terrorism). (AM)

**GOVT 413(4131) Coordination in American Politics (also GOVT 613[6131]) (SBA)**

Spring. 4 credits. Prerequisites: for undergraduates, GOVT 111 and one 300-level course in American government, or permission of instructor. W. Mebane. For description, see GOVT 613.

**[GOVT 420(4201) War at Home (also AM ST 422[4201]) (HA)]**

Fall. 4 credits. Next offered 2007–2008. M. Shefter and J. Rabkin.]

**GOVT 422(4221) Immigrants, Migrants and Metro. Governance (CA)**

Spring. 4 credits. L. Frasure.

This course will examine how socioeconomic and political factors related to immigration and racial/ethnic migration impact metropolitan governance in both U.S. central-cities and suburban jurisdictions. We will consider some major issues in metropolitan governance through readings on pluralism, political power, regime theory, racial/economic segregation and the incorporation of immigrant and racial/ethnic groups. We will examine how metropolitan governments have traditionally balanced allocative versus distributive concerns of newcomers and existing groups. We will also examine the contemporary prospects for public-private-non-profit partnerships at the local government level. Students will participate in both theoretical and practical discussions and will be evaluated based on participation, short papers and a research design (final paper) covering a related topical area. (AM)

**GOVT 423(4231) The 1960s: Conceptualizing the Future from the Past (also AM ST 425)**

Fall. 4 credits. J. Kirshner and T. Lowi.

The decade of the 1960s was a genuine sea change in American history. 1968 was its culmination and remains its symbol. Politically it was the end of the great Roosevelt Revolution and Democratic party hegemony, the end of consensus on rights, the end of liberalism, and the end of world bipolarity. It was also the end of American economic sovereignty. And it was the end of the arts as pure entertainment. Was it the end of everything? What was the response to “1968”? Cultural as well as political and economic phenomena must be explored. The seminar divides neatly and naturally between ends and beginnings. (AM)

**GOVT 424(4241) Contemporary American Politics (also AM ST 424[4241], GOVT 629[6291]) (HA)**

Fall. 4 credits. M. Shefter.

Seminar analyzing some major changes in U.S. electoral and group politics in recent decades. Topics include: partisan realignment, the new conservatism, racial cleavages, “identity politics,” and democratic decline.

**[GOVT 425(4255) The Totalitarian Order: Vision and Critique (also GERST 424[4240]) (CA)]**

Fall. 4 credits. Next offered 2007–2008. P. Hohendahl. (PT)]

**GOVT 428(4281) Government and Public Policy: An Introduction to Analysis and Criticism (also AM ST 428[4281]) (SBA)**

Fall. 4 credits. T. J. Lowi.

Concentrates on history and criticism of U.S. policies and the politics associated with them. Particular attention is given to the origins and character of the regulatory state and the welfare system. (AM)

**GOVT 431(4313) Model European Union I**

Spring. 2 credits. Staff. For description, see GOVT web site.



**GOVT 432(4323) Model European Union II**

Fall. 2 credits. Staff.

For description, see GOVT web site.

**[GOVT 439(4393) Japanese Politics (also ASIAN 439(4439)) @ (SBA)]**

Fall. 4 credits. Next offered 2007-2008.

R. Weiner.]

**[GOVT 458(4585) American Political Thought (also GOVT 658(6585), AM ST 458(4585))]**

Spring. 4 credits. Next offered 2008-2009.

J. Frank.

Seminar providing an advanced survey of the history of American political thought, with emphasis placed on four significant periods: Puritan New England, the Revolution and Founding, Abolition and Civil War, and the Progressive Era. Authors read may include: Winthrop, Hutchinson, Franklin, Paine, Jefferson, Madison, Warren, Tocqueville, Fitzhugh, Calhoun, Douglas, Garrison, Thoreau, Melville, Whitman, Lincoln, Adams, DuBois, Goldman, Dewey, Lippmann, Taylor, and Bourne. (PT)

**GOVT 462(4625) Sexuality and the Law (also GOVT 762(7625), FGSS 461/762(4610/7620)) (KCM)**

Spring. 4 credits. A. M. Smith.

For description, see GOVT 762. (PT)

**[GOVT 466(4665) Topics Pol Phil: Islamism @]**

Spring. 4 credits. Prerequisite: graduate students or juniors and seniors who have taken GOVT 161 or 300-level course in political theory. Next offered 2008-2009. S. Buck-Morss.

Topics vary, but all analyze texts written by non-European and non-U.S. theorists who have inspired modern political and social movements. Attention is given to the political and theoretical presuppositions embedded in the very conception of the "West," the hegemony of its political discourses, and how these figure into the meanings of "modernity," "progress," "universal rights," and "liberation." In fall 2002 the topic was Islamism. Philosophical texts include those by Ayatollah Ruhallah Khomeini, Hassan al-Banna, Muhammad Iqbal, Ustadh Mahmoud, Sayyid Qutb, and Ali Shariati. Commentaries include those by academic scholars: Mohammed Arkoun, Talal Asad, Saba Mahmood, Bobby Sayyid, Azzam Tamini, Bassam Tibi, as well as historical and social-scientific analyses of political events influenced by Islamism. (In alternate years, Latin American and Caribbean writers and social movements are the focus.) (PT)

**GOVT 470(4705) Contemporary Reading of the Ancients (also FRLIT 470(4700), COM L 475(4750)) (CA)**

Fall. 4 credits. Graduate students welcome to enroll. D. Rubenstein.

Focuses on Derrida's reading of Plato and St. Augustine. Begins with Derrida's close reading of Plato's Phaedrus and traces his conceptual adumbration of the pharmakon to other critical and philosophical scenes: addiction and terrorism. The next textual encounter is between St. Augustine's Confessions and Derrida's Circonfession. Considers the questions of national and religious identity in relation to other Derridean texts such as Monolingualism of the Other. Returns to conclude with Plato's Apology, Crito and Phaedo, read in tension with Derrida's last

extended interview, his writings on death and the death penalty. Throughout the seminar students explore Derrida's conceptual interrogation of globalization, citizenship, hospitality, friendship, pedagogy, eros and death. (PT)

**GOVT 471(4715) Critical Reason, The Basics: Kant, Hegel, Marx, Adorno (also GERST 471(4710)) (KCM)**

Fall. 4 credits. S. Buck-Morss.

This course deals with basic concepts and methods of Critical Theory from Kant to Adorno. Lectures will consider philosophy from the perspective of the political, demonstrating how autonomy, freedom, democracy, and law are approached by the following: critical reason, dialectics, materialist epistemology, and the socio-logics of non-identity. Students will tackle difficult primary texts in this tradition, with the goal of enhancing their own critical capacities to analyze political, social and economic life. (PT)

**GOVT 480(4809) Politics of '70s Films (SBA)**

Spring. 4 credits. J. Kirshner.

The ten years from 1967 to 1976 were an extraordinary time both in the history of American politics and in the history of American film. In the same period that the country was rocked by the Vietnam War, the feminist and civil rights movements, Watergate and economic crisis, the end of Hollywood censorship along with demographic and economic change in the industry ushered in what many call "the last golden age" of American film. In this class we study both film theory and political history to examine these remarkable films and the political context in which they were forged. The goal of the course is to take seriously both the films and their politics. (AM or PT)

**GOVT 482(4827) Unifying White Integrating: China and the World (also GOVT 682(6827)) @ (HA)**

Fall. 4 credits. A. Carlson.

Seminar intended to examine the increasingly complex relationship that has evolved between China and the rest of the international system during the 1980s and 1990s. Emphasizes the interrelated, yet often contradictory, challenges facing Beijing in regard to the task of furthering the cause of national unity while promoting policies of integration with international society and interdependence with the global economy. Concentrates especially on ongoing controversies over the rise of Chinese nationalism and the persistence of "minority nationalism" in many regions within China. (IR)

**GOVT 483(4837) The Military and New Technology (also S&TS 483(4831)) (SBA)**

Spring. 4 credits. K. Vogel.

Military organizations are seen paradoxically as both inflexible, hide-bound institutions and avid proponents of new technology. This seminar examines changes over time in the attitude of the military toward new technology and analyze competing explanations, including concepts from science studies, for these changes. Concludes with an analysis of the so-called "Revolution in Military Affairs." Readings include John Ellis, *The Social History of the Machine Gun*, and Steven Rosen, *Winning the Next War*. (IR)

**GOVT 490(4907) International Institutions (SBA)**

Spring. 4 credits. J. J. Suh.

Study of the ways in which units in the international system are constituted and how their interactions are institutionalized. Examines not only formal international organizations that have formal decision-making rules and palpable entities, but also "settled practices" that legitimize certain actions and de-legitimize others. Students develop our theoretical understanding of international institutions by analyzing such issue areas as decolonization, human rights, the environment, and communications. (IR)

**GOVT 491(4917) Normative Issues in International Relations**

Spring. 4 credits. M. Evangelista.

This course examines current and historical issues in international relations from the perspective of international law, norms, and ethics. We develop general principles and concepts, such as "just war," "national interest," and "human rights," and apply them to real-world situations. Most of the focus of the course is on particular cases that involve legal and ethical issues: violations of human rights and genocide; war crimes; military intervention; economic sanctions; environmental degradation; economic injustice. The first part of the course examines these issues using examples from 20th century international affairs, including recent events. The second part focuses on current issues that pose ethical problems for the foreign policy of the United States: internal violence and human rights abuses in the former Yugoslavia and former Soviet Union; indigenous uprisings in Mexico and their relation to U.S. foreign economic policy; the appropriate U.S. response to situations in countries such as Haiti, Nigeria, and China.

**GOVT 494(4949) Honors Seminar: Thesis Clarification and Research**

Fall. 4 credits. Prerequisite: acceptance into honors program. R. Bensele.

Designed to support thesis writers in the honors program during the early stages of their research projects.

**GOVT 495(4959) Honors Thesis: Research and Writing**

Spring. 4 credits. Prerequisite: successful completion of GOVT 494.

**GOVT 499(4999) Undergraduate Independent Study**

Fall or spring. 1-4 credits.

One-on-one tutorial arranged by the student with a faculty member of his or her choosing. Open to government majors doing superior work, and it is the responsibility of the student to establish the research proposal and to find a faculty sponsor. Applicants for independent study must present a well-defined program of study that cannot be satisfied by pursuing courses in the regularly scheduled curriculum. No more than four credits of independent study may count toward fulfillment of the major. Students who elect to continue taking this course for more than one semester must select a new theme or subject each semester. Credit can be given only for work that results in a satisfactory amount of writing. Emphasis is on the capacity to subject a body of related readings to analysis and criticism. Keep in mind that independent study cannot be used to fulfill the seminar requirement. The application form for independent study is available in



210 White Hall and must be completed at the beginning of the semester in which the course is being taken.

**GOVT 500(4998) Politics and Policy: Theory, Research, and Practice (also AM ST 501[4998], PAM 406[4060], ALS 500[4998])**

Fall, spring. Offered in Cornell in Washington Program.

This required course forms the core of the Cornell in Washington program for students in the public policy option. The central course objective is to provide students with the instruction and guidance necessary to analyze and evaluate their own chosen issue in public policy. Toward that end, the course has three components: (1) weekly lectures providing background on the structures and processes of national politics and policy as well as training in research methodology; (2) student externships; and (3) individual research papers or projects. All three components interrelate so as to provide students with a strategy and framework for integrating classroom based learning, field experience and individual research.

**GOVT 601(6019) Methods of Political Analysis I**

Fall. 4 credits. W. Mebane.

The first half of this course examines how to frame, evaluate, and compare empirical explanations in political science. Introduces several theoretical approaches that have been widely applied in political science research, including rational choice, social mechanisms, and functionalism. Students discuss the differences between explanation and description, emphasizing the idea of experimental manipulation. Building on this general discussion, the second half explores the distinctive methodological issues involved in comparing macro-social units and surveys a range of different approaches to comparative analysis.

**GOVT 602(6029) Methods of Political Analysis II**

Spring. 4 credits. Staff.

Introduction to some of the quantitative methods used in political science. The central theme of the course consists in applying quantitative methods to explore and evaluate political science theories. Specific topics include probability theory; concepts of inference, including point estimation, confidence intervals, and hypothesis testing; strategies of data analysis and presentation; and regression. The goal is to provide students with basic familiarity with statistics and econometrics for studying politics, and to lay a solid foundation for further course work for those who choose to pursue quantitative analysis in more depth.

**GOVT 603(6031) Field Seminar in American Politics**

Spring. 4 credits. E. Sanders.

Introduces the major issues, approaches, and institutions of American government and the various subfields of American politics. Focuses on both substantive information and theoretical analysis. (AM)

**GOVT 605(6053) The Comparative Method in International and Comparative Politics**

Spring. 4 credits. K. Roberts.

An in-depth, graduate-level introduction to qualitative and comparative methods of political analysis, with special emphasis on the application of these methods in comparative and international politics. Through readings, discussions, and written assignments, students will explore strategies for concept formation, theory construction, and theory testing, using the craft and tools of comparative political analysis.

**GOVT 606(6067) Field Seminar in International Relations**

Fall. 4 credits. A. Carlson.

General survey of the literature and propositions of the international relations field. Criteria are developed for judging theoretical propositions and are applied to the major findings. Participants are expected to do extensive reading in the literature as well as research. (IR)

**GOVT 607(6075) Field Seminar in Political Thought**

Fall. 4 credits. I. Kramnick.

A survey of the early modern political theory canon, emphasizing texts and writers from the 17th and 18th centuries. (PT)

**[GOVT 610(6101) Political Identity: Race, Ethnicity, and Nationalism**

Fall. 4 credits. Next offered 2007–2008.

M. Jones-Correa.

The social sciences generally treat ethnicity, nationalism, and race as descriptive categories or variables, while avoiding actually defining these categories or thinking about how they should be used. How should we go about describing ethnicity, nationalism, and race? Should we treat them as primordial or as social constructions? Much of the recent literature suggests the latter. If constructed, by whom are they constructed (or by what)? What constrains/structures these constructions? What purposes do these constructions serve? Whom do they serve? Are some constructions better representations of identity than others, and what does this mean? How should we go about applying these categories in political analysis? (AM)

**[GOVT 611(6111) The Political Economy of American Development, 1860 to 1900**

Spring. 4 credits. Next offered 2007–2008. R. Bensel.]

**[GOVT 612(6121) American Political Development in the 20th Century (also AM ST/GOVT 404[4041])**

Fall. 4 credits. Next offered 2007–2008. E. Sanders.]

**GOVT 613(6131) Coordination in American Politics (also GOVT 413[4131])**

Spring. 4 credits. Prerequisites for undergraduates: GOVT 111 and one 300-level course in American government, or permission of the instructor. W. Mebane.

Seminar examining the idea that American voters act in a strategically coordinated way. Are voters as wary of one another as they are of politicians? Students examine how coordination depends on American institutions, especially the separation of powers and the political parties. They also look at how large-scale coordination, which implies collective equilibrium, need

not depend on individuals being highly informed and rational. Students consider how coordination and strategic voting affect the parties' campaign strategies, and what coordination implies about popular control of the government.

**GOVT 615(6151) State and Economy in Comparative Perspective**

Spring. 4 credits. R. Bensel.

Reviews the extensive literature on the political economy of comparative state formation, economic development, and institutional change. Topics include war-making and state expansion, regime evolution and modernization, and market processes and class transformation. The focus ranges from the micro-economic foundations of political choice through the grand historical forces that have shaped the contemporary world economy. Although much of the reading and discussion focuses on European cases, the limits of this experience as a theoretical model for the remainder of the world also are considered. (AM)

**[GOVT 621(6213) Democratic Institutions**

Fall. 4 credits. Next offered 2007–2008.

R. Weiner.

Institutions and constitutions establish the "rules of the game" of democracies. This seminar examines how they emerge and evolve, and how—or whether—they shape democratic stability, policy profiles, party systems, political participation, and quality of governance, among other phenomena. Examines both established and new democracies (with the United States among its major cases). (CO)]

**GOVT 627(6274) People, Markets, and Democracy**

Spring. 4 credits. C. Anderson.

Examines the relationship between the economy and democracy. Focuses on behavioral political economy in democratic or democratizing countries. Major topics include inequality and democratic performance.

**GOVT 629(6291) Contemporary American Politics (also GOVT 424[4241])**

Fall. 4 credits. M. Shefter.

For description, see GOVT 424. (AM)

**GOVT 634(6349) New Life Sciences: Emerging Technologies, Emerging Politics (also S&TS 645[6451])**

For description, see S&TS 645.

**[GOVT 639(6393) Comparative Political Participation**

Fall. 4 credits. S. Martin.]

**GOVT 641(6413) Revitalizing Labor: A Comparative Perspective (also ILRIC 632[6320])**

Spring. 4 credits. L. Turner.

For description, see ILRIC 632.

**GOVT 642(6423) Feminist Methodology (also FGSS 617[6170])**

Spring. 4 credits. S. Martin.

For description, see FGSS 617.

**[GOVT 651(6511) Natural Law and the Law of Nations**

Spring. 4 credits. Next offered 2007–2008. J. Rabkin.

Governments have assumed the existence of international law—or the law of nations—for centuries. Before today's network of multilateral treaties and international organizations, thinking about the law of nations was guided by notions about the

most fundamental obligations in the law of nature. The same law of nature was thought to provide the moral foundations of domestic law. In today's world, when such categories as "domestic" seem questionable, there is renewed interest in philosophic foundations for international law. This course will survey the range of arguments advanced about natural law and international justice, from late medieval times to the 20th century, with particular emphasis on doctrines and assumptions invoked by American statesmen. (AM)

**[GOVT 657(6573) Comparative Democratization]**

Fall. 4 credits. Next offered 2008-2009.  
V. Bunce and D. Moehler.]

**[GOVT 658(6585) American Political Thought (also GOVT/AM ST 458[4585])]**

Spring. 4 credits. Next offered 2008-2009.  
J. Frank.

For description, see GOVT 458.]

**[GOVT 659(6595) Ethics and Cultural Difference]**

Spring. 4 credits. B. Hendrix.

One of the persistent questions in moral thinking is its appropriate degree of generality. Can we make moral claims that have universal applicability? What would it mean for such claims to be valid? If there are some universal moral principles, which ones might they be? These abstract theoretical concerns are tied to obvious political worries: Are claims about universal moral principles often colonialist justifications for oppression? Do theoretical arguments about moral universals have meaning for real people entrenched in actual political structures? What is the role of political theorists themselves in arguments about culture and morality? Authors to be read include Michele Moody-Adams, Michael Walzer, James Tully, Iris Young, Will Kymlicka, and others. (PT)

**[GOVT 660(6603) States and Social Movements (also SOC 660[6600])]**

Spring. 4 credits. S. Tarrow.

Two traditions run parallel in political sociology and comparative politics: the study of statebuilding and state transformation and the study of social movements and contentious politics. In the 1960s and 1970s, they converged in the work of scholars like Charles Tilly, who advanced both fields of study, which then ran along parallel but largely independent tracks. This course seeks to synthesize the two traditions, drawing on both historical and contemporary materials from Europe and the Third World, and searching for the key mechanisms and processes that link forms of contention to processes of statebuilding and state transformation. (CO)

**[GOVT 661(6615) Secession, Intervention, and Just-War Theory]**

Spring. 4 credits. B. Hendrix.

This course examines philosophical viewpoints on secession, military intervention, legitimate reasons to go to war, and justice in prosecuting wars. Roughly the first half of the course will focus on the discussion of secession, while the second half will investigate intervention and war. Central texts include Allen Buchanan, *Secession*; David Miller, *On Nationality*; and Michael Walzer, *Just and Unjust Wars*.

**[GOVT 662(6625) Field Seminar in Political Theory]**

Fall. 4 credits. J. Frank.

Introduces students to several contemporary approaches to political theorizing, with an emphasis placed on different modes of interpretation. Authors read may include: Althusser, Arendt, Butler, Foucault, Habermas, Kristeva, MacIntyre, Skinner, Strauss, Taylor, Wolin, and Zizek. (PT)

**[GOVT 664(6645) Democratic Theory (also AM ST 664[6645])]**

Fall. 4 credits. J. Frank.

In contemporary political contexts "democracy" is often invoked as the very ground of political legitimacy. There is very little agreement, however, on what democracy means or how it is best embodied in state institutions and law. This seminar will introduce students to select debates in contemporary democratic theory over the normative meaning of democracy and the limitations of contemporary democratic practice. Beginning with the work of Rousseau and ending with debates over "radical democracy," we will explore the following themes: How do democratic theorists and democratic actors negotiate the paradoxes of collective self-rule? What is the relationship between liberalism and democracy? Do rights suspend democracy or establish its preconditions? What are the best procedures for democratic decision-making? How does democracy deal with difference? Is democracy best understood as a form of government or a practice of resistance to domination? (PT)

**[GOVT 666(6665) Media Theory: Film and Photograph (also VISST 666[6466])]**

Spring. 4 credits. D. Rubenstein.

Seminar addressing two concerns: the specifically French contribution to visual theory in relation to the media of television, film, and photography, and the political stakes of that theory in relation to larger issues of globalization, in which both image and event are subjected to ever-increasing pressures. To what extent is French media theory a response to tele-technological imperatives? Begins with a consideration of television and the televisual, framed by Jacques Lacan's radio address, "Television," and Pierre Bourdieu's "On Television." Questions of hegemony, institution, and audience induce further interrogation of the status of the virtual and the "operational fetishism" of television in Baudrillard, Derrida, and Virillio. Next the course considers differences between the televisual and cinematic image in relation to three canonical texts: Deleuze's *Cinema* (I & II), Michel Chion's *The Voice in Cinema*, and Christian Metz's *Imaginary Signifier* (as well as selections by Debord). Concludes with an examination of canonical writing on photography (Barthes, Bourdieu) and recent writings of Baudrillard that returns to the question of the digital and numeric's "murder" of the image as well as its political consequences post 9/11. (PT)

**[GOVT 669(6695) Modern Social Theory I (also GERST 669[6690], VISST 670[6470])]**

Fall. 4 credits. S. Buck-Morss.

Topics vary. (PT)

**[GOVT 670(6705) Modern Social Theory II (also GERST 670[6700], VISST 670[6470])]**

Spring. 4 credits. Next offered 2007-2008.  
S. Buck-Morss.

Topics vary. (PT)]

**[GOVT 677(6775) Language and Politics]**

Spring. 4 credits. J. Frank.

This course explores the "linguistic turn" of recent political theory alongside canonical debates over the political and epistemological consequences of different philosophies of language. Writers examined will include Locke, Rousseau, Nietzsche, Wittgenstein, Austin, Derrida, Butler, and Cavell.

**[GOVT 681(6817) Politics of Transnationalism (also SOC 680[6800])]**

Spring. 4 credits. M. Evangelista and S. Tarrow.

Globalization and internationalization are giving rise to a new area of international studies that examines the interactions of civil society actors with one another, with states, and with international institutions. This course traces the development of this area of research from its origins in the "old" transnational politics; examines the contributions of constructivism, liberal internationalism, and state-centered realism, and focuses on four areas of transnational politics: norm formation, the construction of transnational coalitions, the effects of transnational advocacy networks, and whether there is a growing fusion between international and domestic contention. (IR)

**[GOVT 682(6827) Unifying While Integrating: China and the World (also GOVT 482[4827])]**

Spring. 4 credits. A. Carlson.

For description, see GOVT 482.

**[GOVT 685(6857) International Political Economy]**

Spring. 4 credits. Next offered 2008-2009.  
P. Katzenstein.

Exploration into a range of contemporary theories and research topics in the field of international political economy. The seminar covers different theoretical perspectives and a number of substantive problems. (IR)

**[GOVT 688(6887) Political Economy and National Security]**

Spring. 4 credits. J. Kirshner.

This seminar considers the relationship between economics and national security. Specific topics will change from year to year, but will typically include the following: the economic foundations of power, economic coercion, the economic roots of conflict, and the ways in which structural changes in the international economy shape and limit state authority. (IR)

**[GOVT 689(6897) International Security Politics]**

Spring. 4 credits. C. Way.

Examines a variety of international relations theories in studying a broad range of security issues, including the causes of war, alliance formation, balance-of-power politics, security regimes, nuclear and conventional deterrence, the democratic peace, military strategy, international terrorism, and domestic constraints on the use of force. Uses a variety of theoretical perspective to investigate these and other issues, paying particular attention to evaluating the theoretical arguments with both historical and systematic evidence. (IR)

**[GOVT 691(6917) Normative Issues in IR**

Fall. Next offered 2007–2008. H. Shue.

Examines selected normative elements of international affairs, divided into three interlocking clusters. First are issues about conflict, including both low-intensity military intervention and nuclear weapons. Second are questions about cooperation, especially between rich nations and poor nations. Third are debates about the authority and status of the major players in the international system: individual persons, nation-states, and international regimes. Questions considered include: is the retention by some nations of nuclear weapons morally justified? Is the world economy unjust? Should national governments be pressured to respect individual human rights? (IR)

**GOVT 692(6927) Administration of Agriculture and Rural Development (also IARD 603(6060))**

Spring. 4 credits. N. Uphoff and T. W. Tucker.

For description, see IARD 603.

**GOVT 699(6999) CPAs Weekly Colloquium**

Fall, spring. 1 credit. S-U grades only. Staff. Colloquium is the weekly seminar series hosted by the Cornell Institute for Public Affairs (CIPA). It is also a required, 1-credit course for all CIPA Fellows and is graded S-U based on attendance. The colloquium series is a collaborative effort between the CIPA Colloquium Committee and the faculty and staff of CIPA.

**GOVT 703(7035) Political Economy**

Fall. 4 credits. J. Kirshner.

This course will undertake a general survey of the classical and modern theories of political economy. The works of Smith, Keynes, Shumpeter, and Hayek, among others, will be studied and placed within the context of the history and evolution of the thought, practice, and method of the field. Issues pertaining to the politics of macroeconomics and money will be of prominent (but not exclusive) interest in the course. (PT)

**GOVT 706(7063) Labor in Global Cities (also ILRCB 706(7060))**

Fall. 4 credits. L. Turner.

For description, see ILRCB 706. (CO)

**GOVT 707(7073) Game Theory for Political Science**

Fall. 4 credits. Requires no prior training in game theory or formal methods. R. Weiner. Game theory is a tool for studying strategic interaction. This course offers a critical introduction, with applications to comparative politics, American politics, and international relations. Studies the core concepts of game theory; how to formulate, solve, and empirically test games in ways that help advance research; and how to assess game-theoretic arguments in the political science literature.

**GOVT 728(7281) Government and Public Policy**

Fall. 4 credits. T. J. Lowi.

For description, see GOVT 428. (AM)

**GOVT 735(7353) Politics of South Asia (also GOVT 351(3513))**

Spring. 4 credits. R. Herring.

For description, see GOVT 351. (CO)

**GOVT 760(7605) Theoretical Approaches to Ideology**

Fall. 4 credits. A. M. Smith.

Investigation of what is casually referred to as the "politics of meaning" is of course central to political theory and political science as a whole. However, profound controversies revolve around the definition of "ideology," its relationship to the interests of dominant groups, the means by which it is circulated throughout diverse social sites, the ability of political agents to interrupt institutionalized ideologies, and the processes by which ideology penetrates and reconstructs the worldviews of the dominated. The groundwork for the seminar is laid by examining key texts on ideology by Marx. Students trace the multiple meanings of the term in his work and their various implications. Next they explore the ways in which the study of gendered and racial discourse has transformed our understanding of ideology. Students address the Freudian and Lacanian interventions in ideology studies with respect to the concepts of the unconscious and misidentification. They discuss the ways in which Adorno, Horkheimer, and Habermas have re-articulated Marx's formulations. The structuralist and post-structuralist schools are studied with reference to Saussure, Levi-Strauss, Barthes, and Althusser. Finally, students explore the problem of institutional analysis with reference to texts from the science and technology studies and state theory traditions. (PT)

**GOVT 762(7625) Sexuality and the Law (also GOVT 462(4625), FGSS 461/762(4610/7620))**

Spring. 4 credits. A. M. Smith.

Advanced feminist theory/political theory/queer theory/legal theory seminar for graduate students and law students. Deals first with theoretical approaches to sexuality that build on and interrogate the post-structuralist approach that defines sexuality as a social construction, rather than an expression of a-historical instincts. Explores a series of major legal and political issues: the right to privacy with respect to contraception and abortion; the restriction of abortion rights; the exclusion of homosexual sodomy from the practices protected by the right to privacy; the racial regulation of marriage; same-sex marriage; Fineman's "sexual family" critique of family law; the moral regulation of poor women in early welfare law; the sexual regulation of poor single mothers in contemporary welfare law; the question of suspect class status for lesbians and gay men; and homosexuality and military service. Throughout the course, students examine the extent to which sexuality is constructed in articulation with gender, class and race differences. The reading list includes theoretical works (Foucault, Butler, Cohen and Martin), Supreme Court decisions; and critical commentaries by feminist legal theorists. (PT)

**GOVT 799(7999) Independent Study**

Fall or spring. 4 credits. Not open to undergraduates. Undergraduates wishing to conduct supervised study should register for GOVT 499.

Individualized readings and research for graduate students. Topics, readings, and writing requirements are designed through consultation between the student and the instructor. Graduate students in government who are looking to use this as an option to fulfill their course requirements should

check with their chairs to be certain that the program of study is acceptable for this purpose. Applications must be completed and signed by the instructor and by the chairs of their special committees. They are available from, and must be returned to, the graduate assistant in 212 White Hall.

**GREEK**

See "Department of Classics."

**HEBREW**

See "Department of Near Eastern Studies."

**HINDI-URDU**

See "Department of Asian Studies."

**HISTORY**

J. V. Koschmann, chair (fall); R. Lawrence Moore, chair (spring); M. C. Garcia, director of graduate studies; R. Polenberg (fall), M. B. Norton (spring), director of undergraduate studies; E. Baptist, S. Blumin, V. Caron, H. Case, D. Chang, J. Chen, Z. Chen, S. Cochran, D. Corpis, R. Craib, P. Dear, O. Falk, M. C. Garcia, D. Ghosh, K. Graubart, S. Greene, T. J. Hinrichs, K. Hirano, I. Hull, P. Hyams, C. Kammen, M. Kammen, S. Kaplan, D. Lacapra, F. Logevall, T. Loos, R. Moore, J. Najemy, M. B. Norton, J. Parmenter, R. Polenberg, W. Provine, H. Rawlings, E. Rebillard, M. Roldan, A. Sachs, B. Strauss, E. Tagliacozzo, T. R. Travers, M. Washington, R. Weil, J. Weiss. Emeritus: D. Baugh, J. John, W. LaFeber, C. Peterson, W. Pinter, J. Silbey, F. Somkin, B. Tierney, D. Wyatt.

The popularity of history among Cornell students is due to its usefulness as preparation for graduate, professional, or law school and for any career that requires critical thinking and good writing; the reputation of the faculty for scholarship, teaching, and advising; and most of all, the intrinsic interest of the discipline. A wide variety of introductory and advanced courses is offered. The department is particularly strong in ancient, medieval, and modern European history; in American, Latin American, and Asian history; and in the history of science.

**Advanced Placement**

Students who pass the AP American and/or European History exam with a score of 4 or 5 have two options: (1) use the AP credits to fulfill the Arts and Sciences course credit requirements for graduation, or (2) take introductory American and/or European history courses.

## The Major

To complete the history major, a student must fulfill the requirements listed below:

Entry requirement: completion of *any* two history courses excluding first-year writing seminars.

1. Take nine history department courses (for either 3 or 4 credits each), completing all of them with a grade of C or better. (Courses taken for entry may count toward fulfilling the major.)
2. Of the total nine courses:
  - a. four must be in courses designated as outside U.S. history and
  - b. three must be in courses designated as history before 1800.

Courses used to fulfill requirement (1) above may also be used to fulfill requirement (2), in respect both to (a) and (b) if applicable. A course in American history before 1800 may be used to fulfill requirement (2b). A course before 1800 in a field other than American history can be used toward fulfillment of both requirements (2a) and (2b).

A list of those courses that fulfill the "outside U.S." and "pre-1800" requirements is maintained by the History Department. Only courses from that list fulfill these requirements.

3. Two of the nine courses must be seminars, of which one must be a 400-level seminar. HIST 400 may be used to fulfill this requirement.

## Honors

The history department offers an honors program for students who wish to research and write a thesis during their senior year. In addition to fulfilling the thesis, honors students must maintain a 3.5 average in their history courses, take HIST 400 Honors Proseminar during their junior year plus an additional 400-level seminar, preferably during their junior year, and complete 10 courses in history (for 3 or 4 credits each). During the second semester of the sophomore year or early in the junior year, interested students should speak to a faculty member or faculty advisor about the honors program.

Before the beginning of the senior year, the candidate presents, in conversation or in writing, a thesis proposal to an appropriate member of the faculty. The faculty member who approves the proposal ordinarily becomes the thesis supervisor. If for any reason it is necessary to change supervisors, this arrangement should be confirmed no later than the fourth week after the beginning of the candidate's senior year.

Honors candidates should register in HIST 401, a seminar course in honors research. Any exceptions to this must be approved by the Honors Committee. HIST 401 is a 4-credit course that permits honors candidates to conduct research and to begin writing the honors essay in a seminar environment. At the end of the first semester of the senior year, as part of the requirements for HIST 401, the student submits to the supervisor a 10- to 15-page overview, or, alternatively, a preliminary draft of some part of the thesis along with an outline of the whole to the instructor of 401 and to the student's supervisor. HIST 402 is a 4-credit seminar course that permits honors

candidates to complete the honors essay and to demonstrate their understanding of the ways in which the themes explored in the thesis fit into a larger historical context.

The completed thesis is evaluated by three readers, including the supervisor and a first reader selected by the student, in consultation with his or her supervisor.

The text of the honors essay may not exceed 60 pages except by permission of the chair of the Honors Committee and the student's supervisor. Two copies are due during the third or fourth week of April. In May each honors candidate is given an oral exam administered by the supervisor; exam focuses on the essay as well as the specific subfield of history in which the student has conducted research (e.g., Periclean Athens, 17th-century science, 19th-century American politics).

To qualify for a bachelor of arts degree with honors in history, a student must (1) sustain at least a 3.5 cumulative average in all history courses and (2) earn at least a cum laude grade on the honors essay and on the oral exam.

**Cornell in Washington Program.** History majors may apply to the Cornell in Washington program to take courses and undertake a closely supervised externship during a fall or spring semester.

**Category Key:** Courses in History are broken into different categories. To determine which category(s) a course falls in, please note the reference at the end of each course description. The key is as follows: AF = African History, AM = American History, AS = Asian History, CO = Comparative History, EA = Ancient European History, ER = Renaissance & Medieval History, EM = Modern European History, HS = History of Science, LA = Latin American History, NE = Near Eastern History, and HR = Honors, Reading, and Research.

## First-Year Writing Seminars

### HIST 103(1103) First-Year Writing Seminar: Immigrant Experiences (also AAS 103(1103))

Spring. 3 credits. Students should register through First-Year Writing Seminar Program. D. Chang.

An examination of US history through the experiences of immigrants. It surveys the migration of people from Europe, Africa, Asia, and Latin America to the US. Major topics include the relationship between immigration and American national identity, debates over assimilation and pluralism, ethnic resilience, collective struggles for equality, and movements toward immigration exclusion. (AM)

### HIST 119(1190) First-Year Writing Seminar: Gandhi and the Politics of Non-Violence (also ASIAN 118(1118))

Fall. 3 credits. Students should register through First-Year Writing Seminar Program. D. Ghosh.

This course will examine the writings of Mohandas K. Gandhi, a leader of the non-violent movement against British colonialism in India. In particular, students will consider whether Gandhi's philosophies of self-reliance, moral discipline, civil disobedience, non-violent protest, and vegetarianism are applicable to living in the modern world. We will read some of Gandhi's well-known criticisms of modernity, including *Hind Swaraj* and *My Experiments with Truth*, and address

the sources, impact and legacy of Gandhi's ideas, including the relationship between Gandhian non-violence and the American civil rights movement. Written assignments will involve close readings of Gandhi's work with an eye toward engaging whether his ideas translate to being a modern and morally responsible individual in the early 21st century. (AS)

### HIST 126(1260) First-Year Writing Seminar: Local History: Cornell University

Fall and spring. Students should register through First-Year Writing Seminar Program. C. Kammen.

This seminar will explore the history of Cornell University, its origins, founders, and the reasons why it was considered a radical and "godless" place. We will look at how the curriculum expanded, the origins of the education of women, the relationship of the university to the education of African-Americans and foreign students and how the earliest stated principles were adhered to, for the most part, but sometimes ignored. Readings for the course will be drawn from Carl Becker, Morris Bishop, E. B. White and the diaries, letters, and other comments written by more than 50 previous Cornell students. Members of the class will conduct research in the archives and create annotated scrapbooks of the semester. (AM)

### [HIST 130(1300) First-Year Writing Seminar: History of the Writing of History

Fall. 3 credits. Next offered 2008-2009. A. Sachs.]

## Introductory Courses

### HIST 151(1510) Introduction to Western Civilization # (HA)

Summer and fall. 4 credits. D. Corpi. The West and its relations with the rest of the world are central topics today, but just what is the West and what is its history? In this course, we survey the history of the West from its antecedents in the ancient Near East through classical antiquity, and the European Middle Ages, Renaissance, and Reformation. Key themes include the origins of democracy and the civic republican tradition, the western way of war, the formation of Christendom, the development of and conflict between secular and church government, humanism, religious reform movements, and western encounters with other civilizations. Readings include a combination of primary and secondary sources. (EA) (ER)

### HIST 152(1520) Intro to Western Civilization # (HA)

Summer and spring. 4 credits. T. R. Travers.

This course introduces students to the major social, intellectual, political, cultural, artistic, and literary events and movements that emerged in Europe and/or North America during the modern period. Readings will offer a variety of perspectives on topics such as: modernity and its meaning, revolution (industrial, social, political, cultural, artistic), imperialism, war, and the emergence of modern ideologies (capitalism, communism, liberalism, fascism). (ER) (EM)

**HIST 153(1530) Introduction to American History (also AM ST 103[1530]) # (HA)**

Summer and fall. 4 credits. HIST 153 is not a prerequisite for HIST 154.  
M. Washington.

A survey of American history from the beginnings through the Civil War. Topics include cultural encounters in the age of Columbus, European colonization, the American Revolution, the early republic, antebellum reform movements, and the coming of the Civil War. (AM)

**HIST 154(1531) Introduction to American History (also AM ST 104[1531]) (HA)**

Summer and spring. 4 credits. HIST 153 is not a prerequisite for HIST 154. A. Sachs.  
An introductory survey of the development of the United States since the Civil War. (AM)

**[HIST 190(1900) Introduction to Asian Civilizations @ # (HA)**

Spring. 4 credits. Next offered 2007–2008.  
Staff.]

**HIST 191(1910) Introduction to Modern Asian History (also ASIAN 191[191]) @ (HA)**

Fall. 4 credits. E. Tagliacozzo and D. Ghosh.

The history of Asia-Pacific from the 19th century to the present, focusing on relations of India and Southeast Asia with each other and with the west. (AS)

**HIST 195(1950) Colonial Latin America (also LAT A 195[1950]) # @ (HA)**

Fall. 4 credits. K. Graubart.

This course examines the colonial "encounter" of Iberia, Africa and the New World, which began in 1492. Topics include economic and social organization of the colonies; the cultural hybridity that preceded as well as developed within colonialism; the production of ethnicity and race; slavery, forced labor and economic stratification; intellectual currents and daily life; indigenous and slave resistance and rebellion; and independence. (LA)

**HIST 196(1960) Modern Latin America (also LAT A 196[1961]) @ (HA)**

Spring. 4 credits. M. Roldan.

An introductory survey of Latin American history from the early 19th century to the present with particular emphasis on processes of nation-state formation and the development of capitalist economies. Prominent themes include U.S.–Latin American Relations; neocolonialism; and radicalism and revolutionary movements, explored through a variety of primary and secondary sources. (LA)

**HIST 201(2001) Supervised Reading**

Fall or spring. 2 credits. Prerequisite: junior or senior standing. Permission of instructor required. Staff. (HR)

**Sophomore Seminars****[HIST 202(2020) The Court, Crime, and the Constitution (also AM ST 204[2022]) (HA)**

Spring. 4 credits. Limited to 15 students. Designed for sophomores but open to others as space permits. Permission of instructor required. Next offered 2007–2008. R. Polenbergl]

**[HIST 203(2030) Wilderness in North American History and Culture (also AM ST 203[2033]) # (HA)**

Fall. 4 credits. Limited to 15 students. Priority given to sophomores. Students must commit to a weekend-long field trip in Sept. Next offered 2008–2009. A. Sachs.]

**HIST 204(2041) The Dutch and English in Colonial New York (also AM ST 216[2104]) # (HA)**

Fall. 4 credits. Limited to 15 students.  
J. Jacobs.

In this seminar course we will examine how identity and ethnicity shaped the culture of the Dutch in colonial New York, first during the years under Dutch rule in New Netherland (1624–1664, 1673–1674), and subsequently under English rule in New York State and City. Readings will center on a published primary sources (all in English translation). This course aims to provide students with insights into the construction of identity and the experience of ethnic diversity in early America. (AM)

**[HIST 205(2050) The French Enlightenment: Methods, Ambitions, Contradictions # (HA)**

Fall. 4 credits. Limited to 15 students. Next offered 2008–2009. S. Kaplan.]

**[HIST 207(2070) SSP: The Occidental Tourist: Travel Writing and Orientalism in Southeast Asia (also HIST 507[5070], ASIAN 206[2660]) @ (CA)**

Spring. 4 credits. Limited to 15 students. Prefer (but not required) that students have taken HIST 191 or 396. Letter grades only. Next offered 2007–2008. T. Loos.]

**HIST 208(2081) Microhistory and the Margins of Early Modern European # (HA)**

Spring. 4 credits. Limited to 15 students.  
D. Corpi.

This course will examine the practice of "microhistory" as a method for understanding early-modern European culture and society. Microhistory as a genre of history writing has been most strongly developed by early-modern European historians and has largely dealt with the everyday lives of marginal but otherwise ordinary people—criminals, heretics, witches, lovers, peasants, and artisans. Students in this seminar will read exemplary contributions to the genre in an attempt to analyze the successes and short comings of this approach to history writing. Written assignments will ask students to theorize the relationship between everyday life and macrohistorical phenomena, to analyze of specific microhistories, and to write their own microhistories based on primary sources such as memoirs and court cases. (EM)

**HIST 209(2090) Seminar in Early American History (also AM ST/FGSS 209[2090]) # (HA)**

Fall. 4 credits. Limited to 20 students.  
M. B. Norton.

Topic for Fall 2006: The Salem Witchcraft Crisis of 1692. Even though a myriad of books have been written about this endlessly fascinating episode in American history, many aspects of it remain unexplored. After reading some of the latest scholarship on the subject and viewing contemporary depictions of it, students will focus on interpreting and analyzing original documents covering some of the lesser-known aspects of the crisis (for

example, the involvement of large numbers of people from Andover, Mass.). Students will have opportunity to contribute their final work to the Salem Digital Archive on the web. (AM)

**HIST 210(2100) The Government of God # (HA)**

Spring. 4 credits. Limited to 15 students.  
O. Falk.

The most efficient and powerful system of government in the West during the Middle Ages was centered at Rome and headed by the papacy. Yet, paradoxically, the Pope commanded no divisions and identified himself as the 'servant of the servants of God.' This course introduces students to key aspects of medieval institutional and religious history through an examination of this mighty papal apparatus, relying chiefly on reading of primary sources (in translation). We will trace the structure and methods by which the papal hierarchy established its sovereignty, comparing and contrasting them to those used by other medieval rulers, and ponder the ideologies which played a role in animating this enterprise. (ER)

**[HIST 211(2110) SSP: Black Religious Traditions: Sacred and Secular (also AM ST 251[2110], RELST 211[2110]) (HA)**

Fall. 4 credits. Limited to 15 students. Letter grades only. Next offered 2007–2008.  
M. Washington.]

**[HIST 212(2120) African-American Women in the 20th Century (also AM ST/FGSS 212[2120]) (HA)**

Spring. 4 credits. Limited to 15 students. Next offered 2007–2008. M. Washington.]

**HIST 214(2141) SSP: Crusade, Heresy, and Inquisition in the Medieval Mediterranean (also RELST 215[2150]) # (HA)**

Spring. 4 credits. Limited to 15 students.  
P. Hyams.

Crusade and Inquisition are words that retain the capacity to move us today. The decades around 1200 saw the notion of crusade expand greatly from its earlier use as holy war against Islam to license, among other things, ideological war within Christendom and against Christian heretics. The Albigensian Crusade targeted the Cathars of south-western France, followers of a faith imported from the eastern Mediterranean that the pope and western Church swiftly classified as heresy. Once efforts to extirpate dissent by preaching had failed orthodoxy turned to war and torture. The persecuting society transformed inquisition from a technical means for the investigation of truth in Roman law into a device to prosecute unbelievers and then destroy them by torture and fire. This will be a reading and writing seminar, aimed principally at sophomores and freshmen. We shall read mostly original sources, in English translation, and understand them through regular text commentary and investigative papers. Discussion will inevitably raise disturbing questions of contemporary political thought and wartime ethics and should help students clarify their historical roots and their own responses to some of the challenges facing the West today. (ER)

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminar Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the



discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Enrollment is limited to 15. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**[HIST 215(2150) Middle Ages on Film # (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2008-2009. P. Hyams.]

**[HIST 216(2160) Gender and Colonization in Latin America (also LAT A 216[2161], FGSS 216[2160]) @ (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2008-2009. K. Graubart.]

**[HIST 218(2180) Seminar on Genocide (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2008-2009. I. Hull.]

**[HIST 219(2190) Women and Gender in South Asia: State and Society from Pre-colonial to Post-colonial (also ASIAN 219[2191], FGSS 219[2190]) @ (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2008-2009. D. Ghosh.]

**[HIST 220(2200) The Road Trip in American History and Culture (also AM ST 218[2200]) (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2008-2009. A. Sachs.]

**HIST 221(2211) Seminar: The Blues and American Culture (also AM ST 205[2211]) (HA)]**

Fall, 4 credits. Limited to 15 students. Permission of instructor required. R. Polenber.

Topics include: social origins of the blues; Delta, Piedmont, and east Texas variants; religion and racial protest; gender and sexuality; law, crime, and justice; white country blues; collectors and musicians; migration and the urban blues; the 1960s revival; the contemporary scene. (AM)

**HIST 222(2220) SSP: Law, Society, and Culture in the Middle East (also NES/RELST 265[2565]) @ # (CA)]**

Spring, 3 credits. Sophomore seminar. Limited to 15 students. D. Powers. For description, see NES 265. (NE)

**[HIST 223(2230) International Law (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2007-2008. I. Hull.]

**[HIST 224(2240) Art and Politics in 20th-Century Latin History @ (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2007-2008. M. Roldan.]

**HIST 226(2261) Society and Religion in China (also ASIAN 226[2261]) @ # (HA)]**

Fall, 4 credits. Limited to 15 students. T. J. Hinrichs.

Categories that we take for granted, such as church/state, sacred/secular, supernatural/natural, and divine/mundane, do not always fit religious phenomena or ways of talking about them in Chinese society. This course will examine the religious description of society and the social organization of the supernatural. It will investigate the politics of religion and the numinous power of emperors and officials. It will explore the ways in which social groups (such as families, communities, and sects), texts (such as Buddhist sutras and popular fiction), specialists (such as priests

and Confucian teachers), performances (such as state rituals and popular plays), and places (such as temples and homes) participate in the creation, transmission, and transformation of religion and society in late imperial and modern China. (AS)

**HIST 227(2271) Family Life in Renaissance Italy (also ITALL 227[2270]) # (HA)]**

Spring, 4 credits. Limited to 15 students. J. Najemy.

The seminar explores the structures and sentiments of family life in Renaissance Italy, from the 14th to the 16th century, through a combination of translated primary sources and some secondary readings. Chief among the primary sources are the 15th-century dialogues *On the Family* written by the humanist Leon Battista Alberti, supplemented by diaries and memoirs, letters, sermons, and prescriptive writings by fathers, humanists, and churchmen. Among the topics to be investigated will be the variety of family structures, marriage, sexual relations, wives and husbands, parents and children, and family memory and commemoration in art and religious life. (ER)

**[HIST 228(2280) Indian Ocean World (also ASIAN 228[2228]) @ # (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2008-2009. E. Tagliacozzo.]

**[HIST 229(2290) Jefferson and Lincoln: American Ideas about Freedom (also AM ST 229[2290]) (HA)]**

Spring, 4 credits. Limited to 15 students. Priority given to underclassmen. Next offered 2007-2008. E. Baptist.]

**[HIST 230(2300) Seminar in History and Memory @ (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2008-2009. J. V. Koschmann.]

**[HIST 234(2340) Seminar: Gender in Early Modern Europe (also FGSS 234[2340]) # (CA)]**

Fall, 4 credits. Limited to 15 students. Designed for underclassmen but open to all students. Permission of instructor required. Next offered 2008-2009. R. Weil.]

**[HIST 235(2350) Antisemitism and the Crisis of Modernity (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2007-2008. V. Caron.]

**HIST 236(2360) Native Peoples of the Northeast (also AM ST 236[2360]) # (HA)]**

Spring, 4 credits. Limited to 15 students. J. Parmenter.

This course examines the history and culture of the indigenous peoples of northeastern North America, from ancient times through the era of contact with Europeans to the present day. The course emphasizes the fascinating and dramatic series of transformations and adaptations under taken by the Native peoples of the Northeast which have contributed to their survival in the twenty-first century. Readings and discussions will be drawn from a variety of sources, including historical documents, traditional narratives, archaeological reports, ethnography, literature, the Internet, and museum exhibits of material culture. (AM)

**[HIST 238(2431) Families in China since the 17th Century @ (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2008-2009. S. Cochran.]

**[HIST 239(2390) Seminar in Iroquois History (also AM ST 238[2390], AIS 239[2390]) # (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2007-2008. J. Parmenter.]

**HIST 241(2410) Riot and Revolution in 19th-Century Africa: The Birth of the Modern (also AS&RC 241[2303]) @ # (HA)]**

Fall, 4 credits. Limited to 15 students. S. Greene.

The beginning of the 19th century witnessed the rapid and often times forceful expansion of Islam in West Africa, the end of the Atlantic slave trade, the transformation of the Zulu from a small, inconsequential people to the largest and most powerful ethnic group in South Africa, and the wild fire spread of Swahili as a lingua franca in east and central Africa. This course explores these revolutionary changes and the upheavals that accompanied them as Africa remade itself to face the modern era. Lectures, readings and discussions will focus on the causes and consequences of these events and their significance for understanding contemporary Africa. (AF)

**HIST 242(2420) Religion and Politics in American History: From J. Winthrop to R. Reed (also AM ST/RELST 242[2420]) (HA)]**

Spring, 4 credits. Limited to 15 students. Permission of instructor required. R. L. Moore.

This course is intended to provide historical background for understanding contemporary debates about church/state controversy in American politics. Permission of the instructor is required to enroll. (AM)

**[HIST 243(2430) SSP: History of Things (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2007-2008. E. Tagliacozzo.]

**[HIST 244(2440) The United States in Vietnam (HA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2008-2009. F. Logevall.]

**[HIST 245(2450) SSP: Drugs: People, Policies, Politics @ (HA)]**

Spring, 4 credits. Limited to 15 students. Recommended: previous course in Latin American history. Next offered 2008-2009. M. Roldan.]

**[HIST 247(2470) The Age of Charlemagne (HA)]**

Spring, 4 credits. Limited to 15 students. Next offered 2007-2008. P. Hyams.]

**HIST 248(2480) Ghosts and Legacies: The Construction of Public Memory (HA)]**

Spring, 4 credits. Limited to 15 students. J. Weiss.

Focusing principally on instances of guilty and divisive pasts produced by genocide, civil war, or colonial struggles, this course will investigate how contemporary politics, in Europe and America, shaped the perception of past events; how strategies of forgetting succeeded in repressing the memory of guilty pasts and what happened when they failed; and how the public memory of traumatic events was shaped in films, literature, and other cultural locations. (EM)

**HIST 249(2491) French Social Thought from Rousseau to Foucault (HA)**

Spring. 4 credits. Limited to 15 students.  
C. Robcis.

In the aftermath of the French Revolution and the resulting social upheaval, many thinkers became preoccupied with the problem of "the social": how is society born? What links individuals into units such as the family, the corporation, or the nation? How can the State promote strong and lasting bonds between the individual and the collectivity? This seminar provides an introduction to some of the major figures in 19th and 20th century French intellectual history who have attempted to think this concept of "the social" in new ways. We will pay special attention to the implicit and explicit role that class, gender, sexuality, and race have occupied in the constructions of each author's normative social orders. Readings will include: Rousseau, Tocqueville, de Maistre, Durkheim, Mauss, Bataille, Beauvoir, Sartre, Lévi-Strauss, Lacan, Foucault, Deleuze, Derrida, Gauchet, and Rosanvallon. (EM)

**Lecture Courses****HIST 250(2500) Technology in Society (also ENGRG/ECE 250[2500], S&TS 250[2501]) (HA)**

Fall. 3 credits. R. Kline.  
For description, see ENGRG 250. (HS)

**HIST 251(2511) Perspectives on Latin America (also LAT A/SPANL 320[3200]) @ (CA)**

Spring. 3 credits. E. Paz-Soldán.  
For description, see SPANL 220.

**HIST 252(2520) Modern East-Central Europe (HA)**

Fall. 4 credits. H. Case.  
This course covers the key events, political ideologies, social and cultural trends, and definitions of East-Central Europe from 1848 to the present. Themes will include experiences of empire, war and revolution, the rise of nationalism, liberalism, fascism, and communism, totalitarian regimes, dissident movements, the post-communist transition, the experiences and roles of women in the region's history, the fate of minorities and multi-national states, European integration, and the future of the region. (ER) (EM)

**HIST 253(2530) Introduction to Islamic Civilization (also NES/RELST 255[2555]) @ # (HA)**

Fall. 3 credits. D. Powers.  
For description, see NES 255. (NE)

**HIST 255(2550) The Past and Present of Pre-Colonial Africa @ (HA)**

Spring. 4 credits. S. Greene.  
How has Africa's pre-colonial past influenced current events in Africa and elsewhere? To answer this question, this course explores the pre-19th century histories of four different cultural areas in Africa (e.g. Ancient Egypt, the West African coast). Using both ancient and more recent oral traditions, travelers' accounts and visual images, we link these histories to current debates about the role of history in contemporary politics, the significance of race, class and gender in times past and present, and the role of Africa in world affairs. (AF)

**HIST 256(2560) War and Peace in Greece and Rome (also CLASS 229[2650]) # (HA)**

Spring. 4 credits. B. Strauss.

In ancient Greece and Rome, government did little besides wage war and raise taxes, culture focused on war, warriors gloried in battle, and civilians tried to get out of the way. This course surveys the impact of war and the rarity of peace in the ancient world. Topics include: "why war?"; the face of battle; leadership; strategy, operations, and tactics; women and war; intelligence and information-gathering; diplomacy and peacemaking; militarism; war and slavery; the archaeology of warfare. Readings in translation include selections from Homer, Herodotus, Thucydides, Xenophon, Caesar, Livy, Tacitus, Josephus, and Ammianus Marcellinus. (EA)

**HIST 257(2571) China Encounters the World (also ASIAN 257[2257], CAPS 257[2570]) @ (HA)**

Fall. 4 credits. J. Chen.  
This is a lecture and discussion course focusing on how China has encountered the world since the 17th century, with an emphasis on the late 19th and 20th centuries. In particular, it will analyze the age-old Chinese "Central Kingdom" conception and how the conception was challenged during modern times as the result of Western and Japanese incursion and China's inability to deal with the consequences of the incursion. It will further analyze the impact of the Chinese "victim mentality" in order to pursue a deeper understanding of why radical revolutions have dominated China's modern history. While the emphasis of this course is China's external relations, foreign policy issues will be examined in the context of China's political, economic and social developments in broader terms. The course's purpose is not just to impart information but also to cultivate a basic understanding of the significance of the Chinese experience in the age of worldwide modernization. Grade in this class will be calculated on the basis of class participation, quizzes, midterm and final exams, and one essay assignment. (AS)

**[HIST 259(2590) The Crusades # @ (HA)**

Spring. 4 credits. Next offered 2007–2008.  
P. Hyams.]

**HIST 260(2600) Latinos in the United States: Colonial to 1898 (also LSP 260[2600], AM ST 259[2599]) # (HA)**

Fall. 4 credits. M. C. Garcia.  
This course examines the history of various Latino populations in the United States up to 1898. Some of the topics we will discuss include the Spanish exploration and settlement of North America; the impact US territorial expansion on Mexicans, Puerto Ricans, and Cubans; the historical-structural factors that influenced 19th century migration; the role of race and class in shaping a national and ethnic identity; and the transnational influence of immigrant communities on their homelands. (AM)

**HIST 261(2610) Latinos in the United States: 1898 to the Present (also AM ST/LSP 261[2610]) # (HA)**

Spring. 4 credits. M. C. Garcia.  
This course examines the history of various Latino populations in the United States since 1898. Some of the topics we will discuss include: immigration as a product of US hemispheric policies; the civil rights struggles of the 20th century and the evolution of a distinct "Latino" identity; the "new" migration from Latin America; the transnational influence of immigrant communities on their homelands. (AM)

**[HIST 262(2620) The Middle Ages: Introduction and Sampler # (CA)**

Summer and fall. 4 credits. Next offered 2008–2009. P. Hyams.]

**[HIST 264(2640) Introduction to Asian American History (also AAS 213[2130], AM ST 213[2610]) (HA)**

Spring. 4 credits. Next offered 2007–2008.  
D. Chang.]

**HIST 265(2650) Ancient Greece from Homer to Alexander the Great (also CLASS 265[2650]) # (HA)**

Fall. 4 credits. Open to freshmen.  
B. Strauss.

A survey of Greece from the earliest times to the end of the Classical period in the late fourth century B.C. The course focuses on the Greek genius: its causes, its greatness, its defects, and its legacy. The Heroic Age, the city-state, ancient democracy, and the intellectual ferment of the Greek Enlightenment are the main topics of study. Readings in translation from Homer, Aristophanes, Sophocles, Herodotus, Thucydides, Plato, Aristotle, and from the evidence of ancient inscriptions, coins, art, and architecture. (EA)

**HIST 266(2660) Introduction to Native American History (also AM ST/AIS 266[2660]) (HA)**

Spring. 4 credits. J. Parmenter.  
With the abandonment of earlier perspectives grounded in romantic and evolutionary stereotypes, Native American history represents today one of the most exciting, dynamic, and contentious fields of inquiry into America's past. This course introduces students to the key themes and trends of the history of North America's indigenous peoples by taking an issues-oriented approach. We will cover material ranging from the debate over the Native American population at the time of first European contact to contemporary social and political struggles over casino gambling and land claims. The course stresses the ongoing complexity and change in Native American societies and will emphasize the theme of Native peoples' creative adaptations to historical change. (AM)

**HIST 267(2670) History of Rome I (also CLASS 267[2683]) # (HA)**

Fall. 4 credits. E. Rebillard.  
For description, see CLASS 267. (EA)

**HIST 268(2671) History of Rome II (also CLASS 268[2684]) # (HA)**

Spring. 4 credits. HIST 267 is not a prerequisite for HIST 268. E. Rebillard.  
For description, see CLASS 268. (EA)

**HIST 269(2691) Holy War, Crusade, and Jihad in Judaism, Christianity, and Islam (also NES/JWST/RELST 251[2651], COM L 231[2310]) @ # (HA)**

Fall. 3 credits. R. Brann.  
For description, see NES 251. (NE)

**HIST 270(2700) The French Experience (also FRLIT 224[2240]) (CA)**

Fall. 4 credits. S. Kaplan and P. Lewis.  
We look ethnographically and through literature at tastes and at class as they function and are discussed in France. We examine speech in its practice and as it is reflected upon; and we look at views from France, from America, and other countries. As we emphasize differences, the French experience emerges. (EM)

**HIST 271(2711) Politics of Violence in 20th-Century Europe (HA)**

Spring. 4 credits. H. Case.

A survey of Europe's 20th-century history with special emphasis on uses of violence, including warfare, terrorism, genocide, uprisings, state-initiated domestic violence, rape, and other forms of violence. Discussions of First and Second World Wars and the political and ethnic clashes of the post-WWII period will be supplemented by less familiar instances of violence in the European context, including domestic violence. Lectures, readings and written assignments will explore the factors determining who organizes, oversees, and commits violence, how it is interpreted, what reactions it provokes, and how states have sought to curtail or facilitate it. (EM)

**[HIST 272(2720) The Atlantic World from Conquest to Revolution (also AM ST 272[2720]) # @ (HA)]**

Spring. 4 credits. Next offered 2008-2009. R. Weil and M. B. Norton.]

**[HIST 273(2730) Women in American Society, Past and Present (also AM ST/FGSS 273[2730]) # (HA)]**

Spring. 4 credits. Next offered 2007-2008. M. B. Norton.]

**[HIST 274(2740) Foodways: A Social History of Food and Eating # (HA)]**

Summer and fall. 4 credits. Next offered 2008-2009. S. Kaplan.]

**HIST 277(2771) Getting Medieval I: The Early Middle Ages # (HA)**

Fall. 4 credits. This course fulfills the prerequisite for HIST 278. O. Falk.

Spanning the period ca. 300 to 1100 AD, this course surveys European history between the twilight of Classical antiquity and the dawn of the second millennium. Although we focus primarily on what would later become Western Europe, we also pay close attention to the neighbors of Latin Christendom, Byzantium and the Muslim world. Social, cultural, and institutional developments are emphasized, as is the variety of historical methodologies used to study the early Middle Ages. Were the "Dark Ages" a tailspin of hopeless decline? Or did medieval Europe embody new alternatives to a monolithic ancient world? Who or what drove the changes, and why? (ER)

**HIST 278(2772) Getting Medieval II: The Later Middle Ages # (HA)**

Spring. 4 credits. Prerequisite: HIST 262/ HIST 277 or permission of instructor. O. Falk.

This course surveys European history in the period ca. 1000 to 1500 AD, when Western Europe was transformed. From inauspicious beginnings as Eastern Christendom and Islam's ragged cousin, it was able to bootstrap itself into the position of a dominant world civilization. We will look at developments in government, economy, technology, religious institutions and faith, cultural media and social ideals. What enabled the "European miracle" of the later Middle Ages? How was it implemented and manifested? What were the costs of progress, and who bore them? Who reaped the benefits? (ER)

**HIST 279(2790) International Humanitarianism @ (HA)**

Spring. 4 credits. J. Weiss.

This course studies international humanitarian and human rights activities from their

origins to the present. The ideological and social roots of humanitarian thought and action receive attention, as does the often-overlapping, sometimes conflictual relationship between humanitarianism and human rights advocacy. Case studies will include the anti-slavery movement, the activities of faith-based groups, biographical studies of pioneering individuals, and the international response to various genocides. (EM)

**HIST 280(2800) Introduction to Korea (also ASIAN 218[2218]) @ CA**

Fall. 3 credits. B. Kwon.

Multi-disciplinary introduction to Korean history, society, and culture. The first part of the course examines sources of Korean tradition in their historical contexts. The second part, on the transition to a modern society, covers the mid-19th century to the Korean War. The last part is devoted to contemporary society. (AS)

**HIST 281(2810) Science in Western Civilization (also S&TS 281[2811]) # (HA)**

Fall. 4 credits. HIST 281 in not a prerequisite for HIST 282. P. Dear.

This course aims to make comprehensible both to science majors and to students of the humanities the historical structure and development of modern science and to show sciences as a cultural phenomenon. Changing perceptions of nature and human knowledge from Greek Antiquity to the 20th century form the framework for current Western views of the world, while the roots of the present-day dominance of "science" as a symbol of progress of modernity lie in an alliance between knowledge of nature and power over nature that took shape in the 19th century after a long period of emergence. HIST 281 runs chronologically up to the death of Isaac Newton and focuses on the cultural traditions of Christian Europe and its selective appropriation of a Greek heritage. (HS)

**HIST 282(2820) Science in Western Civilization (also S&TS 282[2821]) # (HA)**

Spring. 4 credits. HIST 281 in not a prerequisite for HIST 282. P. Dear.

This course aims to make comprehensible both to science majors and to students of the humanities the historical structure and development of modern science and to show sciences as cultural phenomena. Changing perceptions of nature and human knowledge from Greek Antiquity to the 20th century form the framework for current Western views of the world, while the roots of the present-day dominance of "science" as a symbol of progress and modernity lie in an alliance between knowledge of nature and power over nature that took shape in the 19th century after a long period of emergence. This course covers the 18th, 19th, and early 20th centuries. (HS)

**HIST 283(2831) The Dutch and the Atlantic World (also AM ST 283[2831]) # (HA)**

Fall. 4 credits. J. Jacobs.

This course analyzes the unique nature of Dutch involvement in the Atlantic World from the end of the 16th century to the close of the 17th century. Unlike other early modern European colonial efforts, nations, the Dutch did not found flourishing settlement colonies, but instead concentrated on trade and shipping. This course emphasizes the problems and advantages associated with

non-territorial colonial expansion. Considered in comparative context, the Dutch experience raises the question of whether expansion without empire was a viable option during the early modern period. Readings will consist of primary documents and secondary scholarship in the form of both articles and monographs. Students will take two exams and write a research essay. (AM)

**HIST 285(2850) From Medievalism to Modernity: The History of Jews in Early Modern Europe, 1492 to 1789 (also JWST 253[2850]) # (HA)**

Fall. 4 credits. V. Caron.

This course examines the history of European Jewry during the centuries of transition from the Middle Ages to the Modern Era. We examine the extent to which traditional Jewish life began to break down during this period and thus paved the way for the emergence of modern Jewry. Topics include the Spanish Expulsion of 1492, religious, intellectual, and socioeconomic dimensions of the Marrano dispersion, including Lurianic Kabbalah and the messianic movement of Shabbetai Zevi; the establishment of Jewish communities in the West; the end of the "Golden Age" of Polish Jewry and the rise of Hasidism; the changing economic and political role of Jews in the 17th and 18th centuries; and the impact of the Enlightenment. (EM)

**HIST 286(2861) History of Zionism and the Birth of Israel (also JWST 290[2670]) (HA)**

Spring. 4 credits. V. Caron.

This course will examine the history of Zionism as an ideology and political movement from its origins in the 19th century to the present. Attention will be paid to situating Zionism within the context of modern Jewish, European, and Middle Eastern History. Topics will include: the ideological foundations of Zionism; the role of Theodor Herzl and the rise of political Zionism; the Balfour Declaration; the development of the Yishuv; Zionism as a cultural identity for Diaspora Jewry; the British mandate; the Arab-Zionist encounter; Zionist responses to the Holocaust; and Zionism and contemporary Israeli society. (EM)

**HIST 287(2870) Evolution (also BIOEE 207[2070], S&TS 287[2871]) (PBS)**

Fall. 3 credits. A. MacNeil.

For description, see BIOEE 207. (HS)

**[HIST 289(2890) The U.S.-Vietnam War (also ASIAN 298[2298]) @ (HA)]**

Fall. 3 credits. Next offered 2007-2008.

K. Taylor.]

**[HIST 291(2910) Modern European Jewish History, 1789 to 1948 (HA)]**

Fall. 4 credits. Next offered 2007-2008.

V. Caron.]

**HIST 292(2920) Inventing an Information Society (also ENGRG/ECE 298[2980], S&TS 292[2921]) (HA)**

Spring. 3 credits. R. Kline.

For description, see ENGRG 298.

**HIST 294(2940) History of China in Modern Times (also ASIAN 294[2294]) @ (HA)**

Spring. 4 credits. Staff.

A survey that concentrates on the rise of the last imperial dynasty in the 17th and 18th centuries, the upheavals resulting from domestic rebellions and foreign imperialism in the 19th century, and the 20th-century efforts

to achieve social mobilization, political unity, and commercial expansion. (AS)

**[HIST 295(2950) Introduction to the History, Language, and Culture of the Balkans (HA)]**

Spring. 4 credits. Next offered 2007–2008. J. Weiss.]

**HIST 300(3000) Spanish in the Disciplines (also SPANL/LAT A 302[3020])**

Fall. 1 credit. Staff.

For description, see SPANL 302. (LA)

**HIST 302(3002) Supervised Research**

Fall and Spring. 3 or 4 credits. Prerequisite: junior or senior standing. Permission of instructor required. Staff. (HR)

**[HIST 303(3030) African-American Women in Slavery and Freedom (also FGSS 307[3070], AM ST 303[3030]) # (HA)]**

Fall. 4 credits. Letter grade only. Next offered 2007–2008. M. Washington.]

**HIST 304(3040) American Culture in Historical Perspective, 1880–1980 (also AM ST 304[3040]) (CA)]**

Fall. 4 credits. M. Kammen.

An introduction to the study of modern American culture. Emphasis upon the role of culture in the quest for national identity; the function of cultural myths and myth making; the advent of modernism; relationships between mass culture, popular culture, and high culture; and on the question of American exceptionalism (distinctiveness). Special attention also to the situation of subcultures and regions, to the changing role of entertainment in relation to leisure, the media, ethnicity (pluralism), the decorative and popular arts. (AM)

**[HIST 305(3050) Britain, 1660 to 1815 # (HA)]**

Fall. 4 credits. Next offered 2007–2008. R. Weil.]

**HIST 306(3060) Modern Mexico: From Independence to the Zapatistas (also LAT A 306[3060]) @ (HA)]**

Spring. 4 credits. R. Craib.

A survey of Mexico's history from the early 19th century to the present. The course covers social, cultural and economic trends and their relationship to political movements. Special emphasis will be given to the ways in which "common people" participated in and influenced politics; to the important regional, class, ethnic, and gender differences that have figured prominently in Mexico's history; and to the politics of history-making. (LA)

**[HIST 307 British History, 1760–1870 # (HA)]**

Spring. 4 credits. Next offered 2007–2008. T. R. Travers.]

**[HIST 308(3080) History of Post-War Germany (1945 to Present) (HA)]**

Fall. 4 credits. Next offered 2008–2009. I. Hull.]

**[HIST 309(3090) History and Geographical Imagination @ # (HA)]**

Fall. 4 credits. Next offered 2008–2009. R. Craib.]

**[HIST 311(3110) Andean History and Ethnohistory @ # (HA)]**

Spring. 4 credits. Next offered 2008–2009. K. Graubart.]

**HIST 312(3120) Forging Nations: Experiments in Latin American Nation-Building and Reform (also LAT A 312[3211]) @ (CA)]**

Fall. 4 credits. M. Roldan.

This course examines efforts undertaken to beautify, rationalize, integrate, reform and engineer into existence 'modern' Latin American citizens and nations, and the ways in which these efforts were contested and re-shaped by Latin Americans from the 19th through the 20th century. Topics will include (but are not limited to): race, science and rights; immigration, sexuality and urban regulation; radio, mass politics and space; the Cold War, Liberation Theology, revolution and counter-revolutions. (LA)

**[HIST 314(3140) History of American Foreign Policy, 1912 to the Present (also AM ST 314[3140]) (HA)]**

Spring. 4 credits. Next offered 2007–2008. F. Logevall.]

**[HIST 315(3150) Environmental History: The United States and Beyond (also AM ST 349[3510]) (HA)]**

Spring. 4 credits. Next offered 2008–2009. A. Sachs.]

**HIST 316(3160) American Political Thought: From Madison to Malcolm X (also AM ST 376[3665], GOVT 366[3665]) # (HA)]**

Fall. 4 credits. I. Kramnick.

For description, see GOVT 366. (AM)

**HIST 318(3180) American Constitutional Development (also AM ST 317[3180]) (HA)]**

Fall. 4 credits. Not open to freshman.

R. Polenber.

Major issues in constitutional history. Topics include: the drafting of the Constitution; the Bill of Rights; the Marshall era; the crises caused by slavery and emancipation; the rise of substantive due process; Holmes, Brandeis, and freedom of speech; the Roosevelt "revolution"; civil liberties and civil rights in modern America; the right of privacy; the contemporary Supreme Court. (AM)

**HIST 319(3191) Martial Arts and Society and Religion (also ASIAN 391[3391]) @ (HA)]**

Fall. 4 credits. T. J. Hinrichs.

Exploration of the social, political, and cultural contexts of martial arts practice, and historical dynamics behind their transmission, transformation, and spread. Examination of the emergence of martial artists as popular figures, and martial arts as distinct sets of practices in China and Japan. Study of the modern re-invention of these practices, and of their transmission to other parts of the world. Investigation of a local martial arts school, and of the question, "What is East Asian about East Asian martial arts in Ithaca?" (AS)

**[HIST 320(3200) The Viking Age # (HA)]**

Spring. 4 credits. Next offered 2007–2008. O. Falk.]

**HIST 321(3210) Colonial North America to 1763 (AM ST 321[3210]) # (HA)]**

Fall. 4 credits. M. B. Norton.

A survey of European settlement in North America and the Caribbean, emphasizing the interactions of Europeans, Indians, and Africans; economic development; gender relations; religious and political change; and the impact on the colonies of internal and external conflicts. (AM)

**HIST 324(3240) Varieties of American Dissent, 1880–1900 (also AM ST 324[3240]) (HA)]**

Fall. 4 credits. N. Salvatore.

For description, see AM ST 324. (AM)

**HIST 325(3250) Age of the American Revolution, 1754 to 1815 (also AM ST 322[3250]) # (HA)]**

Spring. 4 credits. M. B. Norton.

An examination of the process by which the 13 English colonies became an independent and united nation, with emphasis on political thought and practice, social and economic change, and cultural development. Attention will be paid to the impact of the American Revolution on women, Blacks, and Indians as well as on white males. (AM)

**[HIST 326(3260) History of the Modern British Empire (HA)]**

Fall. 4 credits. Next offered 2008–2009.

T. R. Travers.]

**[HIST 327(3270) The Old South # (HA)]**

Spring. 4 credits. Next offered 2007–2008.

E. Baptist.]

**[HIST 328(3280) Construction of Modern Japan (also ASIAN 328[3328]) @ # (HA)]**

Spring. 4 credits. Next offered 2007–2008.

J. V. Koschmann.]

**HIST 329(3290) Physical Science in the Modern Age (also S&TS 330[3301]) (HA)]**

Fall. 4 credits. S. Seth.

For description, see S&TS 330.

**HIST 330(3300) Japan from War to Prosperity (also ASIAN 335[3335]) @ (HA)]**

Spring. 4 credits. J. V. Koschmann.

An interpretation of Japanese history from the late-1920s to present, emphasizing mobilization for total war and its continuing legacies, technology and organized capitalism, relations with the U.S. and Asian neighbors, social integration and exclusion, historical representation and consciousness, and political dynamics. (AS)

**[HIST 331(3310) Causes of the American Civil War, 1815 to 1860 (also AM ST 331[3310]) # (HA)]**

Fall. 4 credits. Next offered 2007–2008.

E. Baptist.]

**[HIST 338(3644) Sages and Saints/Ancient World (also CLASS/RELST 332[3644]) # (HA)]**

Spring. 4 credits. Next offered 2008–2009.

E. Rebillard.]

**HIST 339(3391) Seminar on American Relations with China (also CAPS 300[3000])**

Fall. 4 credits. Offered in the Cornell in Washington Program. R. Bush.

For description, see CAPS 300. (AM) (AS)

**[HIST 340(3400) Recent American History, 1925 to 1965 (also AM ST 340[3400]) (HA)]**

Fall. 4 credits. Not open to freshman. Next offered 2007–2008. R. Polenber.]

**HIST 341(3410) Recent American History, 1965 to the Present (also AM ST 341[3410]) (HA)]**

Spring. 4 credits. R. Vanderlan.

Topics include the Supreme Court, civil liberties, the Great Society and the Vietnam War; politics and the presidency from Nixon



to Bush; and class, race, and ethnicity in modern America. (AM)

**[HIST 342(3420) History of Modern South Asia, 1700 to 1947: From the Mughals to Midnight (also ASIAN 342(3422)) @ # (HA)]**

Fall. 4 credits. Next offered 2008-2009.  
D. Ghosh.]

**[HIST 343(3430) American Civil War and Reconstruction, 1860 to 1877 (also AM ST 343(3430)) # (HA)]**

Spring. 4 credits. Next offered 2008-2009.  
E. Baptist.]

**[HIST 344(3440) South Asia and the Early Modern World @ # (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
D. Ghosh.]

**[HIST 345 19th-Century Cultural History (also AM ST 345(3450)) # (HA)]**

Fall. 4 credits. Next offered 2007-2008.  
A. Sachs.]

**[HIST 346(3460) The Modernization of the American Mind (also AM ST 346(3460)) (HA)]**

Spring. 4 credits. Next offered 2008-2009.  
R. L. Moore.]

**HIST 347(3470) Asian American Women's History (also AAS/FGSS 347(3470), AM ST 351(3470)) (CA)]**

Spring. 4 credits. D. Chang.

This course examines the experiences and representations of Asian American women from the mid-19th century to the present. It explores the lives & contexts of immigrant women and of women both in the U.S. questions of identity and power are at the heart of this course as we explore the intertwined nature of race, gender, and nation. (AM)

**HIST 348(3481) Modern France: 1870 to the Present (also FRLIT 348(3480)) (HA)]**

Spring. 4 credits. C. Robcis.

This course will explore some of the major developments in French history, from the advent of the Third Republic to the present day. We will focus in particular on the political, social, economic, and cultural constructions of a "French Republican model" which has engendered a specific set of inclusions and exclusions. Among other themes, we will explore the consolidation of bourgeois power and socialist challenges; imperial expansion and decolonization; the impact of the two World Wars and the contested memory of Vichy; anti-Semitism, nationalism, and the rise of the new Right; immigration policies, May 68, and contemporary challenges to the "French social model." (EM)

**[HIST 349(3490) Renaissance England, 1485 to 1660 # (HA)]**

Fall. 4 credits. Next offered 2007-2008.  
R. Weil.]

**HIST 350(3500) The Italian Renaissance (also ITALL 221(2210)) # (HA)]**

Spring. 4 credits. J. Najemy.

An exploration of intellectual, cultural, religious, and political developments in Italy from the political thought of Dante and Marsilius in the age of the communes, through the several stages of Humanism from Petrarch to Alberti to Pico, down to the crisis of Italian liberty in the generation of Machiavelli, Guicciardini and Castiglione. The course seeks

to problematize the notion of a "Renaissance" in the period's ambivalent attitudes toward history, politics, learning, culture, gender, language, and the role of intellectuals in politics and society. Emphasis is placed on the close reading of primary sources and on issues of interpretation. (ER)

**HIST 351(3510) Machiavelli (also ITALL 351(3510)) # (HA)]**

Fall. 4 credits. J. Najemy.

This course presents Machiavelli in a variety of historical and interpretive contexts; European and Italian politics in the early 16th century; the decline of the Florentine republic and the rise of the Medicean principate; Machiavelli's career in government and his, and the republic's, crisis in 1512-13; the intellectual traditions of Renaissance humanism, political thought, and the revival of antiquity; vernacular literary currents and popular culture; and the political writers and theorists with whom Machiavelli associated and corresponded. Emphasis is placed on a close reading of the major works (including the letters, *The Prince*, the *Discourses*, *Mandragola*, and selections from *The Art of War* and the *Florentine Histories*, all in translation) and a critical examination, in the light of that reading, of some major modern interpretations of Machiavelli. (ER)

**[HIST 352(3520) 20th-Century East Asian-American Relations (also CAPS 352(3520)) @ (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
J. Chen.]

**[HIST 356(3560) The Era of the French Revolution and Napoleon # (HA)]**

Fall. 4 credits. Next offered 2007-2008.  
S. Kaplan.]

**HIST 357(3570) Engineering in American Culture (also ENGRG 357(3570), S&TS 357(3571), AM ST 356(3570))**

Fall. 4 credits. R. Kline.

For description, see ENGRG 357. (HS)

**HIST 358(3580) Survey of German History, 1890 to the Present (HA)]**

Fall. 4 credits. For freshman, permission of instructor required. I. Hull.

An examination of the "German problem," that is the political, social, cultural, economic and other causes of modern Germany's extreme violence and volatility from 1870 through 1945. The course covers German unification, Bismark's Empire, World War I, The Weimar Republic, and the Third Reich. (EM)

**HIST 361(3611) Bakumatsu-Ishin: Conflicts and Transformations in Early Modern Japan, 1700-1890 @ (HA)]**

Fall. 4 credits. K. Hirano.

This course explores Japan's tumultuous transformation from a samurai military government to a modern nation-state and its political and cultural implications for the present. It has been debated among both Japanese and American historians whether or not Japan's modern transformation is best understood as a "restoration (of imperial rule)" or as a "revolution." The choice of word as a descriptive category matters to the extent that it reveals one's perspective on this event. "Restoration" expresses the view that Japan's metamorphosis into a modern society was a relatively uneventful and smooth "transition" carried out by a handful of leaders whereas "revolution" recognizes Japan's experience

as one of the great transformations in which people from different segments of society participated for various reasons and motives. In this class, we will examine this event as a revolution, thus paying close attention to a wide range of ideas, activism, and practices such as samurai loyalism, peasant uprisings, popular culture, millenarianism, the exploration of western forms of knowledge and power, nation-state building and new ideologies of time (progress) and space (national identity). In other words, we seek to understand Japan's transformation as a fairly long, multifaceted and widely participated process of intense intellectual and cultural criticism as well as social and political activism. In addition to primary and secondary texts, we will read a few important theoretical works on revolution/social transformation for the purpose of critically examining the history of the fall of the Tokugawa samurai regime and creation of a modern social order, called bakumatsu-ishin in Japan. (AS)

**HIST 364(3640) The Culture of the Renaissance II (also COM L/FRLIT/RELST 362(3620), ENGL 325(3250), MUSIC 390(3242)) # (CA)]**

Fall. 4 credits. For freshman, permission of instructor required. Next offered 2007-2008. K. P. Long and W. Kennedy.]

**HIST 365(3650) West Africa and the West: 1450-1850 (also AS&RC 365(3302)) # (HA)]**

Fall. 4 credits. S. Greene.

1450 marks the time when peoples, ideas, material goods and beliefs began to move on a regular basis across the Atlantic, first between Africa and Europe, and then later between Africa, North and South America, and the Caribbean. This course examines these movements and explores how West Africans managed their relations with the west over a 400 year period. (AF)

**HIST 367(3671) Survey of German History, 1648-1870 # (HA)]**

Fall. 4 credits. For freshman, permission of instructor required. I. Hull.

An examination of the social, political, intellectual, and diplomatic history of the German states from the devastation of the Thirty Years' War, through absolutism, the bourgeois revolutions of 1848, the struggle for unification, to the beginning of the modern industrial state. The course concentrates on the transition from early modern to modern social and state organization, and on the development of modern civil society. (EM)

**HIST 368(3680) Marriage and Sexuality in Medieval Europe (also RELST/FGSS 368(3680)) # (HA)]**

Fall. 4 credits. Recommended: some prior knowledge of medieval European history.  
P. Hyams.

Few topics generate heat so readily as gender relations and sexuality. Behind the current controversies lie decisions made in the first Christian centuries, and firmed up in the course of the Middle Ages; these still affect all of us, believers and unbelievers alike. This course studies Western attempts to deal with the problem of sexuality up to about 1500. The class will first clarify the church's normative rules of law and theology. Armed with this framework, it will then turn to more specific topics, including homosexuality, prostitution, rape/abduction and sexuality in medieval literature. The goal is to be able to compare the ideal model with the reality,



and thus to assess the product the medieval church passed on to Western culture and ourselves. No formal prerequisite, though some prior knowledge of medieval European history is desirable. (ER)

**[HIST 369(3690) The History of Florence in the Time of the Republic, 1250 to 1530 (also ITAL 369[3690]) # (HA)]**  
Spring. 4 credits. Next offered 2007–2008. J. Najemy.]

**[HIST 370(3700) History of the Holocaust (HA)]**  
Spring. 4 credits. Next offered 2007–2008. V. Caron.]

**HIST 371(3710) World War II in Europe (HA)**

Summer and fall. 4 credits. J. Weiss.  
The Second World War remains the single most important set of events shaping the contemporary world. The course deals with both the events of World War II as they shaped European and world history and the way those events were remembered and commemorated in postwar years. Lectures, screenings, and readings will examine: the role of wartime political leaders and military commanders; the experience of war and occupation for soldiers and civilians, including Resistance movements and collaborators; Nazi genocide; intellectual and cultural changes during the war, including the impact on literature and philosophy; strategic questions about the origins and conduct of the war; the concluding phases involving the Nuremberg Trials, the Yalta and Potsdam conferences, and the launching of the Cold War; and the representation of the war in subsequent films, literature, and political culture. (EM)

**HIST 373(3730) Law, Crime, and Society in Early Modern Europe # (HA)**

Spring. 4 credits. D. Corpi.  
This course will survey the development of law, legal institutions, definitions of crime, and practices of criminality from the 16th through 18th centuries. We often associate this period with extreme measures of law enforcement and repression, whether the persecution of converted Jews by the Inquisition or the witch burnings that raged through various parts of Europe in the 16th and 17th centuries. Yet much of our common knowledge of law and crime in early modern European history consists of exaggerations, myths and misunderstandings. This course offers a corrective by exploring the historical contexts and meanings of law and crime in European society. Some of the themes covered in this course include the relationship between common law and Roman law, jurisdiction building and jurisdictional competition, the imposition of gender and sexual norms, heresy and witchcraft prosecutions, the sociology and anthropology of "criminal" subcultures, and the political process of "criminalization." (EM)

**[HIST 375(3750) The African American Workers, 1865 to 1910: The Rural and Urban Experience (also ILCB 385[3850]) # (HA)]**  
Fall. 3 credits. Junior or senior standing or permission of instructor. Next offered 2007–2008. N. Salvatore.]

**HIST 376(3760) The African-American Workers, 1910 to the Present: Race, Work, and the City (also ILCB 386[3860])**

Fall. 3 credits. N. Salvatore.  
For description, see ILCB 386. (AM)

**[HIST 378(3780) Topics in U.S. Women's History (also AM ST 378[3780])]**  
Fall. 4 credits. Prerequisite: HIST/FGSS 273, 303, or 238 or permission of instructor. Next offered 2007–2008. M. B. Norton.]

**[HIST 379(3790) The First World War: Causes, Conduct, Consequences (HA)]**  
Spring. 4 credits. For freshman, permission of instructor required. I. Hull.]

**HIST 388(3880) History of Vietnam (also HIST 688[6880], ASIAN 385/685[385/685]) @ # (HA)**

Fall. 3 credits. K. Taylor.  
For description, see ASIAN 385. (AS)

**[HIST 395(3950) Premodern Southeast Asia (also HIST 695[6950], ASIAN 397[397]) @ # (HA)]**

Fall. 4 credits. Open to undergraduates, and to graduate students, although with separate requirements. Next offered 2007–2008. E. Tagliacozzo.]

**HIST 396(3960) Southeast Asian History from the 18th Century (also HIST 696[6960], ASIAN 396/696[396/696]) @ (HA)**

Spring. 4 credits. Graduate students must enroll in HIST 696. E. Tagliacozzo.  
Surveys the modern history of Southeast Asia with special attentions to colonialism, the Chinese diaspora, and socio-culture institutions. Considers global transformations that brought "the West" into people's lives in Southeast Asia. Focuses on the development of the modern nation-state, but also questions the narrative by incorporating groups that are typically excluded. Assigns primary texts in translation. (AS)

## Honors Courses

**HIST 400(4000) Honors Proseminar**

Fall and spring. 4 credits. Limited to 15 students. For prospective honors candidates in history. Permission of member of Honors Committee required. Fall, H. Case; spring, R. Craib.

An exploration of major contemporary approaches to historical inquiry, analysis, and presentation. Ways of thinking about history along with research methods and organization of the results will be considered by reading and discussing a variety of historical works. (HR)

**HIST 401(4001) Honors Guidance**

Fall. 4 credits. Prerequisite: HIST 400. Permission of instructor required. E. Tagliacozzo. (HR)

**HIST 402(4002) Honors Research**

Spring. 4 credits. Prerequisite: HIST 400. Permission of instructor required. E. Tagliacozzo. (HR)

## Undergraduate Seminars

**HIST 403(4030) History of the U.S. Senate in the 20th Century (also GOVT 400) (HA)**

Fall and spring. 4 credits. Offered in Cornell in Washington Program. B. Koed.  
This course will offer students an opportunity to view the process of shaping national debates from the perspective of the United States Senate. The modern Senate will serve as the point of reference for an inquiry into the development of the institution's powers under the Constitution during the past 200 years. Class readings, lectures and discussions will focus on the themes of continuity and change, the role of individual senators, and the institutional evolution of the Senate. In addition to general class reading and written examinations, each student will write a short paper and participate in an oral presentation. (AM)

**[HIST 404(4041) Ethnicity, Race, and Indigeneity in Latin America @ (HA)]**

Fall. 4 credits. Limited to 15 students. Prerequisite: a previous course in Latin American history. Next offered 2008–2009. K. Graubart.]

**HIST 405(4050) U.S.–Cuba Relations (also HIST 605[6050], LAT A/LSP/AM ST 405/605[4050/6050]) (HA)**

Fall. 4 credits. M. C. García.  
The course examines the political, cultural, and economic relations between the United States and Cuba since the 18th century. Special attention is given to the transnational role of exiles and immigrants in shaping policy in both countries and across the region. (AM) (LA)

**HIST 406(4061) The New Cold War History (also HIST 606[6061]) @ (HA)**

Spring. 4 credits. Limited to 15 students. J. Chen.  
This is a reading and research seminar with an emphasis on the "new" Cold War history—a scholarly phenomenon emerging since the early 1990s, along with the end of the global Cold War and the new opportunities to conduct multi-archival and multi-source research. Students will be exposed to various new interpretations, new methods of research, and new ways of thinking associated with the "new Cold War history" studies. Readings in this class will be focused on the scholarship that has appeared since the early 1990s. Students are required to write several feature reviews and a comprehensive review essay, as well as to present them, in the course. Grade in the course will be calculated on the basis of evaluation of both written work and oral presentations, as well as of class participation. (AS)

**[HIST 408(4080) Feudalism and Chivalry: Secular Culture in Medieval France, 1000 to 1300 # (HA)]**

Fall. 4 credits. Recommended: HIST 262, 263, or 264. Next offered 2007–2008. P. Hyams.]

**[HIST 410(4100) Archipelago: Worlds of Indonesia (also HIST 617[6100], ASIAN 409/617[4409/6617]) @ (HA)]**

Spring. 4 credits. Open to undergraduates and graduate students, though with separate requirements. Limited to 15 students. Next offered 2007–2008. E. Tagliacozzo.]

**HIST 413(4130) American Immigration Law and Policy in Historical Perspective (HA)**

Spring. 4 credits. Offered in Cornell in Washington Program. S. D. Kang.

This class examines some of the major trends in immigration history by surveying the legal and policy mechanisms used to regulate the inflow and outflow of immigrant populations from the colonial period to the present. The course also explores the impact of these regulatory devices on the shaping of immigrant communities, the political behavior of ethnic groups, immigrant working class formation, race relations, and notions of membership and citizenship in American society. In the simplest terms, the course considers both the law-on-the-books and the law-in-action. In so doing, the seminar provides a comprehensive overview of the operation of this nation's immigration infrastructure. Students will become familiar with the major legal/doctrinal questions, political debates, institutions (the Border Patrol and the INS), and social issues surrounding American immigration policy. Since this class will be taught from a multidisciplinary perspective, class assignments will include a variety of materials such as legal and government documents, primary sources such as oral histories and newspaper articles, as well as historical monographs and essays. (AM)

**HIST 415(4150) Seminar in the History of Biology (also BIOEE 467[4670], B&SOC/S&TS 447[4471]) (PBS)**

Summer or fall. 4 credits. Limited to 18 students. W. Provine.

For description, see BIOEE 467. (HS)

**[HIST 416(4160) Undergraduate Seminar on Gender and Sexuality in Southeast Asia (also HIST 616[6160], FGSS 416/616[4160/6160], ASIAN 416/618[4416/6618]) @ (CA)**

Spring. 4 credits. Letter grades only. Next offered 2008-2009. T. Loos.]

**[HIST 417(4170) History of Jews in Modern France (also JWST 446[4170], FRLIT 413[4130]) (HA)**

Spring. 4 credits. Permission of instructor required. Next offered 2008-2009. V. Caron.]

**HIST 419(4190) Seminar in American Social History (also AM ST 419[4190]) (HA)**

Spring. 4 credits. Offered in Cornell in Washington Program. S. Blumin. (AM)

**[HIST 420(4200) Asian American Communities (also AM ST 420[4220], AAS 420[4240]) (HA)**

Fall. 4 credits. Limited to 15 students. Next offered 2008-2009. D. Chang.]

**HIST 421(4210) Undergraduate Seminar in Cultural History (also AM ST 421[4120], ART H 421[4021])**

Fall. 4 credits. Limited to 15 students. Permission of instructor required. M. Kammen.

Topic for Fall 2006: Tocqueville's *Democracy in America*. This seminar will undertake a close reading of the most astute and influential inquiry ever made concerning politics and society in the U.S., Alexis de Tocqueville's *Democracy in America* (2 vols. 1835-40). In addition, we will read Tocqueville's correspondence concerning the U.S.; some major secondary sources about

Tocqueville and his companion Beaumont; two works by "moderns" who have done the "Tocqueville thing" (1982 and 2005); and assess the uses and abuses of Tocqueville's insights in recent American political discourse. How prophetic was this French political philosopher? (AM)

**HIST 422(4221) British in India, 1750-1830 @ # (HA)**

Spring. 4 credits. T. R. Travers.

Examines the growth of British power in India before 1830. Topics include: the sequence and causes of historical conquests, the British-Indian army, colonial legal regimes and knowledge systems, and the social life of colonial towns. Students will undertake their own research paper and a topic of their choice. (EM)

**[HIST 423(4230) Chronicles of the Conquest of Latin America @ (HA)**

Spring. 4 credits. Next offered 2007-2008. K. Graubart.]

**HIST 424(4240) Art and Politics in 20th-Century Latin America (also LAT A 424[4241]) @ (CA)**

Fall. 4 credits. Limited to 15 students.

Permission of instructor required. HIST 296 or other Latin American course suggested. M. Roldan.

This seminar will examine how the intersection of art and politics shaped culture, ideology, and identity in Latin America from the Mexican Revolution to the dictatorships of the late 20th century. Topics may include muralism and the Mexican Revolution; the artist as muse and activist (Frida Kahlo); working class and immigrant culture in Argentina and the tango; samba as social and political protest in Brazil; gender and politics in exiled women's literature; the appropriation of public spaces as artistic forum and mean of communication under authoritarian regimes. (LA)

**HIST 426(4260) The West and Beyond: Frontiers and Borders in American History and Culture (also AM ST 426[4260]) (HA)**

Spring. 4 credits. Limited to 15 students.

Priority given to junior and senior majors in History and American Studies. A. Sachs.

"Eastward I go only by force," said Henry David Thoreau, "but westward I go free." This seminar explores the many meanings of the West—as a place, as a process, and especially as a borderground—in U.S. history. The Civil War was fought between North and South, but in many ways these two regions were disputing the fate of the West. Indeed, some historians have argued that there is nothing more significant than the idea of the frontier in American history. But did the "westerling" movement represent a heroic accomplishment or a tragic act of violent appropriation? What is covered up by the very idea of something called a West, with all its mythic connotations? We'll attempt to address these and other questions as we wander along various fault lines in time and space, analyzing American frontiers from the era of the Indian Wars in the Massachusetts Bay Colony to the era of Arnold Schwarzenegger's governorship. (AM)

**[HIST 428(4261) Commodification in Historical Perspective: Sex, Rugs, Salt, and Coal (also AM ST 427[4261]) @ # (HA)**

Spring. 4 credits. Priority given to juniors and seniors majoring in History and American Studies. Next offered 2008-2009. A. Sachs.]

**[HIST 430(4300) America in the Camera's Eye**

Fall. 4 credits. Limited to 15 students. Permission of instructor required. Next offered 2008-2009. R. L. Moore.]

**HIST 431(4310) Farmworkers (also HIST 631[6310], LSP 431/631[4310/6310], CRP 395.72/679.72[3850/5850], ILRCB 402[4020]) (HA)**

Spring. 4 credits. R. Craib.

For description, see LSP 431. (LA)

**[HIST 432(4320) Topics in Ancient Greek History (also HIST 633[6330]) # (HA)**

Spring. 4 credits. Next offered 2008-2009. B. Strauss.]

**HIST 433(4330) History of Modern German Jewry: From Enlightenment to the Post-1945 Era (also GERST/JWST 453[4330]) (HA)**

Spring. 4 credits. Limited to 15 students. V. Caron.

Although the fate of the Jews in Germany ended in tragedy during the Holocaust, the German-Jewish interacting during the modern period was also characterized by immense creativity. Modern German Jewry stood at the forefront of innovative religious and ideological movements, and their history therefore offers a lens through which we can focus on the opportunities and challenges that faced modern European Jews more generally. Topics include: debates about Jewish emancipation; the processes of anti-Semitism; the encounter with East European Jewish immigrants; Jews in Weimar culture; Jewish responses to the rise of Nazism; and post-1945 German reflections on the Holocaust. (EM)

**[HIST 436(4360) Conflict Resolution in Medieval Europe # (KCM)**

Spring. 4 credits. Next offered 2008-2009. P. Hyams.]

**[HIST 439(4390) Reconstruction and the New South (also AM ST 439[4390]) # (HA)**

Spring. 4 credits. Limited to 15 students. Limited to juniors and seniors. Next offered 2008-2009. M. Washington.]

**HIST 441(4411) Fourth Century and Early History of Greece (also CLASS 441[4410]) # (HA)**

Fall. 4 credits. B. Strauss.

Topics include the evolution of the Greek city-state; society, economy, and gender; democracy, oligarchy, and tyranny; the careers of Philip, Alexander, and the Successors. Greco-Persian relations. Sicily and southern Italy, and the establishment of the Hellenistic Kingdoms. (EA)

**HIST 442(4421) To Be Enslaved Then and Now # (HA)**

Spring. 4 credits. S. Greene.

In this course, we will read and analyze select texts (both oral and written) that were composed between the late 18th century and 2005 by individuals who were enslaved or who boasted of enslaving others. Emphasis is placed on African and African American texts but in comparison with narratives by

Europeans, Asians and Latin Americans. For whom were these texts produced and for what purpose? How much in these texts is history, how much is fiction, and how do we determine the difference? What can these texts tell us about the individual authors and the political, economic and cultural contexts in which they were written? These and other related questions will structure this seminar. (AF)

**[HIST 444(4440) American Men (also AM ST/FGSS 444[4440]) (HA)**

Fall. 4 credits. Limited to 15 students. Next offered 2008–2009. E. Baptist.]

**HIST 445(4451) New York Women (also S&TS 422[4221], FGSS 422[4220]) (HA)**

Fall. 4 credits. Limited to 15 students. M. Rossiter.

For description, see S&TS 422. (AM)

**HIST 446(4460) Strategy in World War II (HA)**

Spring. 4 credits. Permission of instructor required. J. Weiss.

Strategic decision-making in World War II. The course will be organized into a "task force" addressing crucial problems faced by the European–American Allies in World War II: the invasion of northwest Europe, strategic bombing tactics, the rescue of European Jews, and coordination with the Soviet Union. Individual presentations/papers followed by meetings to draft group reports. (EM)

**[HIST 447(4470) Crusaders and Chroniclers @ # (HA)**

Fall. 4 credits. Limited to 15 students. Next offered 2007–2008. P. Hyams.]

**HIST 448(4480) The Rabinor Seminar (also AM ST 430.5[4301], AAS 430[4301], ENGL 430[4300])**

Spring. 4 credits. Permission of instructor required. S. Wong.

For description, see AM ST 430.5.

**[HIST 452(4520) History of the New Europe (HA)**

Fall. 4 credits. Limited to 15 students. Next offered 2008–2009. H. Case.]

**HIST 453(4530) Formation of Islamic Law (also NES/RELST 457[4657]) @ # (HA)**

Fall. 4 credits. D. Powers.

For description, see NES 457. (NE)

**HIST 454(4541) The Rise and Fall of 20th-Century Liberalism (HA)**

Spring. 4 credits. R. Vanderlan.

This seminar will consider the origins, achievements, limits and legacy of 20th century attempts to create a more just and equal society. We will examine the evolving nature of liberal thought from the New Deal through the Great Society and on to Bill Clinton, and trace opposition from Barry Goldwater through Ronald Reagan and on to Welfare Reform. We will focus on the interplay between ideas, policies, and politics. (AM)

**HIST 456(4560) Topics in Medieval Historiography (also HIST 656[6560]) # (HA)**

Spring. 4 credits. Permission of instructor required. O. Falk.

This seminar explores issues of historical theory and methodology, emphasizing their specific iterations in medieval European history. Historians of the Middle Ages must wrestle with all of the challenges familiar to

our modern counterparts, and then some: documents are more scarce, languages more dead, categories more elusive than in recent historical context. We will examine medieval historians' contributions to broad debates in the discipline, sample historiographical chestnuts that have occupied medievalists, and enquire into ways of expanding our conceptual tool kits further in the future. (ER)

**HIST 457(4570) Seminar in European Fascism (HA)**

Fall. 4 credits. Permission of instructor required. I. Hull.

An attempt to define and understand the social, political, and intellectual origins, mechanisms, and goals of European fascist movements of the 1920s and 1930s by detailed study of German national socialism, Italian fascism, and the Action Française. (EM)

**HIST 458(4581) Intelligibility in Science (also S&TS 458[4581]) (HA)**

Spring. 4 credits. P. Dear.

In what ways has the European tradition known as "science" attempted to understand the natural world, and how has it attempted to lend credibility to its accounts? This senior research seminar will focus on the study of primary sources in the history of science, especially the European science of the past four centuries, to investigate what issues were involved in the establishment and acceptance of dominant approaches in various areas of scientific work, in both physical and life sciences. Work will be centered on the text of Peter Dear's *The Intelligibility of Nature: How Science Makes Sense of the World* (U. Chicago Press, currently in press), with the intention of investigating further some of its ideas in relation to source material not considered in the text. Final papers for the course will pursue the notion of intelligibility in the history of science by investigating a case study from any period and in any scientific discipline that the student (in consultation with the professor) deems worthwhile. (HS)

**[HIST 462(4620) Popular Culture in European History (CA)**

Fall. 4 credits. Next offered 2007–2008. S. Kaplan.]

**[HIST 463(4630) War and Society in Eastern Europe (HA)**

Spring. 4 credits. Next offered 2007–2008. H. Case.]

**[HIST 464(4640) Historical Issues of Science, Technology, Race, and Colonialism (also S&TS 475[4751]) (HA)**

Fall. 4 credits. Next offered 2007–2008. S. Seth.]

**HIST 465(4651) Special Topics: Chinese Historical Documents (also CHIN 425[4425])**

Fall. 4 credits. Prerequisite: equivalent of three years Mandarin instruction.

Permission of instructor required. Z. Chen. Topic for Fall 2006: Historical Documents on Modern China. For description, see ASIAN 425. (AS)

**[HIST 466(4660) Iroquois History (also AM ST/AIS 466[4660]) # (HA)**

Fall. 4 credits. Next offered 2008–2009. J. Parmenter.]

**HIST 468(4680) Love and Sex in the Italian Renaissance (also ITALL 468[4680]) # (HA)**

Spring. 4 credits. J. Najemy.

An exploration of the representation of love, sex, and eros in Italian Renaissance literature, and the attempts by secular governments and the Church to manage, discipline, and punish sexual transgression. Primary texts include Boccaccio's *Decameron*, 15th-century novella, plays by Machiavelli (*Mandragola*, *Clizia*) and Bibbiena (*Calandria*), and Aretino's *Dialogues*. Secondary readings include studies of sexual crime, love across social boundaries, prostitution, homosexuality, and lesbianism. (ER)

**HIST 469(4691) The Old English Laws and Their Politico-Cultural Context (also HIST 669[6691], ENGL 419[4190]) # (CA)**

Fall. 4 credits. P. Hyams and T. Hill.

The Old English law codes contain basic information on almost every historical topic for the period from kingship down to peasants and their boundary fences. This makes them central to the study of Anglo-Saxon England. Yet their very nature remains controversial. How far, for example do they represent achievement such as the establishment of central authority capable of enforcing laws throughout the realm, and how far merely aspiration, possibly clerical and unworldly at that, toward that end? The special character of the laws comes from their being in the vernacular. In this interdisciplinary class, there will be an opportunity to read them in the original Old English, with assistance to beginners. But the excellent translations we possess and a plethora of lively comment offer anyone an attractive introduction to the study of pre-modern texts in general and to the reasons why Old English scholars are now extending their canon so far beyond its traditional "literary" borders. (ER)

**HIST 474(4740) Topics in Modern European Intellectual and Cultural History (also COM L/JWST 474[4740])**

Fall. 4 credits. Limited to 15 students. D. LaCapra.

Topic for 2006: History and Trauma. The course will focus on the relation between trauma and history, including the experience, memory, and representation of traumatic events. It will treat a series of works (historical, theoretical, and fictional) in which this problem arises in an acute form, especially (but not exclusively) with respect to the Holocaust. (EM)

**[HIST 476(4760) History and Story in the North Sagas (also HIST 676[6760]) (HA)**

Spring. 4 credits. Next offered 2008–2009. O. Falk and T. Hill.]

**[HIST 477(4770) Seminar on the Politics of the Enlightenment # (HA)**

Fall. 4 credits. Next offered 2008–2009. S. Kaplan.]

**[HIST 483(4831) Christianization/Roman World (also CLASS 475[4625], RELST 475[4625]) # (HA)**

Fall. 4 credits. Next offered 2008–2009. E. Rebillard.]

**[HIST 484(4840) Subversion as Foreign Policy: The United States in Southeast Asia @ (HA)**

Spring. 4 credits. Next offered 2007–2008. T. Loos.]

**[HIST 488(4880) Seminar in the Late 19th-Century European Imperialism (HA)]**

Spring. 4 credits. Permission of instructor required. Next offered 2008-2009. I. Hull.]

**[HIST 490(4900) New World Encounters, 1500 to 1800 (also AM ST 490[4990], AIS 490[4900]) (HA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007-2008. J. Parmenter.]

**[HIST 491(4910) Approaches to Medieval Violence (also HIST 692[6920]) # (HA)]**

Fall. 4 credits. Limited to 15 students. Permission of instructor required. Next offered 2007-2008. O. Falk.]

**[HIST 493(4930) Problems in Modern Chinese History (also HIST 693[6930], ASIAN 493/693[4493/6693]) @ (HA)]**

Fall. 4 credits. Prerequisite: HIST 294 or permission of instructor. Next offered 2007-2008. S. Cochran.]

**[HIST 494(4940) Theories of Civilization (also ASIAN 425[4425]) @ # (HA)]**

Spring. 4 credits. Next offered 2007-2008. K. Taylor.]

**[HIST 495(4950) Gender, Power, and Authority in England, 1600 to 1800 # (CA)]**

Spring. 4 credits. Next offered 2008-2009. R. Weil.]

**HIST 496(4961) History of Medicine and Healing in China (also ASIAN 469[4469], S&TS/B&SOC 496[4961]) @ # (HA)]**

Spring. 4 credits. T. J. Hinrichs.

An exploration of processes of change in medicine in China. Focuses on key transitions, such as the emergence of canonical medicine, of Daoist approaches to healing and longevity, of "Scholar Physicians," and of Traditional Chinese Medicine in modern China. Inquires into the emergence of new healing practices in relation to both popular and specialist views of the body and disease, "cultivating vitality" practices, modes of transmission of medical knowledge, and healer-patient relations. Course readings include primary texts in translation as well as secondary materials. (AS)

**[HIST 497(4970) Jim Crow and Exclusion-Era America (also HIST 697[6970], AM ST 497/697[4970/6970], AAS 497[4970]) (HA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007-2008. D. Chang.]

**[HIST 499(4990) Problems in Modern Chinese History (also HIST 694[6940], ASIAN 499/694[4499/6694]) @ (HA)]**

Spring. 4 credits. Prerequisite: HIST 294 or permission of instructor. Next offered 2007-2008. S. Cochran.]

**HIST 500(4997) Undergraduate Research Seminar (also AM ST 500[4997])**

Fall and spring. 8 credits each semester. Offered in Cornell in Washington Program. S. Jackson.

Intensive research and writing experience using the extensive resources of Washington D.C. (AM)

## Graduate Seminars

**[HIST 507(5070) Graduate Seminar: The Occidental Tourist (also HIST 207[2070], ASIAN 206[2660])**

Fall. 4 credits. Next offered 2007-2008. T. Loos.]

**[HIST 525(5250) Seminar in the History of Technology (also S&TS 626[6261])**

Spring. 4 credits. R. Kline.]

**HIST 601(6010) European History Colloquium**

Fall and spring. 2 credits each semester. Limited to graduate students. Fall, D. LaCapra and H. Case; spring, V. Caron and T. R. Travers.

A research colloquium designed for European history graduate students. The colloquium will offer a forum for students to present papers and to discuss the work of visiting scholars. (EM)

**HIST 604(6040) Colloquium in American History**

Spring. 4 credits. Requirement for first- and second-year graduate students in U. S. history. M. B. Norton.

Examination of major approaches, periods, issues, and modes of interpreting American history. Readings include recent "classics" of American scholarship from diverse sub fields and genres. (AM)

**HIST 605(6050) U.S.-Cuba Relations (also HIST 405[4050], LAT A/LSP/AM ST 405/605[4050/6050])**

Fall. 4 credits. M. C. García. For description, see HIST 405. (AM) (LA)

**HIST 606(6061) The New Cold War History (also HIST 406[4061])**

Spring. 4 credits. Limited to 15 students. J. Chen.

For description, see HIST 406. (AS)

**[HIST 607(6041) Race and Ethnicity in Latin America (also HIST 404[4041])**

Fall. 4 credits. Next offered 2008-2009. K. Graubart.]

**[HIST 608(6051) Themes and Issues in Modern European History**

Spring. 4 credits. Next offered 2007-2008. H. Case.]

**HIST 610(6101) Afro-American Historiography (also AM ST 610[6101])**

Fall. 4 credits. Letter grades only. M. Washington.

Reading and discussion course focusing on the way historians write and interpret the Black experience in America. Students will be concerned with individual historians, various schools of thought, and historical approaches. (AM)

**HIST 612(6120) Colonial Latin America (also LAT A 612[6120])**

Fall. 4 credits. K. Graubart.

This course provides a foundation in colonial Latin American history and historiography for graduate students. We will examine some of the most exemplary recent monographs in the field as well as analyze the debates of the past four decades. (LA)

**HIST 615(6150) The Past in the Present/The Present in the Past: Histories of Tokugawa Japan**

Fall. 4 credits. K. Hirano.

This course investigates the interactive play between historians' interpretations of the past

and their concerns with the present. It places an emphasis on the ways in which modern/contemporary historians of Japan interpret early modern thinkers, texts, and events, and the ways such interpretations are shaped by their understandings of Japanese modernity and their aspirations for a better future. The questions we shall address throughout this course are as follows: Why do historians of Japan pay special attention to the early modern period as an epoch indispensable for a better and deeper understanding of Japanese modernity? How do historians' concerns with the present shape the ways in which they interpret the past? How do historians' dialogues with the past (interpretations) alter our perspectives not only on the past but also on the present? (AS)

**[HIST 616(6160) Gender and Sexuality in Southeast Asia (also HIST 416[4160], ASIAN 416/618[4416/6618], FGSS 416[4160])**

Spring. 4 credits. Limited to 15 students. Intended for graduate students. Letter grades only. Next offered 2008-2009. T. Loos.]

**[HIST 617(6100) Archipelago: Worlds of Indonesia (also HIST 410[4100], ASIAN 409/617[4409/6617])**

Spring. 4 credits. Limited to 15 students. Open to undergraduates and graduate students, although with separate requirements. Next offered 2007-2008. E. Tagliacozzo.]

**[HIST 618(6180) Readings in 20th-Century U.S. Political, Intellectual, and Diplomatic History**

Spring. 4 credits. Prerequisite: graduate standing. Next offered 2008-2009. F. Logevall.]

**[HIST 619(6190) Seminar in the History of Technology (also S&TS 626[6261])**

Spring. 4 credits. Next offered 2007-2008. Open to graduate students only. R. Kline.]

**[HIST 620(6200) Intelligibility in Science**

Spring. 4 credits. Graduate seminar. Next offered 2007-2008. P. Dear.]

**[HIST 623(6230) Nation, Empire, and Identity in 17th-Century Historiography**

Fall. 4 credits. Next offered 2008-2009. R. Weil.]

**[HIST 626(6260) Graduate Seminar in the History of American Women**

Fall. 4 credits. Next offered 2007-2008. M. B. Norton.]

**[HIST 627(6270) Graduate Seminar in Early American History**

Spring. 4 credits. Prerequisite: graduate standing. Permission of instructor required. Next offered 2007-2008. J. Parmenter.]

**[HIST 628(6280) Graduate Seminar: 19th-Century U.S. History**

Fall. 4 credits. Next offered 2008-2009. E. Baptist.]

**HIST 630(6300) Topics in Ancient History (also CLASS 632[7682])**

Fall. 4 credits. E. Rebillard.

For description, see CLASS 632. (EA)

**HIST 631(6310) Farmworkers (also HIST 431[4310], LSP 431/631[4310/6310], CRP 395.72/679.72[3850/5850], ILRCB 402[4020])**

Spring. 4 credits. R. Craib.

For description, see LSP 431. (LA)

**[HIST 633(6330) Topics in Ancient Greek History (also HIST 432[4320], CLASS 436/636[4360/7684])]**

Spring. 4 credits. Next offered 2008–2009.  
B. Strauss.]

**HIST 636 Ancient Warfare (also CLASS 638[7686])**

Spring. 4 credits. Prerequisites: at least one course in ancient history and a reading knowledge of Greek and Latin. Permission of instructor required. B. Strauss.

A survey of recent theories, methods and publications as well as readings in Greek and Latin. (EA)

**HIST 637(6370) Popular Culture in Europe from the Middle Ages through the 19th Century: Problems in Thinking about Cultural and Social History/Historiography**

Fall. 4 credits. S. Kaplan.

An examination of the origins, practices and meanings of popular culture throughout Europe from the Middle Ages to the Commune. After considering the various ways in which "culture" and "popular" can be construed, the seminar will focus on two sets of questions: (1) the specific manifestations of popular culture, its various languages and gestures, and its complex relations with the dominant/elite cultures.; (2) the epistemological, methodological and historiographical issues that arise from this effort to confront cultural and social approaches to "doing" history. (EM)

**[HIST 639 Mao and the Chinese Revolution]**

Spring. 4 credits. Next offered 2008–2009.  
J. Chen.]

**[HIST 641(6410) Science, Technology, Gender: Historical Issues (also S&TS 640[6401], FGSS 640[6400])]**

Spring. 4 credits. Next offered 2007–2008.  
S. Seth.]

**[HIST 642(6420) The Politics of History-Writing: Historiography and Post-Colonial Criticism of South Asia]**

Spring. 4 credits. Next offered 2007–2008.  
D. Ghosh.]

**[HIST 648(6480) Historiography of Latin America]**

Fall. 4 credits. Next offered 2008–2009.  
R. Craib.]

**[HIST 649(6481) Seminar in Latin American History]**

Fall. 4 credits. Next offered 2007–2008.  
M. Roldan.]

**[HIST 654(6540) Topics in East-Central European History]**

Fall. 4 credits. Next offered 2008–2009.  
H. Case.]

**HIST 656(6560) Topics in Medieval Historiography (also HIST 456[4560])**

Spring. 4 credits. Permission of instructor required. O. Falk.

For description, see HIST 456. (ER)

**[HIST 661(6610) Graduate Seminar in 20th-Century German History]**

Fall. 4 credits. Permission of instructor required. Next offered 2007–2008. I. Hull.]

**HIST 662(6620) Thucydides (also GREEK 672[7172])**

Fall. 4 credits. Advanced historical and literary studies in Herodotus. Reading knowledge of ancient Greek required.  
H. Rawlings.

**[HIST 663(6630) Graduate Seminar in Renaissance History]**

Fall. 4 credits. Next offered 2007–2008.  
J. Najemy.]

**HIST 669(6691) The Old English Laws and Their Politico-Cultural Context (also HIST 469[4691], ENGL 419[4190])**

Fall. 4 credits. P. Hyams and T. Hill.  
For description, see HIST 469. (ER)

**HIST 672(6720) Seminar in European Intellectual History**

Fall. 4 credits. D. LaCapra. (EM)

**[HIST 676(6760) History and Story in the North Sagas (also HIST 476[4760])]**

Spring. 4 credits. Next offered 2008–2009.  
O. Falk and T. Hill.]

**[HIST 683(6830) Seminar in American Labor History (also ILRCB 783[7081])]**

Fall. 3 credits. Prerequisite: graduate standing. Next offered 2007–2008.  
N. Salvatore.]

**HIST 688(6880) History of Vietnam (also HIST 388[3880], ASIAN 385/685[3385/6685])**

Fall. 3 credits. K. Taylor.  
For description, see ASIAN 385. (AS)

**[HIST 692(6920) Approaches to Medieval Violence (also HIST 491[4910])]**

Fall. 4 credits. Next offered 2007–2008.  
O. Falk.]

**[HIST 694(6940) Problems in Modern Chinese History (also HIST 499[4990], ASIAN 499/694[4499/6694])]**

Fall. 4 credits. Prerequisite: HIST 294 or permission of instructor. Next offered 2007–2008. S. Cochran.]

**HIST 697 Jim Crow and Exclusion-Era America (also HIST/AAS 497[4970], AM ST 497/697[4970/6970])**

Spring. 4 credits. Limited to 15 students.  
Next offered 2007–2008. D. Chang.]

**[HIST 698(6980) Seminar in Japanese Thought (also ASIAN 698[6698])]**

Spring. 4 credits. Prerequisite: reading knowledge of Japanese. Next offered 2008–2009. J. V. Koschmann.]

**HIST 709(7090) Introduction to the Graduate Study of History**

Fall. 4 credits. Requirement for first-year graduate students. R. Craib and H. Case.  
This course is designed to introduce entering graduate students to crucial issues and problems in historical methodology that cut across various areas of specialization. (HR)

**HIST 711(7110) Introduction to Science and Technology Studies (also S&TS 711[7111])**

Fall. 4 credits. P. Dear.  
For description, see S&TS 711. (HS)

**HIST 804–807(8004–8007) Supervised Reading**

4 credits each semester. Prerequisite: graduate standing. Permission of instructor required. Staff. (HR)

**HISTORY OF ART**

S. Samuels, acting chair; A. Alexandridis, J. E. Bernstock, M. I. Dadi, M. Fernandez, C. Finley, S. Hassan, C. Lazzaro, K. McGowan, L. L. Meixner, A. Pan, A. Ramage, J. Rickard, C. Robinson, T. Tu

The Department of the History of Art provides a broad range of introductory and advanced courses in Western art (European and North American) and non-Western art (East and Southeast Asian, African), from antiquity to the present.

**The Major**

Department majors acquire a broad understanding of the history of art in several chronological and geographical areas: ancient, medieval, Renaissance, modern (Europe and North America), Southeast Asia, China, Japan, and Africa. Additionally, majors practice a range of art historical methods and interpretive strategies, including connoisseurship, dendrochronology, feminism, iconography, semiotics, and social history. Majors are encouraged to locate the history of art within allied humanities fields and the applied arts by taking courses in history, literature, history of architecture, and fine arts. The study of foreign languages is strongly encouraged.

**Requirements for the Major**

Prospective majors should consult the director of undergraduate studies. Students wishing to declare a major in the history of art should have completed any two courses above the 100 level at Cornell in the department by the end of their sophomore year and have received a grade of B- or above in both. Courses must be taken for a letter grade. These courses count toward the total 44 credits. The major in the history of art requires 44 credits, 30 at the 300 level or above. The core requirements are: proseminar; another seminar at the 400 level or above; two courses on art from the following time periods: Ancient Europe, Medieval/Islamic, or Renaissance/Baroque (one course per time period); two courses on art from the three following geographical areas: Africa, Asia, or Latin America (one course per region); and two courses on modern/contemporary art in Europe and North America, including art from outside the Anglo-American tradition. In addition to the 44 credits, majors are required to take two courses, approved by their advisors, in areas related to the history of art.

**Honors**

To become a candidate for the degree of bachelor of arts with honors in the history of art, a student must have a cumulative average of A- for all courses taken in the department and B+ in all arts and sciences courses. Application to write an honors thesis should be made to the director of undergraduate studies during the second semester of the junior year. Students are advised to enroll in ART H 497 Honors Research at this time. The application must include a summary of the proposed project, an endorsement by a faculty sponsor, and a copy of the student's transcript. In the senior year the honors candidate will include ART H 498 and 499 in his or her course load. These courses address the research and writing of the senior thesis under the direction of the student's project advisor.



## Course Numbering System

100-level courses are first-year writing seminars.

200-level courses are introductions to the major subdivisions of Western art and art outside the West.

300-level courses are intermediary courses addressing more specialized topics or epochs.

400-level courses are seminars primarily for advanced undergraduates and graduate students.

500-level courses are seminars primarily for professional level.

600-level courses are seminars primarily for graduate students.

## First-Year Writing Seminars

For first-year writing seminar offerings in the history of art, consult the John S. Knight Institute brochure for times, instructors, and descriptions. These courses may not be used to satisfy the distribution requirement or the major.

## Courses

### ART H 202(2100) Survey of European Art: Renaissance to Modern # (CA)

Summer only. 3 credits. D. Royce-Roll.

The major traditions and movements in western European art from the Renaissance to the modern period. Painting, sculpture, and architecture with an emphasis on painting. Each Friday class meets at the Johnson Museum of Art with gallery talks and viewing of relevant works that supplement the previous four days of classroom lectures.

### ART H 209(2190) SSP: The Immigrant Imagination (also AAS 209[2090], AM ST 227[2091]) (HA)

Fall. 4 credits. Limited to 15 students. T. Tu.

Explores how contemporary immigrant experiences are expressed through visual culture. Examines a variety of expressive forms—including visual and material arts, video/performance art, and film—produced by recent immigrants, and considers the ways that they function as a type of “migration narrative.” By doing so, connections are made between visual representations and other modes of narration, including literary and musical. Asks: how do the visual arts operate within immigrant communities as a mode of story-telling or history-making? How have immigrants employed visual culture to narrate their cross-cultural movements, community-building efforts, political struggles, and cultural memories? Is there such a thing as “immigrant art”? If so, what are its characteristics and how does it help to reshape our understanding of contemporary artistic productions?

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

### ART H 219(2019) Thinking Surrealisms (also COM L 220[2200], VISST 219[2190])

Spring. 4 credits. B. Maxwell.

### ART H 227 Art and Arkeo/Ancient Med World (also CLASS 227[2727], ARKEO 228[2727])

Fall. 3 credits. S. Manning.  
For description, see CLASS 227.

### ART H 245(2400) Introduction to Art History: Renaissance and Baroque Art (also VISST 245[2645]) # (HA)

Fall. 4 credits. Each student must enroll in a sec. C. Lazzaro.

Surveys major works of European painting, sculpture, prints, and architecture from 1400 to 1750. Emphasizes the social, religious, and political contexts in which artists worked and the role of patrons in the creative process. Also introduces the art historical approaches through which we interpret these works. Weekly section meetings are required.

### [ART H 250(2350) Introduction to Art History: Islamic Art and Culture @ # (HA)

Fall. 4 credits. Next offered 2007–2008. C. Robinson.]

### [ART H 255(2355) Introduction to Art History: Medieval Art and Culture # (CA)

Spring. 4 credits. Next offered 2007–2008. C. Robinson.]

### ART H 260(2600) Introduction to Art History: The Modern Era (CA)

Spring. 4 credits. Not open to students who have taken ART H 261. Each student must enroll in a sec. J. Bemstock.

Considers modern art in a historical and cultural context, from painting associated with the French Revolution through American pop art. The emphasis is on major movements and artists: Neo-Classicism (David), Romanticism (Delacroix), Realism (Courbet), Impressionism (Monet), Post-Impressionism (Van Gogh), Cubism (Picasso), Fauvism (Matisse), Surrealism (Miro), Abstract Expressionism (Pollock), and Pop Art (Warhol). Different critical approaches are examined.

### ART H 261(2601) Introduction to Art History: Modern Art (CA)

Summer. 3 credits. D. Royce-Roll.

Introduction to early modern art as it developed between the French Revolution and the post-World War II era. Both European and American movements are examined, particularly as represented in the Herbert F. Johnson Museum of Art collection where some class meetings are held. The course combines a chronological survey with a brief examination of topics concerning the social condition, the artist's vision, and cultural iconology.

### ART H 262(2602) 20th Century Art: Modernism and After (New; Summer) (HA)

Summer. 4 credits. J. Stojanovic.

Since the end of the 19th century, Modernism has been the dominant force in the production of western avant-garde art. However, since the early 1950s many of the values assumed by the modernist avant-garde have come under fundamental scrutiny. The goal of this course is to enable the student to understand these debates while providing an accessible historical progression through 20th-century art. Modernist myths which have

appeared to make art elitist or inaccessible, or simply irrelevant, are examined. We also consider Postmodernism and explore whether the diversity of contemporary art mirrors this 'new' situation. Issues of gender and ethnicity, criticism of the accepted canon of modern art, and important social and political influences upon the institutions of art are incorporated into the discussion of particular works and case studies.

### ART H 306(3600) Introduction to Art History: Contemporary Art: 1960 to Present (CA)

Spring. 4 credits. Prerequisite: ART H 260 or equivalent. I. Dadi.

Discusses new art practices since the 1960s. Although numerous artistic experiments took place during the first half of the 20th century, it was with the declining importance of modernist painting and sculpture by the 1960s that newer modes of artistic practice became established. This course explores the rise of Fluxus, Minimalism, Conceptualism, Land Art, Video and Performance, Postmodernism, and Postcolonialism. These practices are located in relation to intellectual and social movements, such as the 1960s counterculture, feminism, race, ecology, institutional critique, and globalization. This course focuses primarily on European and American art but also incorporates selected global developments.

### ART H 307(3607) Orientalism and Representation

Fall. 4 credits. I. Dadi.

This course will explore how the Orient has been represented in Western art, architecture, literature, and media since the 19th century. Popular and scholarly ideas about the Orient and Orientalism have come under increasing scrutiny since the publication of Edward Said's influential critique of Orientalism that explored the persistence of these tropes in historical and literary writings. The course will explore the debates surrounding Said's critique, and also discuss its salience in the analysis of modern and contemporary art and visual culture. The course will include discussions of French Orientalist paintings; Hollywood depictions of the Orient; national independence movements that redeployed colonial textual and visual archives to formulate the national past; and the strategies of artists who have appropriated the trope of Orientalism to create new understandings of hybridity and intercultural encounters.

### ART H 322(3202) Arts of the Roman Empire (also CLASS 350[3740]) # (HA)

Fall. 4 credits. Prerequisite: permission of instructor. Staff.

The visual arts in the service of the first world state. Starts with the architecture, painting, and sculpture of the Etruscan and Republican period but concentrates on monuments of the Imperial era in Italy and the provinces until the time of Constantine. Art made for private patrons is considered, along with the official presentations of the emperors.

### ART H 343(3443) Art and Society in Early Renaissance Italy # (HA)

Spring. 4 credits. C. Lazzaro.

The new style of Donatello, Masaccio, Brunelleschi, and later Botticelli and Alberti, spread from Florence to the courts of northern Italy. A new urban, educated class, increasingly concerned with material goods, commissioned images celebrating individuals,

family, and the rituals of birth, marriage, and death, as well as contemporary devotional practices.

**[ART H 344(3440) Leonardo, Michelangelo, and Raphael # (HA)]**  
Spring. 4 credits. Next offered 2007–2008.  
C. Lazzaro.]

**[ART H 345(3445) Rome, Florence, and Venice in the 16th Century # (HA)]**  
Spring. 4 credits. Next offered 2008–2009.  
C. Lazzaro.]

**ART H 349(3149) Artistic Identity through Time: From Anonymous to Magnanimous (HA)**  
Fall. 4 credits. P. Morin.

Surveys the variety of roles artists/architects have assumed, constructed, or negotiated over time. The social economic status of the artists has ranged from priestly demigod to slave, manual laborer to intellectual, bohemian to member of the bourgeoisie, craftsperson to visionary, activist to actor, spectator to hero. Constructions of genius and personal negotiation of identity are explored through a variety of sources, including philosophical texts, biography, treatises, popular press, and film. We consider artistic identity through gender, ethnicity, nationality, and social economic status. Artistic productions including architecture, painting, sculpture, installation, and performance are examined from the time of the Pharaohs to the present day, from Imhotep to Warhol.

**ART H 350(3100) History of Photography (LA)**

Summer and winter. 4 credits. I. Dadi.  
Provides a survey of the history of photography over a course of two centuries. Starting with its invention in the 1830s, this course covers the subject both topically and chronologically. During the 19th century, it focuses on its technical development and on the complex relations that situate photography in relation to painting, portraiture, urban life, war, anthropology, exploration and travel, and science and industry. While these topics continue to be important during the 20th century, photography has been enriched by new developments that include its use as a modernist and experimental art form, in social documentary and photojournalism, in propaganda, in advertising and fashion, and its centrality in the practice of conceptual art, postmodernism, and in the digital age.

**[ART H 355(3300) Romanesque and Early Gothic Art and Architecture: Europe and the Mediterranean, 900 to 1150 AD # (LA)]**  
Fall. 4 credits. Next offered 2008–2009.  
C. Robinson.]

**[ART H 356(3301) Gothic and the Medieval World # (LA)]**  
Spring. 4 credits. Next offered 2008–2009.  
C. Robinson.]

**ART H 360(3740) Painting 19th-Century America (also AM ST 360[3740]) # (CA)**  
Spring. 4 credits. Recommended: ART H 245. L. L. Meixner.

Interdisciplinary view of art and life in 19th-century America from the colonial era through the Gilded Age. Considers definitions of democratic culture through topical units, including New England portraiture and commodity culture; the art museum in the new republic; genre painting in the Jacksonian

era; Hudson River landscape and railroad expansion; photography and the rising middle class; images of African Americans and Reconstruction; images of Native Americans, Manifest Destiny, and the frontier myth; cosmopolitan taste and robber barons in the Gilded Age. Alongside key paintings, students look at print culture including daguerreotypes, postcards, political prints, photographs, and advertisements.

**ART H 362(3760) Impressionism in Society # (CA)**

Fall. 4 credits. Not open to freshmen.  
Recommended: ART H 245. L. L. Meixner.  
Discusses French Impressionist art as products of 19th-century public life. By relating Impressionism to state culture, including Universal Expositions, the course traces subversive themes such as criminality, café and brothel societies, clandestine prostitution, and class-regulated leisure. Students consider images of Parisian spectacle and commodity culture (Manet, Cassatt, Degas, Toulouse-Lautrec) as well as French landscapes (Monet, Van Gogh, Pissarro). Special topics include artists' relationships to novelists (Zola), poets, and the avant-garde theater as well as the construction of the artist and courtesan in Puccini's *La Bohème* and Verdi's *La Traviata*. Images include postcards, playbills, medical photographs, and posters. Organizing our historical units is the theme of power and vision with attention to the female gaze, voyeurism, surveillance, and scopophilia.

**ART H 365(3605) U.S. Art from FDR to Reagan (also AM ST 355[3605]) (LA)**

Fall. 4 credits. Each student must enroll in a sec. J. E. Bernstock.  
Considers the contextual features of American art from the 1930s through the late 1980s. Examines art in relation to contemporary politics, society and literature. A few of the developments on which the course focuses are: Abstract Expressionism, Pop Art, Earth Art, and Feminist Art. Examines various critical approaches.

**ART H 366(3650) History and Theory of Digital Art (CA)**

Fall. 4 credits. M. Fernandez.  
In this course students will examine the role of mechanical, electronic, and digital technologies in the arts of the late 20th and 21st centuries with emphasis on Europe and North America. Beginning with kinetic art and the cybernetically inspired work of the late sixties, we will explore early uses of computer technology, including early work in synthetic video in the 1970s. An overview of pre-Internet telematic experiments will lead to an investigation of net art. The ongoing development of behavioral art forms including interactive art and interactive installation will be a central theme. Critical evaluation of various attitudes concerning technology will be encouraged.

**ART H 368(3550) Modern and Contemporary Latin American Art (also LSP 368[3551], LAT A 368[3680]) (HA)**

Spring. 4 credits. M. Fernandez.  
This course is designed as a thematic survey of Latin American art from the early 20th century to the present. Attention is given to issues such as: the effect of colonialism on Latin America's visual arts, the creation of national artistic styles, the relation of Latin American art and artists to European and American culture centers, the interaction of

high art and popular culture, the role of art criticism on popular perceptions of Latin American Art, and the contributions of Latin American women to various aspects of artistic practice. Special classes will examine border arts and Latin America artists' exploration of electronic technologies.

**ART H 371(3171) Architectural History of Washington, D.C. # (HA)**

Fall or spring. 4 credits. Prerequisite: students in Cornell in Washington program; nonarchitects. P. Scott.  
Historical and critical survey of the architecture of Washington. Attention is given to the periods, styles, architects, and clients—public and private—of the notable buildings and to the urbanscape of the nation's capital. The vocabulary of architectural analysis and criticism is taught. Field trips required.

**ART H 378(3510) Introduction to African Art (also AS&RC 310[3501]) @ (LA)**

Fall. 3 credits. S. Hassan.  
Survey of the visual art and material cultural traditions of sub-Saharan Africa. It aims at investigating the different forms of visual artistic traditions in relation to their historical and sociocultural context. The symbolism and complexity of traditional African art are explored through the analysis of myth, ritual, and cosmology. In-depth analysis of particular African societies is used to examine the relationship of the arts to indigenous concepts of time, space, color, form, and sociopolitical order. New and contemporary art forms associated with major socioeconomic changes and processes of assimilation and accumulation also are explored. These include tourist art, popular art, and elite art.

**ART H 380(3800) Introduction to the Arts of China (also ARKEO 380[3880], ASIAN 383[3383]) @ # (LA)**

Fall. 4 credits. A. Pan.  
This course offers a survey of the art and culture of China, from the Neolithic period to the 20th century. We begin with an inquiry into the meaning of national boundaries and the controversy of the Han Chinese people, which helps us identify the scope of Chinese culture. Pre-dynastic (or prehistoric) Chinese culture is presented through both legends about the origins of the Chinese, and scientifically excavated artifacts. Art of the dynastic and modern periods is presented in light of contemporaneous social, political, geographical, philosophical and religious contexts. Students work directly with objects in the Herbert F. Johnson Museum of Art.

**ART H 384(3820) Introduction to the Arts of Japan @ # (LA)**

Spring. 4 credits. A. Pan.  
As an island nation east of the Asian continent, Japan developed a unique culture that reflects both continental and indigenous characteristics. This course examines pre- and post-contact with continental culture and the process of artistic acculturation and assimilation in successive periods of Japanese art history.

**[ART H 390(3520) African American Cinema (LA)]**

Fall. 4 credits. Next offered 2007-2008.  
C. Finley.]

**[ART H 395(3855) The House and the World: Architecture of Asia (also VISST 394[3655]) @ # (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
K. McGowan.]

**[ART H 396(3850) The Arts of Southeast Asia @ # (CA)]**

Fall. 4 credits. Next offered 2007-2008.  
K. McGowan.]

**Seminars**

Courses at the 400 to 600 level are open to juniors and seniors, majors, and graduate students unless otherwise stated. All seminars involve the writing and presentation of research papers. Enrollment is limited to 15 students, and *permission of the instructor is required*. Students may repeat courses that cover a different topic each semester.

**ART H 400(4100) Proseminar (also VISST 400[4200], ART H 600[6100]) (HA)**

Fall. 4 credits. Limited enrollment.

Prerequisite: history of art majors. Grads should enroll in 600. I. Dadi.

Works of art have always engendered political, social, and cultural meanings. This seminar introduces the methods that art historians have engaged in, studying the objects and ideas that constitute the historiography of their discipline. Challenged and enlarged by cultural debates over issues of class, ethnicity, nationality, sexual orientation, and gender, the field of art history is expanding to incorporate problems of assessing quality of intention and reception along with authorship, of artistic production in place of artistic creation, and of Western-oriented attitudes to race in reference to orientalism and colonialism. Readings focus on historically situating methods and the implications of their cross-cultural application. Papers encourage students to put methods into practice, realizing in the process that subject matter is not an isolated choice to which methods are applied, but something that profoundly affects the approach the researcher brings to the writing of art history. In addition to the seminar meeting from 2:30 to 4:30, students are required to attend the Visual Culture Colloquium held on most Mondays from 5:00 to 6:30 P.M.

**ART H 401(4991) Independent Study**

Fall or spring. 2-4 credits; may be repeated for credit. Prerequisite: permission of department faculty member.

Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

**ART H 402(4992) Independent Study**

Fall or spring. 2-4 credits; may be repeated for credit. Prerequisite: permission of department faculty member.

Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

**ART H 407(4107) The Museum and the Object (also VISST 407[4607]) (CA)**

Fall. 4 credits. Prerequisite: history of art majors; freshmen and sophomores by permission of instructor. All classes meet in Johnson Art Museum study gallery.  
K. McGowan.

Gives advanced students the opportunity to work directly with original objects from the collection in the Herbert F. Johnson Museum. Focuses on art and connoisseurship by questioning the ways quality is determined in works of art. Topics include methods of attribution, fakes and forgeries, technique and media, restoration and conservation, art education and theories of perception. Session leaders include the curatorial staff of the art museum.

**ART H 408(4508) Exhibiting Cultures: Museums, Monuments, Representation and Display (also ART H 608[6508], AS&RC 408/608[4504/6508], AM ST 408/608[4508/6508])**

Fall. 4 credits. Grads should enroll in 608.  
C. Finley.

This seminar explores the ways in which our contemporary understanding of art, history, and culture is constructed and informed by public display in museums, galleries, and the broader cultural landscape. Using a series of case studies, we consider issues of representation and display and the wider social context in which art and culture are presented. Topics include the 'blockbuster' exhibition, cultural heritage museums, the effect of globalization on the museum industry, recent developments in the monument making and the UNESCO Slave Routes Project. Our specific focus will be on African, African American and African diaspora art and visual culture.

**[ART H 410(4310) Methods in Medieval # (CA)]**

4 credits. Next offered 2009-2010.  
C. Robinson.]

**[ART H 411(4311) The Multicultural Alhambra (also SPANL 411[4110])**

4 credits. Next offered 2007-2008.  
C. Robinson.]

**[ART H 412(4312) The Late Medieval Art of Devotion # (HA)]**

4 credits. Next offered 2008-2009.  
C. Robinson.]

**[ART H 413(4113) Race, Technology and Visuality (also AAS 413[4130], AM ST 412[4113]) (CA)]**

4 credits. Next offered 2007-2008. T. Tu.]

**ART H 414(4114) Popular Culture and Visual Practice in Asian America (also AAS 414[4140], AM ST 414[4114]) (CA)**

Spring. 4 credits. T. Tu.

Through a variety case studies, this course examines the forms and practices of Asian American popular culture (including music, film, video, print and visual, decorative, and performance arts) within the historical, social, and economic contexts that have shaped their production. Asks the following questions: What is the relationship of these popular forms to the histories of Asian American community arts? How have Asian Americans' engagements with "the popular" altered "traditional" modes of visual representation, artistic production, and cultural exchange? In this course we also consider how the circulation of Asian popular culture in the United States (from anime to Bollywood and beyond) has informed the styles, fashions, and visual vocabularies of contemporary Asian American culture.

**ART H 417(4917) Modern Art and Popular Culture (also S HUM 416, VISST 417[4170])**

Fall. 4 credits. Limited to 15 students.  
S. Evans.

This course will examine a range of art-historical approaches to the relationship between modern art and popular culture from the 19th century to now. While we will read pertinent critiques by Benjamin, Greenberg, and others of mass culture, we will also investigate the elitist interface as the site at which the social dimension of art production and reception is made manifest. In pursuit of methods more sensitive to the common culture, we will revisit the myth of bohemia via the model of the artist subculture and investigate the social and sociable dimensions of avant-garde projects. We will study Manet, Toulouse-Lautrec, Picasso, Rodchenko, Johns, Fluxus, the Exploding Plastic Inevitable, Collaborative Projects, Sherman, Tiravanija and Bradley.

**ART H 421(4021) Undergraduate Seminar in Cultural History (also HIST/AM ST 421[4120])**

Fall. 4 credits. M. Kammen.

Topic for fall 2006: Tocqueville's Democracy in America. This seminar will undertake a close reading of the most astute and influential inquiry ever made concerning politics and society in the U.S., Alexis de Tocqueville's Democracy in America (2 vols. 1835-40). In addition, we will read Tocqueville's correspondence concerning the U.S.; some major secondary sources about Tocqueville and his companion Beaumont; two works by "moderns" who have done the "Tocqueville thing" (1982 and 2005); and assess the uses and abuses of Tocqueville's insights in recent American political discourse. How prophetic was this French political philosopher?

**[ART H 422(4322) The Late Medieval Devotional Image in Iberia (also NES 422[4722], SPANL 422[4220]) # (CA)]**

4 credits. Next offered 2010-2011.  
C. Robinson.]

**ART H 444(4144) Responsive Environments (also ART H 644[6144]) (CA)**

Fall. 4 credits. M. Fernandez.

This seminar will examine notions of interactivity, immersion, and responsiveness in works of art and architecture from the 1950's to present. Select historically significant works in traditional media, telematics, machine sculpture, interactive and digital installation will be explored as well as more recent genres of artistic practice including interactive cinema, locative media and video games. Theorizations of interactivity, addressing narrativity, performativity, embodiment, 'liveness' and the sensual and affective engagement of the user with the work will be discussed, as will the relation of art and surveillance, and the relation of 'high art' interactivity with popular techno-cultural forms. The relevance of these topics to architecture will be a recurrent theme.

**[ART H 448(4440) Constructing the Self in the 16th Century # (HA)]**

Spring. 4 credits. Next offered 2007-2008.  
C. Lazzaro.]

**ART H 450(4450) Women in Italian Renaissance Art (also FGSS 451[4510]) # (HA)**

Spring. 4 credits. Prerequisite: permission of instructor required. Not open to freshmen or sophomores. C. Lazzaro.

This seminar examines representations of women in Renaissance Italy, including upper class wives, courtesans, religious, biblical, and historical figures, and also women artists. It investigates contemporary ideas about motherhood, beauty, sexuality, creativity, gender roles, and violence to women, and is particularly concerned with how visual images are encoded with meaning.

**[ART H 451(4451) Prints and Visual Culture in Early Modern Europe # (HA)]**

Fall. 4 credits. Next offered 2007–2008. C. Lazzaro.]

**ART H 461(4761) Art and Social Histories (also AM ST 463[4761]) (CA)**

Fall and spring. 4 credits. Prerequisite: permission of instructor. Auditing not permitted. L. Meixner.

Topic for fall 2006: The Long 19th Century. This seminar focuses on current scholarship in the long 19th century—1789–1914—that combines the methods of art history and visual culture. We will take a comparative approach to issues explored through gender, race, and class in England, Europe, and the U.S. Framed by the French Revolution and World War I, these include print culture and public laughter, the body and Empire, genre painting and bourgeois audiences, landscape and violence, World's Fairs, spectacle and popular entertainments, and Cubism, science, and anarchy. Topic for spring 2007: American Art and the Machine Age. Seminar examining early modernism in America, between World Wars I and II, with a particular emphasis on the machine and mechanical reproduction. Defines "machine" in the broadest sense to mean the artist, the city, the camera and its consumer by-products including pictorial monthlies such as *Life*, advertisements, comics, and popular entertainments such as vaudeville. Also considers film, with views toward urban surveillance and the mechanized laboring body. Themes include images of women as they shifted from flapper to New Woman, and the emergence of artists representing the Left in painting and theatre. Key artists include the Urban Realists, political cartoonists at *The Masses*, Stieglitz, Steichen, Riis, Hine, the Precisionists, FSA photographers, Evans, and Lange. Considers these alongside the films of Chaplin, Hitchcock, and Capra.

**ART H 464(4600) Studies in Modern Art (LA)**

Fall and spring. 4 credits. Prerequisite: permission of instructor. No auditors. J. E. Bernstock.

Topic for fall 2006: The Self Image in Modern Art. This seminar focuses on self-imaging and self-imagining in art since the early 19th century. Issues such as personal and cultural identity, the gaze, the other, interior/exterior, and autobiography will be considered in relation to the works of various artists.

Topic for spring 2007: TBD.

**[ART H 466(4610) Women Artists (also FGSS 404[4040]) (LA)]**

Fall. 4 credits. Next offered 2007–2008. J. E. Bernstock.]

**ART H 479(4979) Advanced Seminar in American Literature: Visual Culture in Women's Literature (also ENGL 479[4790], VISST 480[4800], FGSS 479[4790])**

Fall. 4 credits. S. Samuels.

This course will explore a concern shared by contemporary women writers and artists. In their works, bodily visibility raises questions about sexuality, race, and mother-daughter relations. They also use fiction and visual culture to show ingestion and forced incorporation. For example, many works emphasize scenes of eating and, contrarily, refusing to eat. Texts may include novels by Dorothy Allison, Tsitsi Dangarembga, Edwidge Danticat, Oonya Kempadoo, Jamaica Kincaid, Maxine Hong Kingston, Toni Morrison, Marilynne Robinson, and Leslie Marmon Silko. Artists examined may include Renee Cox, Mary Kelly, Shirin Neshat, Jolene Rickard, Cindy Sherman, Sally Mann, Bernie Searle, and Kara Walker. Course requirements: Two class presentations, three essays.

**ART H 481(4811) Art of the Tang Dynasty (618 to 907) @ # (LA)**

Spring. 4 credits. Prerequisite: ART H 383 or course in Chinese history or literature and permission of instructor. A. Pan.

This seminar explores art and culture of the Tang dynasty, China's "golden age," by focusing on new discoveries and museum objects representing court, secular, and Buddhist art. We examine how imperial taste, patronage, and aesthetics influenced painting, calligraphy, gold and silver wares, ceramics, and important architectural and cave-temple sites.

**[ART H 482(4840) The Era of Contention: Contemporary Taiwanese Art Since 1987 @ (HA)]**

4 credits. Prerequisite: history of art majors; freshmen or sophomores by permission of instructor. Next offered? A. Pan.]

**ART H 483(4813) Arts of the Song Dynasty @ # (LA)**

Fall. 4 credits. Prerequisite: permission of instructor. A. Pan.

Topic for fall 2006: Tea Ceremony and its diaspora. This seminar focuses on the cultural phenomena of tea cultures in East Asia, namely China, Korea, and Japan. Social, economic, and aesthetic concerns pertaining to tea cultures will be addressed in our weekly discussion.

**ART H 491(4690) Comparative Modernities (also ART H 691[6910]) @ (CA)**

Spring. 4 credits. I. Dadi.

Since the late 19th century, the effects of capitalism across the globe have been profoundly transformative, and have continued to intensify with the demise of the older colonial empires, the rise of national independent states, and the onset of neoliberal globalization. This transformation is manifested in the constitution of the visible in the domains of high art, mass culture, and popular culture, yet remains inadequately theorized and studied in a comparative context. The recent rise of globalization studies, and the visibility of immigrant cultural practices within the West itself has resulted in the focusing of a near exclusive attention upon contemporary artists working today both in the West and the non-West, and upon historical studies of earlier decades in cases of immigrant and diaspora artists working

in the West. However, the question of visual modernity in the non-West before around 1990—barring a few privileged moments and sites—is largely ignored in art historical scholarship, or studied in geographical isolation. This course will introduce students to the study of non-Western modernist and postmodernist art practice in a comparative framework, by locating them in the context of postcolonial theoretical and methodological approaches. The course is designed as a seminar, and assumes active participation by advanced undergraduate and graduate students who have a prior knowledge of Euro-American modernism and art history, and who wish to better understand the great artistic transformations in the 20th century in a global context.

**ART H 497(4997) Honors Research**

Fall or spring. 2 credits. Staff.

The prospective honors student does rigorous independent readings supervised by a selected thesis advisor. By the end of the semester, an annotated bibliography and detailed outline of the thesis should be completed.

**ART H 498(4998) Honors Work I**

Fall or spring. 4 credits. Intended for senior art history majors who have been admitted to the honors program.

Basic methods of art historical research are discussed and individual readings assigned, leading to selection of an appropriate thesis topic.

**ART H 499(4999) Honors Work II**

Fall or spring. 4 credits. Prerequisite: ART H 498.

The student under faculty direction prepares a senior thesis.

**[ART H 506(5505) Contemporary African Diaspora Art (also AS&RC 506[6500])]**

Spring. 4 credits. Next offered 2007–2008. C. Finley.]

**ART H 540(5440) Nature, Cultural Landscape, and Gardens in Early Modern Europe**

Fall. 4 credits. Prerequisite: permission of instructor. C. Lazzaro.

This seminar examines cultural understandings of nature in early modern Europe, especially Italy. It considers concepts of nature, as well as "second nature," "cultural landscape," and "pastoral." The cultural significance of plants, animals, and collections of natural objects is considered, as well as the role of gardens and alteration to the land in the formation of national identity. The focus is on Italian gardens of the 16th and 17th centuries and some French gardens, especially the Versailles of King Louis XIV.

**ART H 571(5571) African Aesthetics**

Fall. 4 credits. S. Hassan.

This course offers an overview of African cinema and filmmaking. It surveys historically the evolution of African cinema from its early days to the present. Through screening of selected African films, different trends within African cinema will be explored, such as "Return to the Sources" and the rediscovery of the pre-colonial past; the "Social Realist" narrative and critique of post-independence Africa; reconstructing the story of colonialism from the perspective of the colonized; and the entertainment genre. Techniques, style, and aesthetics of African cinema will also be discussed. The course offers a unique opportunity of looking at African culture and



society, and it issues of social change, gender, class, tradition, and modernization through African eyes.

**ART H 575(5075) Digital Bodies, Virtual Identities (also COM L 692, ENGL 696, THETR 637)**

Fall. 4 credits. T. Murray.

**ART H 580(5850) Dancing the Stone: Body, Memory, and Architecture (also THETR 580[5800])**

Spring. 4 credits. Prerequisite: permission of instructor. K. McGowan.

**[ART H 585(5855) Threads of Consequence: Textiles in South and Southeast Asia**

Spring. 4 credits. Next offered 2007-2008. K. McGowan.]

**ART H 591-592(5991-5992) Supervised Reading**

591, fall; 592, spring. 4 credits; may be repeated for credit. Prerequisite: graduate standing.

**ART H 593-594(5993-5994) Supervised Study**

593, fall; 594, spring. 4 credit; may be repeated for credit. Prerequisite: graduate standing.

**ART H 600(6100) Proseminar (also ART H 400[4100], VISS 400[4200])**

Fall. 4 credits. Limited enrollment. Undergraduates should enroll in 400. I. Dadi.

Works of art have always engendered political, social, and cultural meanings. This seminar presents an introduction to the methods which art historians have engaged in, studying the objects and ideas that constitute the historiography of their discipline. Challenged and enlarged by cultural debates over issues of class, ethnicity, nationality, sexual orientation, and gender, the field of art history is expanding to incorporate problems of assessing quality of intention and reception along with authorship, of artistic production in place of artistic creation, and of Western-oriented attitudes to race in reference to orientalism and colonialism. Readings will focus on historically situating methods and the implications of their cross-cultural application. Papers will encourage students to put methods into practice, realizing in the process that subject matter is not an isolated choice to which methods are applied, but something which profoundly affects the approach which the researcher brings to the writing of art history.

**ART H 608(6508) Exhibiting Cultures: Museums, Monuments, Representation and Display (also ART H 408[4508], AS&RC 408/608[4504/6508], AM ST 408/608[4508/6508])**

Fall. 4 credits. Undergraduates should enroll in 408. C. Finley.

This seminar explores the ways in which our contemporary understanding of art, history, and culture is constructed and informed by public display in museums, galleries, and the broader cultural landscape. Using a series of case studies, we consider issues of representation and display and the wider social context in which art and culture are presented. Topics include the 'blockbuster' exhibition, cultural heritage museums, the effect of globalization on the museum industry, recent developments in the monument making and the UNESCO Slave Routes Project. Our specific focus will

be on African, African American and African diaspora art and visual culture.

**ART H 644(6144) Responsive Environments (also ART H 444[4144])**

Fall. 4 credits. M. Fernandez.

This seminar will examine notions of interactivity, immersion, and responsiveness in works of art and architecture from the 1950's to present. Select historically significant works in traditional media, telematics, machine sculpture, interactive and digital installation will be explored as well as more recent genres of artistic practice including interactive cinema, locative media and video games. Theorizations of interactivity, addressing narrativity, performativity, embodiment, 'liveliness' and the sensual and affective engagement of the user with the work will be discussed, as will the relation of art and surveillance, and the relation of 'high art' interactivity with popular techno-cultural forms. The relevance of these topics to architecture will be a recurrent theme.

**ART H 674(6104) Cyberfeminism (also FGSS 674[6740])**

Spring. 4 credits. M. Fernandez.

In this seminar students will investigate the emergence of cyberfeminism in art and theory in the context of feminism/post feminism and the accelerated technological developments of the last thirty years of the 20th century. The course will focus on texts by Donna Haraway, Luce Irigaray, Sadie Plant, Allucquere Rosanne Stone, Elizabeth Grosz and Rosie Braidotti as well as on the work of relevant women artists.

**ART H 691(6690) Comparative Modernities (also ART H 491[4690])**

Spring. 4 credits. I. Dadi.

For description, see ART H 491.

## HUMAN BIOLOGY PROGRAM

J. Haas, nutritional sciences, director (220 Savage Hall, 255-2665); A. Clark (molecular biology and genetics); P. Cassano (nutritional sciences); B. Finlay (psychology); J. Fortune (physiology/women's studies); E. Frongillo (nutritional sciences); R. Johnston (psychology); K. A. R. Kennedy (ecology and systematics/anthropology); D. Levitsky (nutritional sciences); D. L. Pelletier (nutritional sciences); W. Provine (ecology and systematics/history); S. Robertson (human development); R. Savin-Williams (human development); M. Small (anthropology)

Human biology integrates the methods and theories of many disciplines, such as biological anthropology, nutrition, neurobiology, physiology, psychology, demography, ecology, genetics, and paleontology into a comprehensive study of biological diversity in *Homo sapiens*. A central focus of this interdisciplinary approach to the study of the human organism is an understanding of evolutionary processes that explain our biological variation through space and time. The curriculum of study seeks to educate future biological scientists to address the concerns of a society that is becoming more demanding of the scientific community to place its specialized biological knowledge in a broad context. The human biology curriculum is of particular relevance to undergraduate students in premedical and predentistry programs, biological anthropology, nutrition, human development, ecology and evolutionary biology, psychology,

physiology, genetics, and the health-related sciences. It serves to bring together students who have a common interest in humankind as defined from these diverse fields and to provide a forum for student-faculty interaction on various topics relating to human evolution and biological diversity. Human biology is not a major but a curriculum of study that provides majors in various departments and colleges with a program for selecting elective courses that deal with the biology of the human species. Students after their freshman year may develop a program of study in human biology while majoring in any one of a number of different departmental fields.

## Basic Requirements

The requirements for a program of study in human biology are designed to ensure sufficient background in physical sciences and mathematics to enable the student to pursue a wide range of interests in the fields of modern biological sciences, anthropology, and fields related to the evolution and biological diversity of the human species. Adjustments may be made in these requirements, depending on the student's academic background and affiliation with colleges and schools within the university.

The basic requirements are one year of introductory biology (BIO G 101-103 plus 102-104 or 105-106 or BIO G 107-108 offered during the eight-week Cornell Summer Session); one year of general chemistry (CHEM 207-208 or 215-216); one year of college mathematics (MATH 111-112 or 105-106 or 111-105); one course in genetics (BIO G 280, 281, or 282); one course in biochemistry (BIO G 330, 331, 332, or 333 or NS 320). It is recommended that students planning graduate study in biological anthropology, psychology, and related fields in the medical and nutritional sciences take a course in statistics. Students should consult their faculty advisor in human biology for help in selecting appropriate courses.

Elective courses should be taken that enable the student to acquire breadth in the subject matter of human biology outside of their departmental major. Therefore only 6 of the 15 human biology elective credits may also fulfill requirements for the major. Courses should be selected that also provide sufficient exposure to the integration of basic anatomical and physiological sciences with the behavior of individuals and groups within the context of evolutionary theory and ecology. The courses listed below are representative of the offerings in human biology and are included to assist the student in organizing a curriculum of study. They are organized into three groups that reflect the three levels of integration noted above: (1) human anatomy and physiology, (2) human behavior, and (3) human evolution and ecology. Students should choose at least one course from each of these areas of integration. It is anticipated that the student will include in a program of study at least one of the laboratory courses offered. It is expected that a student will take a minimum of 15 credits from among these courses.

There is no foreign language requirement for human biology beyond what is dictated by specific departments and colleges. The requirements for the human biology curriculum are set alongside requirements of the undergraduate majors as these are defined by different departments. Students with independent majors may design their



own programs of study under the guidelines provided by their college. Although a student may indicate an interest in human biology in the freshman year and be able to obtain early guidance from a faculty advisor representing the curriculum of study, it is more usual for students to establish their course programs in the first semester of the junior year. The student may request one of the faculty advisors in his or her department who is listed as faculty in human biology to be their principal advisor, or he or she may have an advisor in the department of the major and seek the advice of a human biology faculty advisor in matters pertaining to satisfaction of the requirements. In certain cases a faculty advisor may represent both the major and the curriculum of study in human biology.

## Courses

### Human Anatomy and Physiology

**AN SC 410(4100) Nutritional Physiology and Metabolism**  
Fall. 3 credits.

**BIOAP 214(2140) Biological Basis of Sex Differences (also B&SOC 214[2141], FGSS 214[2140])**  
Spring. 3 credits.

**BIOAP 311(3110) Introductory Animal Physiology, Lectures (also VETPH 346[3460])**  
Fall. 3 credits.

**BIOAP 319(3190) Animal Physiology Experimentation**  
Fall. 4 credits.

**BIOAP 427(4270) Fundamentals of Endocrinology**  
Fall. 3 credits.

**BIOAP 458(4580) Mammalian Physiology**  
Spring. 3 credits.

**BIOBM 434(4340) Applications of Molecular Biology to Medicine, Agriculture, and Industry**  
Fall. 3 credits.

**BIOBM 439(4390) Molecular Basis of Human Disease (also BIOGD 439[4390])**  
Fall. 3 credits.

**BIOEE 274(2740) The Vertebrates: Structure, Function, and Evolution**  
Spring. 4 credits.

**BIOGD 487(4870) Human Genomics**  
Fall. 3 credits.

**BIOMI 417(4170) Medical Parasitology (also VETMI 431[4310])**  
Fall. 2 credits.

**NS 115(1150) Nutrition, Health, and Society**  
Fall. 3 credits.

**NS 222(2220) Maternal and Child Nutrition**  
Fall. 3 credits.

**NS 315(3150) Obesity and the Regulation of Body Weight (also PSYCH 613[3150])**  
Spring. 3 credits.

**NS 331(3310) Physiological and Biochemical Bases of Human Nutrition**  
Spring. 4 credits.

**NS 341(3410) Human Anatomy and Physiology**  
Spring. 4 credits.

**NS 361(3610) Biology of Normal and Abnormal Behavior (also PSYCH 361[3610])**  
Fall. 3 credits.

**NS 421(4210) Nutrition and Exercise**  
Spring. 3 credits.

**NS 431(4310) Mineral Nutrition and Chronic Disease**  
Fall. 3 credits.

**NS 441(4410) Nutrition and Disease**  
Fall. 4 credits.

**NS 475(4750) Mechanisms Underlying Mammalian Developmental Defects (also BIOAP 475[4750])**  
Spring. 3 credits.

**NS 614(6140) Topics in Maternal and Child Nutrition**  
Fall. 3 credits.

**PSYCH 322(3220) Hormones and Behavior (also BIONB 322[3220])**  
Fall. 3 or 4 credits.

**PSYCH 425(4250) Cognitive Neuroscience**  
Fall. 4 credits.

**PSYCH 460(4600) Human Neuroanatomy**  
Spring. 3 credits.

### Human Behavior

**ANTHR 208(3308) Anthropology of Human Mating (also BIONB 208[2080])**  
Spring. 3 credits.

**ANTHR 390(3390) Primate Behavior and Ecology**  
Spring. 4 credits.

**ANTHR 490(4930) Topics in Biological Anthropology**  
Spring. 4 credits.

**BIONB 327(3270) Evolutionary Perspectives on Human Behavior**  
Fall. 3 credits.

**BIONB 331(3310) Human Sociobiology**  
Spring. 3 credits.

**BIONB 392(3920) Drugs and the Brain**  
Fall. 4 credits.

**BIONB 421(4210) Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431/631[4310/6310])**  
Fall. 3 or 4 credits.

**BIONB 422(4220) Modeling Behavioral Evolution**  
Spring. 4 credits.

**BIONB 424(4240) Neuroethology (also PSYCH 424[4240])**  
Spring. 3 credits.

**BIONB 427(4270) Animal Social Behavior**  
Fall. 4 credits.

**BIONB 428(4280) Clinical Neurobiology**  
Fall. 3 credits.

**BIONB 431(4310) Genes and Behavior**  
Spring. 3 credits.

**BIONB 496(4960) Bioacoustic Signals in Animals and Man**  
Fall. 3 credits.

**BIOPL 247(2470) Ethnobiology**  
Fall. 3 credits.

**BIOPL 348(3480) The Healing Forest**  
Spring. 2 credits.

**BIOPL 442(4420) Current Topics in Ethnobiology**  
Fall. 3 credits.

**DEA 325(3250) Human Factors: Ergonomics—Anthropometrics**  
Fall. 3 credits.

**DEA 350(3500) Human Factors: The Ambient Environment**  
Spring. 3 credits.

**HD 220(2200) The Human Brain and Mind: Biological Issues in Human Development (also COGST 220[2200])**  
Fall. 3 credits.

**HD 266(2660) Emotional Functions of the Brain**  
Spring. 3 credits.

**HD 320(3200) Human Developmental Neuropsychology**  
Spring. 3 credits.

**HD 344(3440) Infant Behavior and Development**  
Fall. 3 credits.

**HD 366(3660) Psychobiology of Temperament and Personality**  
Fall. 3 credits.

**HD 433(4330) Developmental Cognitive Neurosciences (also COGST 433[4330])**  
Spring. 3 credits.

**NS 245(2450) Social Science Perspectives on Food and Nutrition**  
Fall. 3 credits.

**NS 347(3470) Human Growth and Development: Biological and Behavioral Interactions (also HD/B&SOC 347[3470])**  
Spring. 3 credits.

**NS 361(3610) Biopsychology of Normal and Abnormal Behavior (also PSYCH 361[3610])**  
Fall. 3 credits.

**PAM 380(3800) Human Sexuality**  
Spring. 4 credits.

**PSYCH 223(2230) Introduction to Biopsychology**  
Fall. 3 credits.

**PSYCH 332(3320) Biopsychology of Learning and Memory (also BIONB 328[3280])**  
Spring. 3 credits.

**PSYCH 326(3260) Evolution of Human Behavior**  
Spring. 4 credits.

**PSYCH 422(4220) Developmental Biopsychology**  
Fall. 4 credits.

**PSYCH 425(4250) Cognitive Neuroscience (also BIONB 423[4230])**  
Fall. 4 credits.

**PSYCH 427(4270) Evolution of Language (also COGST 427[4270])**  
Fall. 3 credits.

**PSYCH 440(4400) The Brain and Sleep**  
Fall. 4 credits.

## Human Evolution and Ecology

**ANTHR 101(1300) Introduction to Anthropology: Biological Perspectives on the Evolution of Humankind**

Fall. 3 credits.

**ANTHR 203(2200) Early People: The Archaeological and Fossil Record (also ARKEO 203[2200])**

Spring. 3 credits.

**ANTHR 375(3375) Evolutionary Theory and Human Behavior**

Spring. 4 credits.

**ANTHR 390(3390) Primate Behavior and Ecology**

Spring. 4 credits.

**ANTHR 490(4390) Topics in Biological Anthropology**

Spring. 4 credits.

**BIOEE 261(2610) Ecology and the Environment**

Fall or summer. 4 credits.

**BIOEE 275(2750) Human Biology and Evolution (also NS 275[2750])**

Fall. 3 credits.

**BIOEE 278(2780) Evolutionary Biology**

Fall or spring. 3 or 4 credits.

**BIOEE 371(3710) Human Paleontology**

Fall. 4 credits.

**BIOEE 464(4640) Macroevolution**

Spring. 4 credits.

**BIOEE 469(4690) Food, Agriculture, and Society**

Spring. 3 credits.

**BIOEE 671(6710) Paleoanthropology of South Asia (also ANTHR 671[6671], ASIAN 671[6731])**

**BIOEE 673(6730) Human Evolution: Concepts, History, and Theory (also ANTHR 673[6373])**

Spring. 3 credits.

**BIOGD 481(4810) Population Genetics**

Fall. 4 credits.

**BIOGD 482(4820) Human Genetics and Society**

Fall. 4 credits.

**BIOGD 484(4840) Molecular Evolution**

Spring. 3 credits.

**BIOGD 487(4870) Human Genomics**

Fall. 3 credits.

**B&SOC 447(4471) Seminar in the History of Biology (also HIST 415[4150], S&TS 447[4471])**

Summer. 4 credits.

**D SOC 201(2010) Population Dynamics (also SOC 202[2202])**

Spring. 3 credits.

**D SOC 410(4100) Health and Survival Inequalities (also SOC 410[4100])**

Fall. 4 credits.

**NS 306(3060) Nutritional Problems of Developing Nations**

Spring. 3 credits.

**NS 450(4500) Public Health Nutrition**

Spring. 3 credits.

**NS 451(4510) Epidemiology and Health of Human Communities**

Fall. 3 credits.

**NS 452(4520) Molecular Epidemiology and Dietary Markers of Chronic Disease**

Spring. 3 credits.

**NS 457(4570) Economics of Hunger and Malnutrition (also ECON 474[4740])**

Spring. 3 credits.

**PAM 303(3030) Ecology and Epidemiology of Health**

Fall. 3 credits.

**PSYCH 326(3260) Evolution of Human Behavior**

Spring. 4 credits.

**PSYCH 427(4720) Evolution of Language (also COGST 427[4270])**

Fall. 3 credits.

**VETMI 431(4310) Medical Parasitology (also BIOMI 417[4170])**

Fall. 2 credits.

**VTPMD 664(6640) Introduction to Epidemiology**

Fall. 3 credits.

## HUNGARIAN

See "Department of Linguistics" and "Russian."

## INDEPENDENT MAJOR PROGRAM

J. Finlay, director, 55 Goldwin Smith Hall, 255-5004.

The Independent Major Program is described in the introductory section of "College of Arts and Sciences."

**IM 351(3510) Independent Study**

Fall or spring. 1-4 credits. Prerequisite: permission of program director.

**IM 499(4990) Honors Research**

Fall or spring. 1-8 credits; max. of 8 credits may be earned for honors research. Prerequisite: permission of program director. Each participant must submit brief proposal approved by Honors Committee.

## INDONESIAN

See "Department of Asian Studies."

## INEQUALITY CONCENTRATION

363 Uris Hall  
www.inequality.cornell.edu  
254-8674

The study of inequality lies at the heart of current debates about welfare reform, affirmative action, the "glass ceiling," globalization, and any number of other contemporary policy issues. In recent years, public and scholarly interest in issues of inequality has intensified, not merely because of historic increases in income inequality in the United States and other advanced industrial countries, but also because inequalities of race, ethnicity, and gender are

evolving in equally dramatic and complicated ways.

The inequality concentration allows undergraduate students to supplement their studies for their major with a coherent program of courses oriented toward the study of inequality. Although Cornell University is a leading center of scholarship on poverty and inequality, this strength is necessarily distributed across many departments and colleges; an interdisciplinary concentration thus allows students to combine these resources into an integrated program of study. The institutional home for the inequality concentration is the Center for the Study of Inequality (located at 363 Uris Hall and at [www.inequality.cornell.edu](http://www.inequality.cornell.edu)).

The inequality concentration is appropriate for students interested in government service, policy work, and related jobs in non-governmental organizations (NGOs) as well as students who wish to pursue post-graduate education in such fields as public policy, economics, government, law, history, psychology, sociology, anthropology, literature, and philosophy. In many of these fields, the study of inequality is becoming increasingly central and fundamental, and the inequality concentration can therefore provide students with a valuable and unique foundation for further study.

The inequality concentration is not a major but rather is an interdisciplinary program that should be completed in conjunction with a major. The concentration is open to students enrolled in any of the seven Cornell undergraduate colleges. If the requirements of the concentration are met, a special notation to this effect will be recorded on the transcript.

## Concentration Requirements

The inequality concentration exposes students to the breadth of approaches, methods, and topic areas on offer while also allowing them to tailor a program to their particular interests. The requirements are as follows:

### 1. Overview Course

The required overview course may be selected from any of the eight courses listed below. When possible, the overview course should be completed early in the program, as it serves to define the field and to expose students to areas and topics that might be explored in future course work.

- Income Distribution (ILRLE 441)
- Inequality, Diversity, and Justice (PHIL 193, CRP/GOVT/SOC 293)
- Power and Poverty in America (GOVT 310)
- Social Inequality (SOC 208 and D SOC 209)
- Comparative Social Stratification (D SOC 370 and SOC 371)
- Social Inequality: Contemporary Theories, Debates, and Models (SOC 518)
- Introduction to Social Inequality (SOC 108)
- Inequality and Social Science (SOC 221)

### 2. Controversies About Inequality

(PHIL 195, SOC/PAM/ILROB/D SOC/GOVT 222)

This 3-credit course introduces students to current controversies in the study of inequality while facilitating interdisciplinary dialogue between concentrators and faculty members at Cornell University. Students are exposed to research on inequality under way at Cornell presented by guest lecturers and also participate in debates on pressing inequality-relevant issues (e.g., welfare reform, school vouchers, immigration policy, affirmative action).

### 3. Electives

In addition to the overview course and core course, students must select four electives from the list of qualified courses. This list can be viewed on the web site for the Center for the Study of Inequality, [www.inequality.cornell.edu](http://www.inequality.cornell.edu). Although students may tailor their programs to match their interests, the electives and overview course must be distributed across at least three departments (thereby ensuring breadth in the analytic approaches that are represented).

### 4. Lectures and Seminars

The Center for the Study of Inequality (CSI) hosts occasional lectures and symposia, and concentrators are expected to attend them when possible. These events will be announced via e-mail and are also listed on the center web site, [www.inequality.cornell.edu](http://www.inequality.cornell.edu).

### Enrolling in the Concentration

The web site for the Center for the Study of Inequality, [www.inequality.cornell.edu](http://www.inequality.cornell.edu), provides current information on the Inequality Concentration. For students considering the concentration, it may be useful to schedule a meeting with the assistant to the director ([inequality@cornell.edu](mailto:inequality@cornell.edu)).

### Sample Programs

The inequality concentration allows students considerable flexibility in devising programs that reflect their interests. As examples of possible programs, we have listed below sample tracks, each comprising a different set of possible electives. The first program listed below is a general track that provides an overview of the field, while the remaining nine programs are more specialized and focus on particular issues within the field. This sampling of programs is obviously illustrative and does not cover the entire wide range of interests that may be addressed within the concentration.

#### General Track

The objective of the general track is to provide a broad foundation that addresses both the many forms of inequality (e.g., class, gender, ethnic) as well as the various approaches and perspectives (e.g., economic, sociological, historical) that have been brought to bear on these forms. The sample schedule outlined below is just one of many possible programs that meets this generalist objective.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ECON/ILRLE/GOVT 222)
3. *Possible Electives:*  
Economics of Hunger and Malnutrition (ECON 474, NS 457)

Race, Power, and Privilege in the United States (AS&RC 280)

Gender Inequality (SOC 316)

Social Welfare as a Social Institution (PAM 383)

#### Globalization and Inequality

As a global economy takes hold, there has been increasing concern that economic inequalities will grow apace, especially North-South inequalities between rich and poor countries. The countervailing "optimistic view" is that between-country disparities will in the long run wither away and render inequality an entirely internal, within-country affair. These and related lines of argumentation can be explored in courses that address such topics as trends in income inequality, theories of economic development, emerging patterns of international migration, and globalization and gender.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ECON/ILRLE/GOVT 222)
3. *Possible Electives (choose any four):*  
International Development (D SOC 205, SOC 206)  
Economic Development (ECON 371)  
Labor Markets and Income Distribution in Developing Countries (ILRIC 635)  
Globalization and Inequality (SOC 320)  
Indigenous Peoples and Globalization (D SOC 325)  
Comparative Ethnic Stratification: Demographic Perspectives (D SOC 431/631)  
Global Perspectives on Gender (AS&RC 362)  
Sex and Gender in Cross-Cultural Perspective (ANTHR 321/621, FGSS 321/631)  
Human Migration: Internal and International (D SOC 430)  
Gender and International Development (FGSS/CRP 614)  
Politics of Transnationalism (GOVT 681)

#### Social Policy and Inequality

In the modern period, inequalities generated in the market and through other social institutions are typically regarded as excessive, and the state is seen as the main tool for redistribution, discrimination abatement, equalization of life chances, and related forms of amelioration. The social policy and inequality track explores the role of the state in generating and reducing inequalities of various kinds.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*  
Organizations and Social Inequality (SOC 322, ILROB 626)  
The Sociology of Markets (SOC 217)  
Sociology of Markets (ILROB/SOC 622)  
Economic Security (ILRLE 340, ECON 451)

Employment Discrimination and the Law (ILRCB 684)

Human Resource Economics and Public Policy (ILRHR 360)

Employee Relations and Diversity (ILRHR 463)

Social Welfare as a Social Institution (PAM 383)

Applied Public Finance (PAM 204)

Introduction to Policy Analysis (PAM 230)

Critical Perspectives (PAM 240)

Introduction to Policy Management (PAM 320)

Intermediate Policy Analysis (PAM 330)

Demography and Family Policy (PAM 371)

Social Policy (SOC 326/526)

Social Policy (PAM 473)

Social Policy and Social Welfare (CRP 448/548)

Policy Analysis: Welfare Theory, Agriculture, and Trade (ECON 430, AEM 630)

Economic Analysis of the Welfare State (ILRLE 642, ECON 460)

Families and Social Policy (HD 456)

Health and Social Behavior (HD/SOC 457)

Public Policy and the African-American Urban Community (AS&RC 420)

Seminar: Beliefs, Attitudes, and Ideologies (PSYCH 489, FGSS 488)

Feminist Jurisprudence (LAW 646)

Political Economy of Education (EDUC 378)

Research on Education Reform and Human Resource Policy (ILRHR 653)

#### The Ethics of Inequality

Charges of social injustice are often charges of excessive inequality. What are the political, philosophical, and legal debates that are relevant to such judgements? Under what conditions should rich countries assist poor ones? At what point should governments step in and redistribute income? When should parents pass on their wealth to their children? The ethics of inequality track examines the conditions under which inequalities might be deemed legitimate or illegitimate, evaluates prevailing inequalities and social policy as against this yardstick, and explores the larger role of values in popular and scholarly judgments about inequality.

1. *Overview Course: Inequality, Diversity, and Justice* (PHIL 193, SOC/CRP/GOVT 293)
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives:*

#### A. Ethics Courses (choose two)

Values in Law, Economics, and Industrial Relations (ILRCB 607)

Appropriation and Alienation (PHIL 142)

Global Thinking (PHIL 194, GOVT 294)

Modern Political Philosophy (PHIL 346, GOVT 462)

Contemporary Political Philosophy (PHIL 447, GOVT 465)

International Justice (PHIL 448, GOVT 492)

Feminism and Philosophy (PHIL/FGSS 249)

Marx (PHIL 219)

Marx: An Overview of His Thought (ANTHR 368)

### B. Social Science Classes (choose two)

Select courses in consultation with advisor (see list of electives below).

#### Poverty and Economic Development

Over the past century, rich countries have of course become yet richer, while less developed countries remain burdened with massive poverty. The courses listed below examine the sources and causes of world poverty, the rise of global anti-inequality social movements, and the types of policy interventions that might stimulate economic development and reduce poverty.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*
  - Economic Development (ECON 371)
  - Population and Development (D SOC 438, SOC 437)
  - International Justice (PHIL 448, GOVT 492)
  - Economics of Development (ECON 466, AEM 666)
  - Land Reform Old and New (D SOC 643)
  - Issues in African Development (CRP 477/677)
  - Labor Markets and Income Distribution in Developing Countries (ILRIC 635)
  - Global Perspectives on Gender (AS&RC 362)
  - Population, Environment, and Development in Sub-Saharan Africa (D SOC 495)
  - Gender and International Development (FGSS/CRP 614)
  - Politics of Transnationalism (GOVT 681)
  - Economics of Malnutrition and Hunger (NS 457, ECON 474)

#### Social Movements and Inequality

The history of modern society may be seen in large part as a history of anti-inequality social movements (e.g., the Enlightenment, socialism, the union movement, the civil rights movement, feminism) interspersed with occasional inequality-inducing reactions (e.g., the post-socialist transition). The social movements track examines the causes, effects, and likely future of such social movements and the reactions they spawn.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*
  - Utopia in Theory and Practice (SOC 115)

Social Movements (D SOC 311)

Social Movements in American Politics (GOVT/AM ST 302)

Poor People's Movements (GOVT 456)

Group Conflict and the Nation-State (SOC 531)

Social Movements (SOC/GOVT 660)

Politics of Transnationalism (GOVT 681)

Feminism Movements and the State (GOVT/FGSS 353)

Comparative Labor Movements in Latin America (ILRIC 631)

Union Organizing (ILRCB 400)

Theories of Industrial Relations Systems (ILRCB 606)

Revitalizing the Labor Movement: A Comparative Perspective (ILRIC 632)

Women and Unions (ILRCB/FGSS 384)

History of Resistance Movements in Africa and the Diaspora (AS&RC 283)

Latina Activism Feminist Theory (LSP 300)

Prisons (GOVT 314)

#### Education and the Reproduction of Inequality

In the contemporary period, the study of inequality has increasingly turned on the study of formal education, as schools have become the main institutional locus for training and credentialing workers and for signaling potential employers about (putative) worker quality. The inequality and education track examines educational institutions and how they are organized, how they generate equality and inequality, and how possible institutional changes (e.g., vouchers, required testing) might affect the reproduction of inequalities.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*
  - Introduction to Education (EDUC 101)
  - Sociology of Education (EDUC 271)
  - Education, Inequality, and Development (D SOC 305)
  - Schooling and Society (SOC 357)
  - Issues in Educational Policy (EDUC 370)
  - Political Economy of Education (EDUC 378)
  - The Politics of Education (GOVT 406)
  - Research on Education Reform and Human Resource Policy (ILRHR 653)
  - Education, Technology, and Productivity (ILRHR 695)
  - Educational Finance (EDUC 664)
  - Education in Africa and the Diaspora (AS&RC/EDUC 459)
  - Education and Development in Africa (AS&RC 502)

#### Race and Ethnicity in Comparative Perspective

This program of study examines the many forms of racial and ethnic inequality as revealed across different times and places. When race and ethnicity are examined from an explicitly comparative perspective, it

becomes possible to identify regularities and better understand the forces of competition, conflict, and subordination among ethnic and racial groups. The courses listed below address such issues as the causes of discrimination, the implications of residential segregation for inequality, the sources of ethnic and racial differences in income, the effects of anti-inequality reform efforts (e.g., affirmative action), and the possible futures of ethnic and racial stratification.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*

#### A. General Courses

- Introduction to American Studies: New Approaches to Understanding American Diversity, the 20th Century (AM ST/LSP 110)
- Race and Ethnic Relations (SOC 204)
- Race, Power, and Privilege in the United States (AS&RC 280)
- History and Politics of Racialization: A Comparative Study (AS&RC 204)
- Sociology of Health and Ethnic Minorities (LSP/D SOC 220)
- Prisons (GOVT 314)
- Minority Politics in the United States (GOVT/LSP 319)
- Concepts of Race and Racism (GOVT 377)
- Comparative Ethnic Stratification: Demographic Perspectives (D SOC 431/631)
- Race, Gender, and Organization (GOVT/FGSS 415)
- Employee Relations and Diversity (ILRHR 463)
- Ethnicity and Identity Politics: An Anthropological Perspective (ANTHR 479)
- Political Identity: Race, Ethnicity, and Nationalism (GOVT/LSP 610)

#### B. Immigration and Ethnicity

- Comparative Migration to the Americas (LSP 203, HIST 202, AM ST 204)
- Strangers and Citizens: Immigration and Labor in U.S. History (ILRCB 302)
- Immigration and Ethnic Identity (SOC/AAS 438)
- Human Migration: Internal and International (D SOC 430)
- The Immigrant City: 1900 to 2000 (LSP/S HUM/AM ST 406, HIST 412)
- Immigration and the American Labor Force (ILRHR 469)
- Immigration and Ethnicity in 20th-Century United States (HIST 201)
- Immigration and Refugee Law (LAW 731)

#### C. Case Studies

- African-American Social and Political Thought (AS&RC 231)
- African-American Women in the 20th Century (HIST/AM ST/FGSS 212)
- African-American History from Slavery to Freedom (HIST 335)

The African-American Workers, 1865 to 1910: The Rural and Urban Experience (HIST 375, ILRCB 385)

The African-American Workers, 1910 to The Present: Race, Work, and the City (HIST 376, ILRCB 386)

African-American Women in Slavery and Freedom (HIST/AM ST 303, FGSS 307)

Public Policy and the African-American Urban Community (AS&RC 420)

Politics and Social Change in Southern Africa (AS&RC 484)

Global Africa: Comparative Black Experience (AS&RC 501)

Afro-American Historiography (HIST 610)

African-American Women (HIST 608)

Latinos in the United States (SOC/D SOC 265, LSP 201)

Introduction to U.S. Latino History, Part I (LSP/HIST 260, AM ST 259)

Introduction to U.S. Latino History, Part II (LSP/HIST/AM ST 261)

Latina Activism Feminist Theory (LSP 300)

Latino Politics in the United States (LSP/GOVT 306)

Introduction to Asian American Studies (AAS 110)

Asian American History (AAS/HIST 213)

Asians in the Americas: A Comparative Perspective (AAS/ANTHR 303)

Introduction to American Indian Studies (AIS/D SOC 100)

Indian America in the 20th Century (AIS/D SOC 175)

Indians, Settlers, and Slaves in the Early South (AIS/HIST 329)

Antisemitism and the Crisis of Modernity: From the Enlightenment to the Holocaust (HIST/JWST 459)

### The Family and Inequality

Although workers in modern labor markets are often analytically treated as independent individuals, they of course typically belong to families that pool the labor supply of their members, consume goods jointly, and serve in some circumstances as units of collective production. It might therefore be asked how the modern labor market has adapted to and evolved in the context of the family (and, obversely, how the family has responded to the market). The courses within this track explore such issues as the causes and consequences of the intrafamilial division of labor, the effects of marriage and family structure on careers, and the transmission of socioeconomic advantage from one generation to the next.

1. *Overview Course (choose any one)*
2. *Controversies About Inequality* (PHIL 195, SOC/PAM/ILROB/GOVT 222)
3. *Possible Electives (choose any four):*  
Work and Family (SOC/FGSS 203)  
Demography and Family Policy (PAM 371)  
Families and Social Policy (HD 456)

Families and the Life Course (SOC 251, HD 250)

Parent-Child Development in African-American Families (HD 458)

The Sociology of Marriage (SOC/FGSS 309)

Seminar in Family Studies and the Life Course (HD 655)

Contemporary Family Theory and Research (HD 650)

Economics of Household Behavior (PAM 605)

Politics and Culture SOC 248/GOVT 363

Inequality, Diversity, and Justice SOC 293/GOVT 293/CRP 293/PHIL 193

## INFORMATION SCIENCE

C. Cardie, director; J. Abowd, W. Y. Arms G. Bailey, K. Bala, M. Barazangi, L. Blume, R. Caruana, R. Constable, D. Easley, S. Edelman, E. Friedman, G. Gay, J. Gehrke, T. Gillespie, P. Ginsparg, C. Gomes, J. Halpern, J. Hancock, A. Hedge, D. Huttenlocher, T. Joachims, J. Kleinberg, L. Lee, A. Leiponen, B. Lust, M. Macy, P. Martin, T. Pinch, R. Prentice, M. Rooth, D. Seber, B. Selman, P. Sengers, D. Shmoys, M. Spivey, D. Strang, E. Tardos, E. Wagner, J. Walther, S. Wicker, D. Williamson, C. Yuan.

### The Major

Information Science (IS) is an interdisciplinary field that explores the design and use of information systems in a social context: the field studies the creation, representation, organization, application, and analysis of information in digital form. The focus of Information Science is on systems and their use rather than on the computing and communication technologies that underlie and sustain them. Moreover, Information Science examines the social, cultural, economic, historical, legal, and political contexts in which information systems are employed, both to inform the design of such systems and to understand their impact on individuals, social groups, and institutions.

Courses in the Information Science (IS) major are assigned to three area-based tracks:

**Human-Centered Systems** This area examines the relationship between humans and information, drawing from human-computer interaction and cognitive science.

**Information Systems** This area examines the computer science problems of representing, organizing, storing, manipulating, and accessing digital information.

**Social Systems** This area studies the cultural, economic, historical, legal, political, and social contexts in which digital information is a major factor.

Students must complete a set of 11 core courses: one introductory course, four courses in mathematics and statistics, and two courses from each of the three IS area-based tracks. Students must also obtain depth in two tracks—a primary and a secondary track—that together best represent their interests. In particular, completion of the major requires four advanced courses from the selected

primary track and three advanced courses from the secondary track.

### Requirements

Core (11 courses)

1. Introductory (one course):  
INFO 130 Introductory Design and Programming for the Web
2. Math and Statistics (four courses):  
MATH 111 Calculus I  
either MATH 231 Linear Algebra with Applications or MATH 221 Linear Algebra and Differential Equations  
INFO 295 Mathematical Methods for Information Science

One of the following:

MATH 171 Statistical Theory and Application in the Real World

H ADM 201 Hospitality Quantitative Analysis

AEM 210 Introductory Statistics

PAM 210 Introduction to Statistics

ENGRD 270 Basic Engineering Probability and Statistics (or equivalent)

BTRY 301 Statistical Methods I

SOC 301 Evaluating Statistical Evidence

CEE 304 Uncertainty Analysis in Engineering

ILRST 312 Applied Regression Methods

ECON 319 Introduction to Statistics and Probability

PSYCH 350 Statistics and Research Design

3. Human-Centered Systems (two courses):

INFO 214 Cognitive Psychology

INFO 245 Psychology of Social Computing

4. Information Systems (two courses):

COM S 211 Computers and Programming

INFO 230 Intermediate Design and Programming for the Web

5. Social Systems (two courses):

either ECON 301 Microeconomics or ECON 313 Intermediate Microeconomic Theory

one of the following: INFO 292 Inventing an Information Society, INFO 355 Computers: From the 17th Century to the Dot.com Boom, or INFO 356 Computing Cultures

Where options in the core courses exist, the choice will depend on the student's interests and planned advanced courses for the selected primary and secondary tracks.

### Tracks

Students must complete four advanced courses in their primary track and three advanced courses in their secondary track, selected from those listed below. Human-Centered Systems and Information Systems can be used as primary or secondary tracks. Social Systems can be used only as a secondary track.

Courses taken to satisfy the core course requirements may not be used to fulfill the track requirements.

Additional information on Information Science courses can be found below and



in the "Computing and Information Science (CIS)" section of *Courses of Study*. Course information for all other courses in the major can be found in the relevant departments (e.g., AEM, COM S, S&TS).

#### Human-Centered Systems

PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display\*

INFO 345 Human-Computer Interaction Design

PSYCH 347 Psychology of Visual Communications

PSYCH 380 Social Cognition\*

PSYCH 413 Information Processing: Conscious and Unconscious

PSYCH 416 Modeling Perception and Cognition

INFO 440 Advanced Human-Computer Interaction Design

INFO 445 Seminar in Computer-Mediated Communication

INFO 450 Language and Technology

DEA 470 Applied Ergonomic Methods

\* Students who take PSYCH 342 may also count its prerequisite, PSYCH 205, toward the Human-Centered Systems primary or secondary track requirements. Similarly, students who take PSYCH 380 may also count PSYCH 280 toward the Human-Centered Systems primary or secondary track requirements. At most, one of PSYCH 205 or PSYCH 280 can be counted toward the primary or secondary track requirements.

#### Information Systems

INFO 330 Data-Driven Web Applications

COM S 419 Computer Networks

LING 424 Computational Linguistics

INFO 430 Information Retrieval

INFO 431 Web Information Systems

COM S 432 Introduction to Database Systems

COM S 465 Computer Graphics I

COM S 472 Foundations of Artificial Intelligence

LING 474 Introduction to Natural Language Processing

OR&IE 474 Statistical Data Mining

COM S 478 Machine Learning

OR&IE 480 Information Technology

COM S 501 Software Engineering

COM S 513 System Security

INFO 530 Architecture of Large-Scale Information Systems

OR&IE 574 Statistical Data Mining

COM S 578 Empirical Methods in Machine Learning and Data Mining

#### Social Systems

SOC 304 Social Networks and Social Processes

AEM 322 Technology, Information, and Business Strategy\*

INFO 349 Media Technologies

INFO 355 Computers: From the 17th Century to the Dot.com Boom

INFO 356 Computing Cultures

ECON 368 Game Theory (formerly ECON 467)\*

INFO 387 The Automatic Lifestyle: Consumer Culture and Technology

LAW 410 Limits on and Protection of Creative Expression—Copyright Law and Its Close Neighbors

S&TS 411 Knowledge, Technology, and Property

ECON 419 Economic Decisions under Uncertainty

INFO 429 Copyright in a Digital Age

INFO 435 Seminar on Applications of Information Science

OR&IE 435 Introduction to Game Theory\*

S&TS 438 Minds, Machines, and Intelligence

INFO 447 Social and Economic Data

H ADM 474 Strategic Information Systems\*

ECON 476/477 Decision Theory I and II

INFO 515 Culture, Law, and Politics of the Internet

\*Only one of OR&IE 435 and ECON 368 may be taken for IS credit. Only one of AEM 322 and H ADM 474 may be taken for IS credit.

#### Admission

All potential affiliates are reviewed on a case-by-case basis relative to the following criteria:

- Completion of four core courses, one in each of the core course areas listed above (i.e., Math and Statistics, Human-Centered systems, Information Systems, and Social Systems). Courses must be taken for a letter grade.
- A grade of C or better in each of the completed core courses with an overall GPA for these courses of 2.5 or more.

Courses used in the affiliation GPA computations may be repeated if the original course grade was below a C. The most recent grade will be used for all repeated courses. Qualifying courses must be taken at Cornell.

#### Honors

To qualify for departmental honors, a student must have:

- maintained a cumulative GPA greater than or equal to 3.5;
- completed INFO 435 Seminar on Applications of Information Science;
- completed 3 additional credits of IS course work at or above the 500 level (graded courses only; no seminars or 2-credit project courses; these courses are in addition to the primary and secondary track requirements);
- completed 6 credits of INFO 490 Independent Study and Research with an IS faculty member, spread over at least two semesters and with grades of A- or better. It is expected that the research pursued in INFO 490 will result in a project report.

## The Concentration

A concentration in Information Science is also available to students in the College of Arts and Sciences, CALS, AAP (Architecture and Planning students only), Engineering, Human Ecology, Hotel, and ILR. The concentration has been designed to ensure that students have substantial grounding in all three tracks: Human-Centered Systems, Information Systems, and Social Systems. Detailed information about the concentration can be found in the CIS section of *Courses of Study*. Students are also referred to [www.infosci.cornell.edu/ugrad/concentrations.html](http://www.infosci.cornell.edu/ugrad/concentrations.html) for the most up-to-date description of the concentration and its requirements.

## Courses

For complete course descriptions, see the Information Science listings under Computing and Information Science (CIS).

### INFO 130(1300) Introductory Design and Programming for the Web (also COM S 130[1300])

Fall. 3 credits.

For description, see COM S 130 in CIS section.

### INFO 172(1700) Computation, Information, and Intelligence (also COGST 172, COM S 172[1700], ENGRI 172[1700]) (MQR)

Fall. 3 credits. Prerequisites: some knowledge of differentiation; permission of instructor for students who have completed equivalent of COM S 100.

For description, see COM S 172 in CIS section.

### INFO 204(2040) Networks (also ECON 204[2040], SOC 204[2120]) (SBA)

Spring. 4 credits.

For description, see ECON 204.

### INFO 214(2140) Cognitive Psychology (also COGST 214[2140], PSYCH 214[2140]) (KCM)

Fall. 3 credits. Limited to 175 students.

Prerequisite: sophomore standing.

Graduate students, see COGST 501, INFO/PSYCH 614.

For description, see PSYCH 214.

### INFO 230(2300) Intermediate Design and Programming for the Web (also COM S 230[2300])

Spring. 3 credits. Prerequisite: COM S/INFO 130 or equivalent.

For description, see COM S 230 in CIS section.

### INFO 245(2450) Psychology of Social Computing (also COMM 245[2450])

Fall. 3 credits.

For description, see COMM 245.

### INFO 292(2921) Inventing an Information Society (also AM ST 292[2980], ECE/ENGRG 298[2980], HIST 292[2920], S&TS 292[2921]) (HA)

Spring. 3 credits; may not be taken for credit after ECE/ENGRG 198.

For description, see ENGRG 298.

### INFO 295(2950) Mathematical Methods for Information Science

Fall. 4 credits. Corequisite: MATH 231 or equivalent.

For description, see INFO 295 in CIS section.

### INFO 330(3300) Data-Driven Web Applications (also COM S 330[3300])

Fall. 3 credits. Prerequisite: COM S/ENGRD 211.

For description, see COM S 330 in CIS section.

**INFO 345(3450) Human-Computer Interaction Design (also COMM 345[3450])**

Spring. 3 credits.

For description, see COMM 345.

**INFO 349(3491) Media Technologies (also COMM 349[3490], S&TS 349)**

Spring. 3 credits.

For description, see COMM 349.

**INFO 355(3551) Computers: From the 17th Century to the Dot.com Boom (also S&TS 355[3551]) (HA)**

Fall. 4 credits.

For description, see S&amp;TS 355.

**[INFO 356(3561) Computing Cultures (also S&TS 356[3561]) (CA)]**

Spring. 4 credits. Prerequisite: none. Next offered 2007–2008.

For description, see S&amp;TS 356.]

**INFO 372(3720) Explorations in Artificial Intelligence**

Spring. 3 credits. Prerequisites: MATH 111 or equivalent, an information science approved statistics course, and COM S 211 or permission of instructor.

For description, see INFO 372 in CIS section.

**[INFO 387(3871) The Automatic Lifestyle: Consumer Culture and Technology (also S&TS 387[3871])]**

Spring. 4 credits. Next offered 2007–2008.

For description, see S&amp;TS 387.]

**[INFO 429(4290) Copyright in the Digital Age (also COMM 429[4290])]**

Fall. 3 credits. Next offered 2007–2008.

For description, see COMM 429.]

**INFO 430(4300) Information Retrieval (also COM S 430[4300])**

Fall. 3 credits. Prerequisite: COM S/ENGRD 211 or equivalent.

For description, see COM S 430 in CIS section.

**INFO 431(4302) Web Information Systems (also COM S 431[4302])**

Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with web site technology.

For description, see COM S 431 in CIS section.

**INFO 435(4390) Seminar on Applications of Information Science (also INFO 635[6390])**

- Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent, and experience in using information systems.

For description, see INFO 435 in CIS section.

**INFO 440(4400) Advanced Human-Computer Interaction Design (also COMM 440[4400])**

Fall. 3 credits. Prerequisite: COMM/INFO 245.

For description, see COMM 440.

**INFO 445(4450) Seminar in Computer-Mediated Communication**

Fall. 3 credits. Prerequisites: COMM/INFO 245.

For description, see COMM 445.

**INFO 447(4470) Social and Economic Data (also ILRLE 447[4470])**

Spring. 4 credits. Prerequisites: one semester of calculus, IS statistics requirement, at least one upper-level social science course, or permission of instructor.

For description, see INFO 447 in CIS section.

**INFO 450(4500) Language and Technology (also COMM 450[4500])**

Spring. 3 credits. Prerequisite: COMM 240 or COMM/INFO 245 or permission of instructor.

For description, see COMM 450.

**INFO 490(4999) Independent Reading and Research**

Fall, spring. 1–4 credits.

Independent reading and research for undergraduates.

**INFO 491(4910) Teaching in Information Science, Systems, and Technology**

Fall, spring. Variable credit.

Involves working as a TA in a course in the information science, systems, and technology major.

**INFO 515(5150) Culture, Law, and Politics of the Internet**

Fall. 4 credits.

For description, see INFO 515 in CIS section.

**INFO 530(5300) The Architecture of Large-Scale Information Systems (also COM S 530[5300])**

Spring. 4 credits. Prerequisite: COM S/INFO 330 or COM S 432.

For description, see COM S 530 in CIS section.

**INFO 614(6140) Cognitive Psychology (also PSYCH 614[6140])**

Fall. 3 credits.

For description, see PSYCH 614.

**INFO 630(6300) Human Language Technology (also COM S 630[6300])**

Spring. 4 credits. Prerequisite: basic knowledge of linear algebra and probability theory and basic programming skills.

For description, see COM S 630 in CIS section.

**INFO 634(6341) Information Technology in Sociocultural Context (also S&TS 634[6341])**

Spring. 4 credits. Prerequisite: permission of instructor.

For description, see S&amp;TS 634.

**INFO 635(6390) Seminar on Applications of Information Science (also INFO 435[4390])**

Spring. 3 credits. Prerequisites: background in computing, data structures, and programming at level of COM S 211 or equivalent, and experience using information systems. Undergraduates and master's students should register for INFO 435; Ph.D. students should register for INFO 635.

For description, see INFO 635 in CIS section.

**INFO 640(6400) Human-Computer Interaction Design (also COMM 640[6400])**

Fall. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 640.

**INFO 645(6450) Seminar in Computer-Mediated Communication (also COMM 645[6450])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 645.

**INFO 648(6648) Speech Synthesis by Rule (also LING 648[6648])**

Spring. 4 credits. Prerequisite: LING 401, 419, or permission of instructor.

For description, see LING 648.

**INFO 650(6500) Language and Technology (also COMM 650[6500])**

Spring. 3 credits. Prerequisite: graduate standing or permission of instructor.

For description, see COMM 650.

**INFO 651(6002) Critical Technical Practices**

Fall or spring. 4 credits. Prerequisites: graduate-level training in human-computer interactions, science &amp; technology studies, visual studies, communication, or equivalent, or permission of instructor.

For description, see INFO 651 in CIS section.

**INFO 685(6850) The Structure of Information Networks (also COM S 685[6850])**

Fall or spring. 4 credits. Prerequisite: COM S 482.

For description, see COM S 685 in CIS section.

**INFO 709(7090) IS Colloquium**

Fall, spring. 1 credit. For staff, visitors, and graduate students interested in information science.

**INFO 747(7400) Social and Economic Data (also ILRLE 740[7400])**

Spring. 4 credits. Prerequisites: open to Ph.D. and research master's students only.

For description, see INFO 747 in CIS section.

**INFO 790(7900) Independent Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Independent research for M.Eng. students and pre-A exam Ph.D. students.

**INFO 990(9900) Thesis Research**

Fall, spring. Variable credit. Prerequisite: permission of an information science faculty member.

Thesis research for post-A exam Ph.D. students.

**INTERNATIONAL RELATIONS CONCENTRATION**Office: 152 Uris Hall, 254-5004, [www.einaudi.cornell.edu/irc/](http://www.einaudi.cornell.edu/irc/) D. R. Lee (AEM), director**Objective**

The International Relations (IR) Concentration is an interdisciplinary program for undergraduate students enrolled in any of the seven Cornell undergraduate colleges. The IR Concentration provides a structured yet flexible program for undergraduates to take advantage of the vast resources available at the university for studying the politics, economics, history, languages, and cultures of the countries and regions of the world.

Graduates of the program have gone on to pursue further education in fields such as political science and anthropology and to successful careers in international law, economics, agriculture, trade, finance, international development, and government service, among others. They have gone on to work in international and nongovernmental organizations, in cross-cultural affairs, in journalism, and in education.

The International Relations Concentration is not a major or a department, but rather a program offering a selection of courses reaching across colleges and departments. Students pursue the IR Concentration in addition to their regular degree. Students concentrating in international relations have majored in fields ranging from anthropology, city and regional planning, communications, economics, government, and history to natural resources, industrial and labor relations, and computer science. International course work and language study add a global and cross-cultural dimension to those majors. Some students even design an independent major in some aspect of international relations or comparative social or cultural studies. Spending a semester or year of study abroad can contribute to meeting the course requirements of the IR Concentration, including the language requirement.

### Course Requirements

These requirements are designed to expose students to a broad range of perspectives in international relations while allowing them to tailor their course selections to specific interests. Courses throughout the university are grouped into four subject areas, including:

1. International Economics and Development
2. World Politics and Foreign Policy
3. Transnational Processes and Policies
4. Cultural Studies

Within these four subject areas, courses are also identified as "core" or "elective." Students must complete altogether eight courses from the four groups according to one of two options. Option A emphasizes the politics and economics of international relations. Option B puts greater stress on culture. In choosing either option, students should ensure that they acquire familiarity with more than one geographic region or country. All courses used to fulfill the concentration requirements must be taken for a letter grade. Courses can count both toward a major and the International Relations Concentration.

Option A: One core course from each of Groups 1, 2, 3, and 4; one elective from each of Groups 1, 2, 3, and 4

Option B: One core course from each of Groups 1, 2, 3, and 4; One elective from either Group 1 or Group 2—One elective from Group 3 and 4, and one additional elective from either Group 3 and Group 4

Before pre-registration a course list for the following semester (as well as lists for the current and previous semesters) can be obtained from the administrative coordinator in 152 Uris Hall, as well as from the web site. Note: These lists are not necessarily complete. Other courses throughout the university qualify for the IR Concentration by prior arrangement.

### Language Requirement

Students in the IR Concentration are expected to complete additional language study beyond the College of Arts and Sciences' degree requirement (for those in Arts and Sciences). This study can be accomplished in one of two ways: (1) two years of one foreign language (proficiency plus one course); (2) two languages at proficiency.

### Study Abroad

Students in the IR Concentration are encouraged to study abroad to bring a practical dimension to their expertise in international issues. Those who choose this option will find the requirements for the concentration highly compatible with courses taken abroad. Students are encouraged to contact the administrative coordinator before departure.

### Completion

Transcripts will reflect successful completion of the requirements for the Concentration. In addition, students will receive a special certificate and a letter of confirmation signed by the director of the IR Concentration and the director of the Mario Einaudi Center for International Studies.

### Enrollment

To obtain course lists, to enroll and for all further information, please contact the IR administrative coordinator, Mario Einaudi Center for International Studies, 152 Uris Hall, 254-5004.

### Course List for 2005-2006

Core course options and selected electives are listed below; other electives are possible. Most courses are offered one semester only. Offerings may change, so see the administrative coordinator, course roster, and IR web site for updates and further details.

#### Group 1: International Economics and Development

##### Core:

ECON/AEM 230 International Trade and Finance

AEM 429 International Finance

AEM 430 International Trade Policy

ECON 361 International Trade Theory

ECON 362 International Monetary Theory and Policy

##### Electives:

AEM 432 Business and Governments in Global Marketplace

AEM 433/CRP 412 Development, Privatization, and New Public Management

ECON 324 American Economic History

ECON 371 Economic Development

ECON/ILRLE 444 Evolution of Social Policy in Britain and America

ECON/AEM 450 Resource Economics

ECON/AEM 464 Economics of Agricultural Development

CRP 327 Regional Economic Impact Analysis

CRP 371 Cuba: The Search for Development Alternatives

CRP 417 Economic Development: Firms, Industries, and Regions

GOVT 330/ILRIC 333 Politics of the Global North

GOVT 354 Capitalism, Competition, and Conflict

ANTHR 384 Africa in the Global Economy

#### Group 2: World Politics and Foreign Policy

##### Core:

GOVT 181 Introduction to International Relations

##### Electives:

GOVT 302 Social Movements in American Politics

GOVT 332 Modern European Politics

GOVT 400 Democracy in Latin America

GOVT 424 Contemporary American Politics

GOVT 482 Unifying While Integrating: China and the World

AS&RC 311 Government and Politics in Africa

AS&RC 451 Political and Social Change in Caribbean

HIST/AM ST 214 American Foreign Policy

HIST 252 Modern Eastern Europe

HIST 289/ASIAN 298 The U.S.-Vietnam War

HIST/LAT A 306 Modern Mexico: From Independence to the Zapatistas

HIST 371 World War II in Europe

HIST 414 Motivations of U.S. Foreign Policy

#### Group 3: Transnational Processes and Policies

##### Core:

GOVT/PHIL 294 Global Thinking

GOVT 393 Introduction to Peace Studies

##### Electives:

AEM 432 Business and Governments in Global Marketplace

ECON/AEM 464 Economics of Agricultural Development

CRP 384 Green Cities

CRP 453 Environmental Aspect of International Planning

HD 483 Early Care and Education in Global Perspective

D SOC 275 Immigration and a Changing America

ILRCB 304 Seminar in American Labor and Social History

ILRHR 469 Immigration and the American Labor Force

IARD 300 Perspectives in International Agricultural and Rural Development

IARD/FD SC 402 Agriculture in the Developing Nations I

IARD 494 Special Topics in International Agriculture

NTRES 332 Ethics and the Environment

NTRES 494 History of the Environment Sciences

#### Group 4: Cultural Studies

##### Core:

ANTHR 102 Introduction to Anthropology: The Comparison of Cultures

ANTHR 200 Cultural Diversity and Contemporary Issues

##### Electives:

ANTHR/AIS 230 Cultures of Native North America

ANTHR/AAS 303 Asians in the Americas

ANTHR 316 Power, Society, Culture in Southeast Asia

ANTHR/FGSS 321 Sex and Gender in Cross-Cultural Perspective

ANTHR 335 Situation of China's Minorities

ANTHR/AM ST 353 Anthropology of Colonialism

ANTHR/LSP/AM ST 377 The United States

ART H 245 Renaissance and Baroque

ART H 250/NES 247 Introduction to Art History: Islamic Art and Culture

ART H 322/CLASS 350 Arts of the Roman Empire

ART H 365/AM ST 355 U.S. Art from FDR to Reagan

ART H 378/AS&RC 310 Art in African Culture and Society

AS&RC/ENGL 255 African Literature

AS&RC 310/ART H 378 Introduction of African Art

AS&RC 455 Caribbean Literature

AS&RC/EDUC 459 Education in Africa Diaspora

AS&RC 478 Family and Society in Africa

ASIAN 191 Introduction to Modern Asian History

ASIAN 208 Introduction to Southeast Asia

ASIAN 211 Introduction to Japan

ASIAN/MUSIC 245 Gamelan in Indo Culture

COM L 386 Literature and Film of South Asia

COM L 387/AS&RC 332 20th Black Culture Movement

COM L 489/ENGL 483/THETR 483 Comparative 20th-Century Anglophone Drama

COM L/ITAL 495 Fascist Culture

ENGL 274 Scottish Literature and Culture

ENGL 333 The 18th-Century Novel

ENGL 340 The English Romantic Period

FGSS/SPANL 246 Contemporary Narratives by Latina Writers

FILM 293/NES 293/JWST 291 Sophomore Seminar: Middle Eastern Cinema

FILM/GERST 396 German Film

FRLIT 221 Modern French Literature

FRLIT 224/HIST 270 The French Experience

FRLIT 321 Readings in Modern French Literature and Culture

FRLIT 323 Reading Francophone Literature and Culture

FRLIT 370 The French Enlightenment

HIST 151/AM ST 103 Introduction to Western Civilization

HIST 153 Introduction to American History

HIST/ASIAN 191 Introduction to Modern Asian History

HIST 195 Colonial Latin America

HIST 211/AM ST 251 Black Religious Traditions

HIST/FGSS/ASIAN 219 Women in South Asia

HIST 252 Modern Eastern Europe

HIST 291/JWST 252 Modern European Jewish History 1789 to 1948

HIST 305 Britain, 1660 to 1815

HIST 326 History of the British Empire

HIST/AM ST 345 19th-Century American Cultural History

HIST/ENGRG 357 Engineering in American Culture

HIST 360 Early Warfare, East and west

HIST 364/COM L 362/ENGL 325 Culture of the Renaissance II

HIST 388/ASIAN 385 Vietnamese Histories

HIST 395/ASIAN 397 Premodern Southeast Asia

HIST/LAT A 404 Race and Ethnicity in Latin America

HIST 429/SPANL 448 Cervantes-Mediterranean World

HIST 452 History of the New Europe

HIST 453/NES 457/RELST 457 Formation of Islamic Law

HIST 483/CLASS 475/RELST 475 Christianization/Roman World

HIST/ASIAN 492 Medieval Chinese History

ILRCB/AM ST 306 Recent History of American Workers

ITAL 290 Perspectives in Italian Culture

ITAL 297 Introduction to Italian Literature

ITAL 300 Italian Practicum

KRLIT 405 Readings in Korean Literature

NES 254 Introduction to Near Eastern Civilizations

NES/JWST/RELST 275 Religions of Ancient Israel

NES 366/JWST 366 011-229 The History and Archaeology of the Ancient Near East

NES 447 Middle Eastern Music Ensemble

RUSSEL 369 Dostoevsky

RUSSEL 499 The Avant-Garde in Russian Literature and the Arts

SOC/NES 332 Martyrdom in Contemporary Society

SOC 478 Family and Society in Africa

SPANL 218 Introduction to Hispanic Literature

SPANL 301 Hispanic Theater Production

SPANL 319 Renaissance Hispanism

SPANL 323 Reading Latin American Civilization

THETR 242 Introduction to World Theatre III

## ITALIAN

See "Department of Romance Studies."

## JAPANESE

See "Department of Asian Studies."

## JAVANESE

See "Department of Asian Studies."

## PROGRAM OF JEWISH STUDIES

D. I. Owen, director (Ancient Near Eastern History and Archaeology; Assyriology; Biblical History and Archaeology), L. Adelson (German-Jewish Literature and Culture), D. Bathrick (Holocaust Film Studies), R. Brann (Judeo-Islamic Studies), V. Caron (Modern French and European-Jewish History), M. Diesing (Yiddish Language and Linguistics), K. Haines-Eitzen (Early Judaism and Early Christianity), P. Hohendahl (German Literature), R. Hoffmann (Holocaust Studies), P. Hyams (Medieval Jewish History), D. LaCapra (Holocaust Studies), M. Migiel (Italian Literature), C. Monroe (Near Eastern Mediterranean Studies; Nautical Archaeology), L. Monroe (Hebrew Bible Studies), R. Polenberg (American-Jewish History), D. Powers (Islamic History and Law), E. Rebillard (Jews in the Roman Empire), N. Scharf (Hebrew Language), D. Schwarz (Anglo-Jewish Literature), G. Shapiro (Russian-Jewish Literature), S. Shoer (Hebrew Language), T. Sorek (Sociology and Anthropology), D. Starr (Modern Hebrew and Arabic Literature; Critical Theory; Middle Eastern Film), P. Stevens (curator), S. M. Toorawa (Arabic Literature and Islamic Studies), J. Zorn (Biblical Archaeology). Emeritus: N. Furman, J. Porte, E. Rosenberg, Y. Szekely.

The Program of Jewish Studies was founded as an extension of the Department of Semitic Languages and Literatures, now the Department of Near Eastern Studies, in 1973 and attained status as an intercollegiate program in 1976.

The program has grown out of the conviction that Judaic civilization merits its own comprehensive and thorough treatment and that proper understanding of any culture is inconceivable without adequate knowledge of the language, literature, and history of the people that created it. Accordingly, the offerings in the areas of Jewish languages and literatures have been considerably expanded, and courses in ancient, medieval, and especially modern Jewish history and culture have been added to the program.

It is a broadly based, interdisciplinary program, bringing together faculty from various Cornell departments and colleges.

The Program of Jewish Studies supports teaching and research in the many areas of Jewish Studies. It is a secular, academic program, whose interests are diverse and cross-cultural. The program recognizes its special relationship to teaching and research in classical Judaica and Hebraica pursued by the members of the Department of Near Eastern Studies, with particular emphasis on the interrelationship between Judaism, Christianity, and Islam.

It presently enables students to obtain basic instruction and specialization in the fields of Semitic languages; the Hebrew Bible; medieval and modern Hebrew literature; ancient, medieval, and modern European and Middle Eastern Jewish history; and Holocaust studies. In some of these fields students may take courses on both graduate and undergraduate levels. Faculty throughout the university provide breadth to the program by offering courses in related areas of study.

For more information, please visit [www.arts.cornell.edu/jwst/index.html](http://www.arts.cornell.edu/jwst/index.html).

## Courses Offered

### **JWST 101-102(1101-1102) Elementary Modern Hebrew I and II (also NES 101-102[1101-1102])**

101, fall; 102, spring, 4 credits. Letter grades only. S. Shoer.

For description, see NES 101-102.

### **JWST 103(1103) Elementary Modern Hebrew III (also NES 103[1103])**

Fall, 4 credits. N. Scharf.

For description, see NES 103.

### **JWST 200(2100) Intermediate Modern Hebrew (also NES 200[2100])**

Spring, 4 credits. N. Scharf.

For description, see NES 200.

### **JWST 223(2623) Introduction to the Hebrew Bible (also NES/RELST 223[2623])**

Fall, 3 credits. L. Monroe.

For description, see NES 223.

### **JWST 244(2644) Introduction to Judaism (also NES 244[2644], RELST 244[2644])**

Spring, 3 credits. L. Monroe.

For description, see NES 244.

### **JWST 251(2651) Holy War, Crusade, and Jihad in Judaism, Christianity, and Islam (also HIST 269[2691], NES/RELST 251[2651])**

Fall, 3 credits. R. Brann.

For description, see NES 251.

### **JWST 253(2850) From Medievalism to Modernity: The History of Jews in Eastern Modern Europe, 1492-1789 (also HIST 285[2850])**

Fall, 4 credits. V. Caron.

For description, see HIST 285.

### **JWST 261(2661) Ships and Seafaring: Introduction to Nautical Archaeology (also NES 261[2661])**

Spring, 3 credits. C. Monroe.

For description, see NES 261.

### **JWST 262(2662) Daily Life and the Cultural Landscape of the Biblical World (also ARKEO 260[2662], NES 262[2662], RELST 261[2662])**

Fall, 3 credits. J. Zorn.

For description, see NES 262.

### **JWST 266(2666) Jerusalem Through the Ages (also RELST/NES/ARKEO 266[2666])**

Spring, 3 credits. J. Zorn.

For description, see NES 266.

### **JWST 268(2668) Ancient Egyptian Civilization (also ARKEO/NES 268[2668])**

Fall, 3 credits. C. Monroe.

For description, see NES 268.

### **JWST 290[2670] History of Zionism (also HIST 286[2861])**

Spring, 4 credits. V. Caron.

For description, see HIST 267.

### **JWST 291(2793) SSP: Middle Eastern Cinema (also NES 293[2793], FILM/COM L 293[2930], VISS 293[2193])**

Fall, 4 credits. D. Starr.

For description, see NES 293.

### **JWST 301(3101) Advanced Intermediate Modern Hebrew (also NES 301[3101])**

Fall, 4 credits. N. Scharf.

For description, see NES 301.

### **JWST 305(3105) Conversational Hebrew (also NES 305[3105])**

Spring, Variable to 3 credits. Limited to 15 students. Prerequisite: NES 301, 400, or permission of instructor; non-native speakers only. N. Scharf.

For description, see NES 305.

### **JWST 384(3784) Israeli Literature: Between Self and Nation (also NES 384[3784])**

Spring, 3 credits. D. Starr.

For description, see NES 384.

### **JWST 332(3832) Martyrdom in Contemporary Societies (also NES 332[3832])**

Spring, 4 credits. Staff.

For description, see NES 332.

### **JWST 364(3664) Ancient Iraq I: Origins of Mesopotamian Civilization (also NES/ARKEO 364[3664], NES/JWST 664[6664])**

Fall, 4 credits. D. I. Owen.

For description, see NES 364.]

### **JWST 395(3895) Israeli Society (also NES 395[3695], SOC 390[3900])**

Fall, 4 credits. T. Sorek.

For description, see NES 395.

### **JWST 400(4100) Seminar in Advanced Modern Hebrew (also NES 400[4100])**

Fall, 4 credits. Limited to 15 students.

N. Scharf.

For description, see NES 400.

### **JWST 401(4101) Modern Hebrew Literature (also NES 401[4101])**

Spring, 4 credits. D. Starr.

For description, see NES 401.

### **JWST 420(4102) Biblical Hebrew Prose—Joshua (also NES/RELST 420[4102])**

Fall, 4 credits. L. Monroe.

For description, see NES 420.

### **JWST 438(4738) Imagining the Mediterranean (also NES 438[4738], COM L 496[4960])**

Fall, 4 credits. G. Holst-Warhaft.

For description, see NES 438.

### **JWST 453(4330) History of Modern German Jewry: From the Enlightenment to the Post-1945 Era (also HIST 433[4330], GERST 433[4330])**

Fall, 4 credits. V. Caron.

For description, see HIST 433.

### **JWST 466(4666) History of Israelite Religion (NES 466[4666])**

Spring, 4 credits. L. Monroe.

For description, see NES 466.

### **JWST 470 Power and Wealth in Ancient Civilizations (also NES 470)**

Spring, 4 credits. C. Monroe.

For description, see NES 470.

### **JWST 474(4740) Topics in Modern Europe: Intellectual and Cultural History (also JWST 674[6740], HIST 474[4740], COM L 474[672][4740/6720])**

Fall, 4 credits. D. LaCapra.

For description, see HIST 474.

### **JWST 630(6230) Judeo-Arabic Literature (also NES 630[6230])**

Fall, 4 credits. R. Brann.

For description, see NES 630.

### **JWST 491-492(4991-4992) Independent Study—Undergraduate**

Fall and spring. Variable credit. Staff.

## Courses not offered 2006-2007

JWST 236 Israel: Literature and Society (also NES 236)

JWST 248 Introduction to Classical Jewish History (also RELST/NES 248)

JWST 255 Women and the Holocaust (also ENGL/FGSS 252)

JWST 271 Yiddish Linguistics (also LING 241)

JWST 299 The Hebrew Bible and the Arabic Qur'an in Comparative Perspective (also NES/RELST/COM L 299)

JWST 323 Reinventing Biblical Narrative Apocrypha and Pseudepigrapha (also NES/RELST 323)

JWST 328 Gnosticism and Early Christianity (also NES 328, RELST 330)

JWST 344 The History of Early Christianity (also NES 324, CLASS 344, RELST 325)

JWST 371 A Mediterranean Society and Its Culture: The Jews under Classical Islam (also NES/RELST/COM L 371)

JWST 435 Aramaic (also NES 435)

JWST 449 Rescreening the Holocaust (also GERST 449, COM L 453, THEAT 450)

JWST 494 Studies in the Novel: Reading Joyce's Ulysses (also ENGL 470)

JWST 639 Islamic Spain: Culture and Society (also NES 339/639, JWST 339, RELST/COM L 334, SPANL 339/699)

JWST 694 Joyce's Ulysses and the Modern Tradition (also ENGL 670)

## JOHN S. KNIGHT INSTITUTE FOR WRITING IN THE DISCIPLINES

The director of the John S. Knight Institute is Paul Lincoln Sawyer, professor in the Department of English. Katherine Gottschalk, senior lecturer in the Department of English, is the Walter C. Teagle Director of First-Year Writing Seminars. The institute's offices are in 101 McGraw Hall, 255-4061.

M. Gilliland (Writing Workshop), K. Hjortshoj (Writing in the Majors), B. LeGendre (Writing Workshop), J. Martin (Writing Workshop), J. Pierpont (Writing Workshop), E. Shapiro (Writing Workshop).

The John S. Knight Institute helps to coordinate the teaching of writing in all undergraduate schools and colleges (the School of Industrial and Labor Relations; the School of Hotel Administration; and the colleges of Agriculture and Life Sciences; Architecture, Art, and Planning; Arts and Sciences; Engineering; and Human Ecology). The program administers writing seminars for first-year and upperclass students, discipline-based seminars in its Sophomore Seminars Program, tutorial writing classes, and seminars in the teaching of writing. More than 30 academic departments and programs participate in the program.



## First-Year Writing Seminars

For first-year students the Institute offers the First-Year Writing Seminars—more than 125 different courses in the humanities, social sciences, expressive arts, and sciences. Through introductory work in a particular field of study, seminars help students write good English expository prose—prose that, at its best, is characterized by clarity, coherence, intellectual force, and stylistic control. All seminars pursue this common aim through small classes, with a maximum of 17 students, and adherence to a program-wide set of guidelines:

- Seminars require at least six—and at most nine—formal essays on new topics. (While these assignments should total about 30 pages, some of the 30-page total may include major drafts that receive commentary from the instructor and are later significantly revised.) Assignments form a logical sequence.
- At least three of the six to nine required essays are developed through several stages of revised drafts under the instructor's guidance. Guidance may include, in addition to written commentary on drafts, individual conferences, in-class group work, peer commentary, reading responses, journals, and so on.
- Ample classroom time is spent on work directly related to writing.
- Reading assignments in the course subject are kept under 75 pages per week to permit regular, concentrated work on writing.
- All students meet in at least two individual conferences with the instructor.

Offerings change from semester to semester. Each semester's First-Year Writing Seminars are described on the web at <http://fws.arts.cornell.edu>.

To ensure that students will enjoy the benefits of small writing classes, First-Year Writing Seminars are limited to no more than 17 students. Instead of pre-enrolling in their writing courses, students request placement in one of five writing seminars by filling out an electronic ballot in August for the fall semester and in November for the spring semester. Over 90 percent receive one of their top three choices. After placement by ballot, students may change their writing seminars via electronic add and drop. Writing seminars may be added only during the first two weeks of each semester.

The colleges and the schools served by the Institute accept First-Year Writing Seminars in fulfillment of their individual graduation requirements in categories referred to variously as "first-year writing," "oral and written expression," and the like. The Institute does not decide whether students may graduate: it makes courses available. Individual colleges and schools administer their own graduation requirements.

Currently, most undergraduate students are required to take two First-Year Writing Seminars. Architecture majors, however, need only one. Hotel students fulfill their requirement in one semester, through H ADM 165 in one semester plus one First-Year Writing Seminar in the other. Agriculture and Life Sciences students can take First-Year

Writing Seminars or choose from among a variety of other courses to fulfill their requirement.

All students who score 5 on the Princeton Advanced Placement Examination in English receive 3 credits. Such credits are awarded automatically; no application to the John S. Knight Institute or the Department of English is necessary. How these credits may be applied to first-year writing or other distribution requirements depends on the student's college and score. All students who score 5, except Architecture majors, may apply their 3 credits toward the writing requirements of their college. Of students who score 4, only Agriculture and Life Sciences students and Industrial and Labor Relations students may apply their 3 credits toward the writing requirements of their college. Students should always consult their college registrars to be certain that they understand their writing requirements.

Students who have already taken a First-Year Writing Seminar, or who score 4 or 5 on the Princeton AP exam, or 700 or better on the English Composition or CEEB tests, may enroll, space permitting, in the following upper-level First-Year Writing Seminars: ENGL 270, 271, or 272.

Although there are no exemptions from college writing requirements, some students may fulfill all or part of their college's writing requirement through transfer credits or writing-course substitutions.

For work done at other institutions to be accepted as equivalent to First-Year Writing Seminars, students should demonstrate that they have done a reasonably equivalent amount of writing in a formal course (e.g., it is not sufficient to write one 30-page term paper.) Students in the College of Engineering and the College of Arts and Sciences must file an "application for transfer evaluation" to request writing credit for such courses; students in other colleges should consult their college registrars.

In unusual circumstances, upper-level students may petition to use a Cornell writing course other than a First-Year Writing Seminar to satisfy part of their writing requirement. The John S. Knight Institute must approve all such petitions in advance.

For information about the requirements for First-Year Writing Seminars and descriptions of seminar offerings, see the John S. Knight Institute web site at [http://arts.cornell.edu/knight\\_institute](http://arts.cornell.edu/knight_institute).

## English 288–289: Expository Writing

Helps students write with more confidence and skill in all disciplines. Open to Cornell sophomores, juniors, and seniors, ENGL 288–289 courses explore themes shaped by a genre or use of expository writing, by the common concerns of several disciplines, or by an interdisciplinary topic intimately related to the written medium. Although English department instructors make up roughly half the staff, the Knight Institute's involvement enables the course to extend and diversify its offerings in separately defined, 16-member sections that appeal to the varied interests and needs of students in many areas of study. Students may choose among a variety of sections focusing on such themes as "War, Peace, Terror, and the Law," "Making the News," "The Reflective Essay," "Hollywood

Babylon," and "Rights, Democracy, and the Courts." All staff are selected because their special interests and their training and experience in First-Year Writing Seminars promise original course design and superior performance.

## Sophomore Seminars

Since 2001, the John S. Knight Institute has been sponsoring a distinctive tier of electives through its Sophomore Seminars Program. The program involves a range of disciplines across the College of Arts and Sciences and the university. Building on an introductory exposure to discipline-specific approaches to writing gained in the First-Year Writing Seminars, the Sophomore Seminars provide interested students with an early mentoring experience in a small forum with leading university professors. Limited to 15 students per seminar. Purpose: to prepare sophomores for advanced work they will undertake in their chosen fields as juniors and seniors. Each Sophomore Seminar is presented in an interdisciplinary context and may serve as a gateway to a particular major. Seminars may also be used, with permission, to satisfy remaining First-Year Writing Seminar requirements for transfer students, sophomores, juniors, and seniors. By the end of the present academic year, the Knight Institute will have sponsored the following 62 seminars from 32 disciplines:

### Knight Institute Sophomore Seminars

#### 2001–2007

AAS 210*	South Asian Diasporic Locations
AAS 211*	Race and the American City: Reading New York and San Francisco
AEM 200*	Contemporary Controversies in the Global Economy
AN SC 204*	Domestic Animal Issues
ANTHR 205	The Anthropology of Sport
ANTHR 211*	Nature and Culture
ART 372*	Contemporary Art: Making and Looking
ART H 209	The Immigrant Imagination
ASIAN 201*	Buddhist Felicities
ASTRO 233	From Planets to Galaxies: The Origin of Cosmic Structures
BIOEE 467*	Why Is Evolutionary Biology So Controversial?
CLASS 244*	Psyche, Ego, and Self
COM L 215*	Comparative American Literatures
COM L 225*	Poetry and Poetics of Difference
COM L 227*	Multilingualism
CRP 395	Separate Societies: Poverty and Inequality in U.S. Cities
CSS 200*	Soils and Civilizations
DANCE 204*	Movement in Time and Space
ENGL 204*	Introduction to American Literatures: Narrating the Nation
ENGL 209*	Introduction to Cultural Studies
ENGL 220*	The Idea of the Pet in Literature
ENGL 221*	Imagining the Holocaust
ENGL 244*	Studies in Irish Culture

- ENGL 252\* Late 20th-Century Women Writers and Visual Culture
- ENGL 297\* Sustainable Literature
- FD SC 230\* Functional Foods: Where Food Science and Nutrition Meet
- GOVT 202\* Honor and Obligation in Conflict
- GOVT 215\* Gender, Nationalism, and War
- GOVT 226\* Empires
- GOVT 227 The Atomic Age
- GOVT 261 Feminist Theory/State Theory
- HD 201\* Fatherhood and Family Policy
- HIST 207\* The Occidental Tourist: Travel Writing and Orientalism in Southeast Asia
- HIST 211\* Black Religious Traditions: Sacred and Secular
- HIST 214 Crusade, Heresy, and Inquisition in the Medieval Mediterranean
- HIST 225\* U.S.-Mexico Border: History, Culture, and Representation
- HIST 232\* Eyewitness to War in the Ancient World
- HIST 241\* Riot and Revolution in 19th-Century Africa
- HIST 243\* The History of Things
- HORT 215\* Nonfiction Adventure Writing: Reclaiming the Scientist's Voice
- ITALL 250\* The Uses of Learning
- ITALL 255 The Italian Western and Its American Lineage
- LA 215 Engaging Places
- LING 212\* Language and Culture
- MUSIC 270\* Music in American Cultures
- MUSIC 300\* Proseminar in Musicology
- NES 237\* Ninth-Century Baghdad and Its "Bad" Boys (and Girls)
- NES 265 Law, Society, and Culture in the Middle East
- NES 293 Middle Eastern Cinema
- NES 296\* Jesus in History, Tradition, and the Cultural Imagination
- PHIL 216\* Self, Ego, Psyche
- PSYCH 231 Topics in Cognitive Science: Mind and Reality in Science Fiction
- RELST 253\* Black Religious Traditions: Sacred and Secular
- S&TS 212\* Sound Studies
- SOC 221\* Race/Class/Gender: Research in Progress
- SOC 327 Toleration and Fundamentalism
- SOC 357 Schooling, Racial Inequality, and Public Policy in America
- SPANL 230\* Viewing Modern Barcelona
- SPANL 255\* *Maladies of the Soul: Don Quixote*
- THETR 202\* Film Style and Cinema Experience: Fritz Lang and Martin Scorsese
- THETR 203\* Shakespeare in (Con)text

\*Not offered 2006-2007.

## Writing in the Majors

Spanning the humanities, social sciences, and sciences, the Knight Institute's upper-level, Writing in the Majors courses do not satisfy formal writing requirements, and faculty participation is entirely voluntary. While all Writing in the Majors courses include extensive writing, usually with guided revision, they also emphasize other forms of active, interactive learning essential to scholarship and careers in the disciplines. Writing in the Majors initiatives have included individual and collaborative research projects, collaborative writing, oral presentations, group oral exams, field studies, authentic student-designed laboratory experiments, debates, analytical and critical reading exercises, topical symposia, conversation groups, student-led discussions, poster sessions, and many kinds of informal writing, including online exchanges. Varying radically in design and size, from enrollments of fewer than 10 students to more than 300, Writing in the Majors courses over the past 18 years have involved collaboration with 150 faculty members and more than 250 graduate teaching assistants to enrich learning in 75 upper-level courses offered in 24 departments.

### WRIT 701(7101) Writing in the Majors Seminar

Fall and spring. 1 credit. S-U grades only. Teaching assistants assigned to Writing in the Majors projects enroll in a six-week course on teaching strategies in advanced instruction.

## Teaching Writing

Each summer and fall, the institute offers instruction in the teaching of writing to new staff members in the First-Year Writing Seminars and other interested instructors. Teaching Writing, offered in the summer or fall, is primarily a course for graduate students. The program also sponsors a summer apprenticeship program for a limited number of graduate students, and a summer seminar for faculty members interested in the teaching of writing.

### WRIT 700(7100) Teaching Writing

Summer and fall. 1 credit. S-U grades only. Introduces new instructors of Cornell's First-Year Writing Seminars to the challenges of teaching writing in courses that both introduce students to particular fields of study and develop the sophisticated writing skills students will need throughout their undergraduate careers and beyond. An overview of methodologies involved in the teaching of writing within a disciplinary context is provided by readings representing a range of pedagogical theories and practices, seminar discussions, and presentations of faculty, visiting scholars in the field, and experienced TAs. Participants in the course prepare written assignments designed to prepare them for the actual work of their First-Year Writing Seminars. In addition, written critiques and explanatory rationales of those assignments provide an opportunity for reflection on the methods chosen and on the principles underlying them.

## Writing Workshop

The John S. Knight Institute offers "An Introduction to Writing in the University" for first-year students (or transfer students needing writing credit) through the Writing Workshop. This course is designed for students who have had little training in

composition or who have serious difficulty with writing assignments.

WRIT 137 and 138 are graded S-U only, and students receiving a grade of S are granted credit toward their college writing requirements. Students who think this course might be appropriate including non-native speakers of English scoring less than 600 on the Test of English as a Foreign Language (TOEFL) should attend the assessment sessions offered by the Writing Workshop during orientation week each fall. The workshop also offers a Walk-In Service (see below) to help students work on writing assignments. The director is Joe Martin, senior lecturer in the Writing Workshop. The workshop offices are in 174 Rockefeller Hall, 255-6349.

## The Writing Walk-In Service

Through the Writing Walk-In Service, the Writing Workshop offers tutoring assistance in writing to any student who needs help with a writing project. The Writing Walk-In Service has tutors available during the academic year in 174 Rockefeller Hall and North and West Campus residential areas. The director is Mary Gilliland. For information, contact the Writing Workshop, 174 Rockefeller Hall, 255-6349.

### WRIT 137-138, 134(1137-1138, 1134) An Introduction to Writing in the University

137, fall; 138, spring; 134, summer. 3 credits each semester. Limited to 12 students per sec in fall and spring, 6 in summer. Prerequisite: permission of instructor. S-U grades only.

Writing seminar designed for students who need more focused attention to master the expectations of academic writing. Emphasizes the analytic and argumentative writing and critical reading essential for university-level work. With small classes and weekly student/teacher conferences, each section is shaped to respond to the needs of students in that particular class.

### WRIT 139(1139) Special Topics in Writing

Fall and spring. 3 credits. Cannot fulfill writing or distribution requirements. Prerequisite: undergraduate standing; permission of instructor. S-U grades only. These courses allow students the opportunity to resolve significant writing challenges that have interfered with their academic progress. Students must have ongoing writing projects on which to work. Instruction is in weekly tutorials. Interested students should go to 174 Rockefeller for more information.

### WRIT 702(7102) Graduate Writing Workshop

Fall and spring. 3 credits. Limited to 10 students per sec. Prerequisites: graduate standing; permission of instructor. S-U grades only.

Gives graduate students the opportunity to resolve significant writing challenges that have interfered with their academic progress. Students must have ongoing writing projects to work on. Instruction is in weekly tutorials. Interested students should go to 174 Rockefeller Hall for further information.

### WRIT 703(7103) Work in Progress

Fall and spring. 3 credits. Limited to 10 students per sec. Prerequisite: graduate standing and permission of instructor. S-U grades only.

Writing seminar for graduate students who have substantial work in progress, such as professional articles, theses, or dissertations. In the first two weeks students discuss rhetorical and stylistic features of scholarly writing and methods of composing and revising, with relevant readings. Remaining weeks emphasize exchange and discussion of drafts, supplemented by individual conferences. The course goal is the improvement and completion of student writing projects.

## KHMER (CAMBODIAN)

See "Department of Asian Studies."

## KOREAN

See "Department of Asian Studies."

## LATIN AMERICAN STUDIES PROGRAM

190 Uris Hall

John S. Henderson, Anthropology, Director, Latin American Studies Program; Vilma Santiago-Irizarry, Anthropology, LASP director of graduate studies; Lourdes Benería, City and Regional Planning; Robert Blake, Animal Science; David Block, Ibero-American Bibliographer, Bruno Bosteels, Romance Studies; Debra Ann Castillo, Romance Studies, director of undergraduate studies; Maria Lorena Cook, School of Industrial and Labor Relations; Raymond Craib, History; David Cruz de Jesus, Romance Studies; Eleanor Dozier, Romance Studies; Maria Fernandez, History of Art; Gary Fields, International Labor Relations and Economics; Maria Antonia Garcés, Romance Studies; Maria Cristina García, History; William W. Goldsmith, City and Regional Planning; Karen Graubart, History; Jere D. Haas, Anthropology, Nutritional Science; Jean-Pierre Habicht, Nutritional Science; Zulma Iguina, Romance Studies; Steven Jackson, Government; Teresa Jordan, Geological Science; Steven Kyle, Agricultural Economics; David R. Lee, Applied Economics and Management; Barbara Lynch, City and Regional Planning; Luis Morató, Romance Studies; Ben Olguin, English; Jura Oliveira, Romance Studies; Kathleen O'Neill, Government; Edmundo Paz Soldán, Romance Studies; Gretel Peltó, Nutritional Sciences; José Piedra, Romance Studies; Simone Pinet, Romance Studies; Alison Power, Department of Ecology and Evolutionary Biology; Eloy Rodríguez, Plant Biology; Jeannine Routier-Pucci, Romance Studies; Elvira Sánchez-Blake, Romance Studies; Roberto Sierra, Music; Jose M. Rodríguez-García, Romance Studies; María Stycos, Romance Studies. Emeritus: Thomas Davis, Economics; Matthew Drosdoff, Agronomy; Donald Freebairn, Agricultural Economics; John Murra, Anthropology; Thomas Poleman, Agricultural Economics; Don Sola, Romance Studies; Joseph M. Stycos, Development Sociology; David Thurston, Plant Pathology; Arnold Van Wambeke, Agronomy; Lawrence Williams, School of Industrial and Labor Relations; Frank Young, Developmental Sociology.

Cornell's Latin American Studies Program (LASP) was founded in 1961 with funds from the Mario Einaudi Center for International

Studies and a major grant from the Ford Foundation. The National Defense Education Act (NDEA) Language and Area Center established LASP in 1966 as one of the nation's premier Latin American centers. Today, the Latin American Studies Program provides a focus for all activities oriented toward Latin America on the Cornell campus. Latin Americanists are active in most of Cornell's colleges and schools, with such diverse strengths as the languages and literatures of the area, agricultural sciences, city and regional planning, anthropology, history, economics and the other social sciences. It is the purpose of the program to stimulate teaching by establishing contacts with Latin American universities and institutions, supporting research through grants to faculty members and graduate students, and sponsoring visiting scholars from Latin America. LASP offers a concentration in Latin American Studies for undergraduate students and a graduate minor for graduate students.

## Undergraduate Concentration

To complete an undergraduate concentration in Latin American Studies, students must earn a minimum of 15 credits in Latin American Studies. Latin American content courses not on the list may be approved by petition only. To satisfy the requirements of the concentration, undergraduates must select courses from at least three fields and must include at least one course at the advanced level. Language Instruction below the 300 level may not be counted toward the credit requirement. However, language facility in Spanish, Portuguese, or Quechua must be demonstrated by successfully completing SPANR 219, PORT 219, QUECH 219, or the equivalent.

## Courses

**LAT A 103(1030) Introduction to World Music I: The African Diaspora (also MUSIC 103(1030), LSP 100(1301))**

Spring. S. Pond.

For description, see MUSIC 103.

**LAT A 195(1950) Colonial Latin America (also HIST 195(1950))**

Fall and spring. K. Graubart.

For description, see HIST 195.

**LAT A 131(1310) Introduction to Comparative Government and Politics (also GOVT 131(1310))**

Spring. 3 credits. K. Roberts.

For description, see GOVT 131.

**LAT A 196(1961) Modern Latin America (also HIST 196(1960))**

Spring. M. Roldan.

For description, see HIST 196.

**LAT A 215(2150) The Tradition of Rupture (also SPANL 215(2150))**

Fall. J. Rodríguez-García and staff.

For description, see SPANL 215.

**[LAT A 216(2161) Gender and Colonization in Latin America (also HIST 216(2160))**

Spring. 4 credits. K. Graubart.]

**LAT A 217(2170) Readings—Medieval/Early Mod Sp (also SPANL 217(2170))**

Fall. M. A. Garcés.

For description, see SPANL 217.

**LAT A 220(2200) Perspectives on Latin America (also SPANL 220(2200), HIST 251(2511))**

Spring. E. Paz-Soldan and Director, Latin American Studies Program.

For description, see SPANL 220.

**LAT A 247(2470) Spanish through Media and Culture (also SPANL 247(2470))**

Fall and spring. Conducted in Spanish.

E. Sánchez-Blake.

For description, see SPANL 247.

**LAT A 261(2610) Bolívar in Latin America (also SPANL 261(2610))**

Fall. J. A. Hernandez.

For description, see SPANL 261.

**LAT A 280(2800) Perspectives on Brazil (also PORT 280(2800))**

Fall. L. Horne.

For description, see PORT 280.

**LAT A 301(3010) Hispanic Theater Production (also SPANL 301(3010))**

Fall. D. Castillo.

For description, see SPANL 301.

**LAT A 306(3060) Modern Mexico (also HIST 306(3060))**

Spring. 4 credits. R. Craib.

For description, see HIST 306.

**LAT A 312(3211) Forging Nations (also HIST 312(3120))**

Fall. M. Roldan.

For description, see HIST 312.

**LAT A 329(3290) Comparative Politics of Latin America (also GOVT 329(3293))**

Fall. 4 credits. K. Roberts.

For description, see GOVT 329.

**ILRIC 339(3390) Political Economy of Mexico (also ILRIC 339(3390))**

Spring. M. Cook.

For description, see ILRIC 339.

**LAT A 368(3680) Modern and Contemporary Latin American Art (also ART H 3680(3550), LSP(3680))**

Spring. M. Fernandez.

For description, see ART H 368.

**LAT A 371(3710) Cuba: Search for Development Alternatives (also CRP 371(3710))**

Fall. B. Lynch.

For description, see CRP 371.

**LAT A 376(3760) Latin American Cities (also CRP 376(3760))**

Fall. B. Lynch.

For description, see CRP 376.

**LAT A 405(4050) US-Cuba Relations (also HIST 405(4050))**

Fall. M. C. Garcia.

For description, see HIST 405.

**LAT 415(4150) Post-National Gastroidentities (also S HUM 415, ANTHR 416)**

Fall. S. Ayora-Diaz.

For description, see S HUM 415.

**LAT A 424(4241) Art and Politics in 20th-Century Latin America (also HIST 424(4240))**

Spring. M. Roldan.

For description, see HIST 424.

**LAT A 430(4300) 20th-Century Poetry (also SPANL 430(4300))**

Fall. J. M. Rodríguez-García.

**LAT A 433(4320) 19th Century Hispanic Caribbean (also SPANL 433[4330])**

Fall. J. A. Hernandez.

For description, see SPANL 433.

**LAT A 452(4520) Latin America: Politics and Practice of Culture (also ANTHR 452[4520])**

Fall. C. Howe.

For description, see ANTHR 452.

**LAT A 474(4740) Urban Transformations in the Global South (also CRP 474[4740])**

Spring. W. W. Goldsmith.

For description, see CRP 474.

**LAT A 480 The Return of the Real (also PORT 480[4800])**

Fall. L. Horne.

For description, see PORT 480.

**LAT A 491 Latin American Literature/Mass Media (also SPANL 491[4910])**

Fall. E. Paz-Soldan.

For description, see SPANL 491.

**LAT A 519(5190) Urban Theory and Spatial Development (also CRP 519[5190])**

Spring. W. W. Goldsmith.

For description, see CRP 519.

**LAT A 600(6000) Contemporary Issues in Latin America**

Fall and spring. Director, Latin American Studies Program.

An exploration of critical topics in the Anthropology, Art, Economics, History, Literature, Political Science, and Sociology of Latin America. Course features guest speakers from Cornell and other institutions.

**LAT A 602 Agriculture in the Developing Nations II (also IARD 602[6020])**

Spring. R. Blake.

For description, see IARD 6020.

**LAT A 605(6050) US-Cuba Relations (also AM ST/LSP/HIST 405/605[4050/6050])**

Fall. 4 credits. M. C. Garcia.

**LAT A 612(6120) Colonial Latin America (also HIST 612[6120]) LAT A 633(6330) 19th-Century Hispanic Caribbean (also SPANL 633[6330])**

Fall. J. A. Hernandez.

For description, see SPANL 633.

**LAT A 635 Labor Markets and Income Distribution in Developing Countries (also ILRIC 635[6350])**

Spring. G. Fields.

For description, see ILRIC 635.

**LAT A 612(6120) Colonial Latin America (also HIST 612[6120])**

Fall. K. Graubart.

For description, see HIST 612.

**LAT A 650(6500) Literature of the Conquest (also SPANL 650[6500])**

Spring. M. A. Garcés.

For description, see SPANL 650.

**LAT A 674(6740) Transformations in the Global South (also CRP 674[6740])**

Spring. W. W. Goldsmith.

For description, see CRP 674.

**LAT A 676(6760) Latin American Cities (also CRP 676[6760])**

Fall. B. Lynch.

For description, see CRP 676.

**SPANL 690 Hispanic Feminisms**

Spring. D. Castillo.

For description, see SPANL 690.

**ILRIC 739(7390) Political Economy of Mexico (also ILRIC 739[7390])**

Spring. M. Cook.

For description, see ILRIC 739.

**LATINO STUDIES PROGRAM**

434 Rockefeller Hall

**Undergraduate Concentration**

The Latino Studies Program offers an interdisciplinary undergraduate concentration in Latino studies, with courses mostly drawn from history, sociology, anthropology, literature, and language, but the program also cross-lists courses from other colleges.

- To complete the concentration, students must take at least five courses (a minimum of 15 credits) in Latino Studies, including Latinos in the United States (D SOC 265, LSP 201, and SOC 265), which is offered each spring semester.
- Students are required to include at least three courses from Groups I and II (one from each group, and another from either group). Of the three courses, two must be at the 300 or 400 level.

One elective course (see list below) can count toward the concentration. Courses must be completed with a letter grade of C or above. Independent studies and first-year writing seminars do not count toward concentration requirements. The list varies each semester in accordance with faculty schedules and visiting appointments.

**Group I: Humanities**

- LSP 225 The United States-Mexico Border: History, Culture, Representation (also AM ST/HIST 225)
- LSP 240 Survey in U.S. Latina/o Literature (also AM ST/ENGL 240)
- LSP 246 Contemporary Narratives by Latina Writers (also FGSS/SPANL 246)
- LSP 248 Poetry of the Latina/o Experience (also SPANL 248)
- LSP 260 Latinos in the United States: Colonial Period to 1898 (also AM ST 259, HIST 260)
- LSP 261 Latinos in the United States: 1898 to the Present (also AM ST/HIST 261)
- LSP 264 Exploring Latino/a Identity (also ENGL 264)
- LSP 303 American Dreams (also SPANL 303)
- LSP 398 Latina/o Popular Culture (also AM ST 396, ENGL 398)
- LSP 413 Classics of Latina/o Literature (also SPANL 413)
- LSP 462 Senior Seminar in Latina/o Studies: Chicana Feminism in a Globalizing World (also ENGL 462, AM ST 452)
- LSP 693 Gender, Globalization, and Latina/o Literature (also ENGL 693)

**Group II: Social Sciences**

- LSP 201 Latinos in the United States (also DSOC/SOC 265)

- LSP 220 Sociology of Health and Ethnic Minorities (also D SOC 220)
- LSP 221 Anthropological Representation: Ethnographies of Latino Culture (also AM ST/ANTHR 221)
- LSP 230 Latino Communities (also D SOC 230, AM ST 231)
- LSP 355 Latinos, Law, and Identity (also AM ST 357, D SOC 355)
- LSP 375 Comparative U.S. Racial and Ethnic Relations (also AM ST/D SOC 375)
- LSP 431/631 Farmworkers (also HIST 431/631)
- LSP 451 Multicultural Issues in Education (also EDUC 451)
- LSP 610 Political Identity: Race, Ethnicity, and Nationalism (also GOVT 610)
- LSP 624 Ethnoracial Identity in Anthropology, Language, and Law (also ANTHR 624, LAW 723)
- LSP 660 Language, Ideologies and Practices (also ANTHR 660)

**Electives:**

- LSP 100 Introduction to World Music I: Africa and the Americas (also MUSIC 103)
- LSP 101 Research Strategies in Latino Studies
- LSP 111 Introduction to American Studies: New Approaches to Understanding American Diversity, the 20th Century (also AM ST 110, HIST 161)
- LSP 202 Spanish for English-Spanish Bilinguals (also SPANR 200)
- LSP 241 Immigration and Ethnicity in 20th-Century United States (also HIST 240, AM ST 239)
- LSP 311 Social Movements (also AIS/D SOC 311)
- LSP 313 Spanish Writing Workshop for Advanced English/Spanish Bilinguals (also SPANR 313)
- LSP 319 Racial and Ethnic Politics in the United States (also GOVT 319, AM ST 313)
- LSP 368 Modern and Contemporary Latin American Art (also ART H 368)
- LSP 377 The United States (also ANTHR/AM ST 377)
- LSP 386 Cinema and Social Change (also FILM 386)
- LSP 405/605 U.S.-Cuba Relations (also HIST 405/605, LAT A 405/605)

ART 214 Art and the Multicultural Experience

Other elective courses will be determined each semester.

**Graduate Minor**

Students wishing to complete a graduate minor in Latino studies need to formally register with the Latino Studies Program office, take an upper-level seminar (400/600) in Latino Studies and work intensively with a faculty member outside of their major field. Over the course of their study they will be expected to take two other Latino studies graduate or advanced undergraduate courses outside of their major field. In lieu of available courses, the student and his or her minor field advisor may design a special project that culminates in a paper given at a conference.

or presented for publication. Each special project requires the approval of the director of graduate studies for the minor field. Upon completion of the minor, students receive a certificate from the program. Students wishing to pursue the graduate minor field in Latino studies must file an application at the Latino Studies Program, 434 Rockefeller Hall.

## Library

The Latino Studies Program library in 432 Rockefeller Hall serves Cornell students, faculty, staff, and the wider local community. The library maintains print and media material pertinent to U.S. Latino issues including an extensive collection of books, research material, archives, and films. The library and conference room also provide meeting space for more than 25 Latino student organizations.

## Courses

**LSP 100(1301) Introduction to World Music: Africa and the Americas (also MUSIC 103[1301], LAT A 100[1301])**  
Spring. 3 credits. 1-hour disc. S. Pond.  
For description, see MUSIC 103.

**LSP 101(1101) Research Strategies**  
Spring. 1 credit. I. Martinez.  
The digital revolution has made an enormous amount of information available to research scholars, but discovering resources and using them effectively can be challenging. This course introduces students with research interests in Latino Studies to search strategies and methods for finding materials in various formats (e.g., digital, film, and print) using information databases such as the library catalog, print and electronic indexes, and the World Wide Web. Instructors provide equal time for lecture and hands-on learning. Topics include government documents, statistics, subject-specific online databases, social sciences, the humanities, and electronic citation management.

**LSP 201(2010) Latinos in the United States (also SOC/D SOC 265[2650])**  
Spring. 4 credits, variable. H. Velez.  
For description, see SOC 265.

**LSP 202(2020) Spanish for English-Spanish Bilinguals (also SPANR 200[2000])**  
Fall. 3 credits. Staff.  
For description, see SPANR 200.

**LSP 220(2200) Sociology of Health and Ethnic Minorities (also D SOC 220[2200])**  
Fall. 3 credits. P. Parra.  
Discusses the health status of minorities in the United States. Specifically explores intragroup diversity such as migration, economic status, and the influence of culture and the environment on health status and access to health care. Although special attention is given to Latino populations, discussion encompasses other minorities who face similar problems.

**[LSP 221(2721) Anthropological Representation: Ethnographies on Latino Culture (also AM ST/ANTHR 221[2721])**  
3 credits. Next offered 2007–2008.  
V. Santiago-Irizarry.  
For description, see ANTHR 221.]

**LSP 230(2300) Latino Communities (also D SOC/AM ST 230[2300])**  
Spring. 3 credits. R. Mize.  
For description, see D SOC 230.

**LSP 246(2460) Contemporary Narratives by Latina Writers (also SPANL/FGSS 246[2460])**  
Fall. 3 credits. L. Carrillo.  
For description, see SPANL 246.

**LSP 248(2480) Poetry of the Latina/o Experience (also SPANL 248[2480])**  
Spring. 3 credits. L. Carrillo.  
For description, see SPANL 248.

**LSP 260(2600) Latinos in the United States: Colonial to 1898 (also HIST 260[2600], AM ST 259[2590])**  
Fall. 4 credits. M. C. Garcia.  
For description, see HIST 260.

**LSP 261(2610) Latinos in the United States: 1898 to the Present (also HIST/AM ST 261[2610])**  
Spring. 4 credits. M. C. Garcia.  
For description, see HIST 261.

**LSP 264(2640) The Private I and the Public Eye: Exploring Latino/a Identity in Poetry, Fiction, and Nonfiction (also ENGL 264[2640])**  
Fall. 4 credits. H. Viramontes.  
For description, see ENGL 264.

**[LSP 311(3110) Social Movements (also D SOC/AIS 311[3110])**  
3 credits. Next offered 2007–2008.  
A. Gonzales.  
For description, see D SOC 311.]

**LSP 313(3130) Spanish Writing Workshop for Advanced English/Spanish Bilinguals (also SPANR 313[3130])**  
Fall. 1 credit. Prerequisite: permission of instructor. Students must be registered concurrently with LSP 202. N. Maldonado-Mendez.  
For description, see SPANR 313.

**LSP 319(3191) Racial and Ethnic Politics in the United States (also GOVT 319[3191], AM ST 313[3191])**  
Spring. 4 credits. M. Jones-Correa.  
For description, see GOVT 319.

**[LSP 355[3550] Latinos, Law, and Identity (also AM ST 357[3550], D SOC 355[3550])**  
3 credits. Next offered 2007–2008. R. Mize.  
For description, see D SOC 355.]

**LSP 368(3551) Modern and Contemporary Latino/Latin American Art (also ART H 368[3550], LAT A 368[3680])**  
Spring. 4 credits. M. Fernandez.  
For description, see ART H 368.

**LSP 375(3750) Comparative U.S. Racial and Ethnic Relations (also AM ST 375[3750], D SOC 375[3750])**  
Spring. 3 credits. R. Mize.  
For description, see D SOC 375.

**[LSP 377(3777) The United States (also ANTHR/AM ST 377[3777])**  
4 credits. Next offered 2007–2008.  
V. Santiago-Irizarry.  
For description, see ANTHR 377.]

**LSP 398(3980) Latina/o Popular Culture (also ENGL 398[3980], AM ST 396[3981])**  
Spring. 4 credits. M. P. Brady.  
For description, see ENGL 398.

**LSP 405/605(4050/6050) U.S.-Cuba Relations (also AM ST/HIST/LAT A/ LSP 405/605[4050/6050])**  
Fall. 4 credits. M. C. Garcia.  
For description, see HIST 405/605.

**[LSP 413(4130) Classics of Latina/o Literature (also SPANL 413[4130])**  
4 credits. Next offered 2007–2008.  
D. Castillo.]

**LSP 420–421(4200–4210) Undergraduate Independent Study**  
Fall and spring. 2–4 credits. Prerequisite: permission of instructor.  
Guided independent study.

**LSP 431/631(4310/6310) Farmworkers (also CRP 395.72/679.72, HIST 431/631[4310/6310], ILRCB 402[4020])**  
Spring. 4 credits. Team taught. Faculty supervisor: R. Craib.

Interdisciplinary, team-taught course on the world of rural migrant labor. Weekly sessions taught by faculty members from across campus combine short lectures and discussion of assigned readings. Emphasis is on migrant farmworkers in the United States, mostly from the Caribbean and mainland Latin America, with an increasing focus as the semester progresses on farmworkers in central and upstate New York. Course requirements include analytical essays, a final paper, and participation in a service-learning project that are arranged in conjunction with the instructors.

**LSP 620–621(6200–6210) Graduate Independent Study**  
Fall, spring. 2–4 credits. Prerequisite: permission of instructor.  
Guided independent study.

**LSP 624(6424) Ethnoracial Identity in Anthropology, Language, and Law (also ANTHR 624[6424], LAW 723)**  
Spring. 4 credits. V. Santiago-Irizarry.  
For description, see ANTHR 624.

**[LSP 660(6460) Latino Languages, Ideology, and Practice (also ANTHR 660[6440])**  
4 credits. Next offered 2008–2009.  
V. Santiago-Irizarry.  
For description, see ANTHR 660.]

## LAW AND SOCIETY

Co-directors: M. Lynch (science and technology studies), 302 Rockefeller Hall, 255-7294, mel27@cornell.edu, and R. Lieberwitz (ILR), \*287A Ives Hall, 255-3289, ril5@cornell.edu.

Advisers: G. Alexander (law), D. Dunning (psychology), G. Hay (law), B. Hendrix (government), P. Hyams (history), M. Katzenstein (government), R. Miller (philosophy), M. Moody-Adams (philosophy), M. B. Norton (history), R. Polenber (history), D. Powers (Near East studies), J. Rabkin (government), A. Riles (law), V. Santiago-Irizarry (anthropology), P. Sawyer (English), S. Shiffrin (law).

The law and society concentration provides an opportunity for focused study of the interaction between law and society from an interdisciplinary perspective predominantly rooted in the social sciences and humanities: anthropology, comparative literature, economics, government, history, philosophy, psychology, science and technology studies, and sociology.

The concentration is open to all undergraduates, but interested students with majors outside the College of Arts and Sciences are advised to check their college's



policy and procedures regarding external concentrations, including whether the concentration is included on their college transcript. All students completing the concentration will receive a certificate and can include their participation in the law and society concentration on a résumé or law school application.

To allow sufficient time for a coherent program of study to be developed and completed, students who have an interest in this concentration are required to register before the start of the second semester of their junior year. Under extenuating circumstances, late registrations may be accepted at the discretion of the directors, but only if the registrant has a plan already formulated for completing the concentration's requirements. Special late registration forms that include the student's plan outline are available in the Ethics and Public Life (EPL) office, 240 Goldwin Smith Hall.

The standard law and society registration form is available online at [www.arts.cornell.edu/epl](http://www.arts.cornell.edu/epl) and in the EPL office. As part of the registration process, each student is assigned a law and society adviser who is available to provide guidance with course selection and help with other questions or concerns related to the student's participation in the concentration. The name and contact information of the assigned adviser are included in a welcome e-mail that is sent shortly after a student's registration form is received.

#### Four-Event Requirement

Many students find access to and participation in law and society events a particularly beneficial component of the concentration. Officially registered law and society students are notified of qualifying events (usually at least 10 per semester) and other information related to the concentration through an e-mail listserve and postings outside the Ethics and Public Life office. Attendance at a minimum of four events (tracked with sign-in sheets) is required between registration and graduation, but students seeking a broader perspective are encouraged to attend as many events as they can.

#### Four-Course Requirement

Law and society is an interdisciplinary concentration requiring students to successfully complete four courses (at least 12 credits) from the approved course list, earning a letter grade no lower than C- in each. Of the four qualifying courses, at least two must be outside the student's major, and no more than two can be in the same subject area. Cross-listed courses may be counted in any of the departments listed. Students who have a double major are permitted to select one major as the dominant and use applicable courses from the second major toward the four-course requirement. Appropriate courses taken before registering for the law and society concentration can be counted toward the four-course requirement. There are no required courses, but past students have found GOVT 313 and PSYCH 265 particularly relevant.

At the discretion of the law and society directors, permission may be granted to substitute an appropriate course that has been:

1. accepted from another educational institution toward the student's degree program (one course maximum)

2. taken as part of a semester abroad program
3. recently added to the Cornell curriculum

The best evidence of a course's appropriateness is the syllabus, which is often available online and can be submitted electronically to one of the directors for their determination. Petitions for course substitutions must be submitted before the student's final semester.

To facilitate tracking of courses taken and/or events attended, a printable student progress record can be accessed electronically or obtained as a preprinted form from the EPL office.

The law and society concentration is administered by the Ethics and Public Life (EPL) office. For more information, contact the EPL administrative assistant at 240 Goldwin Smith Hall, [epi@cornell.edu](mailto:epi@cornell.edu), or 255-8515.

### Approved Law and Society Courses

#### Arts and Sciences

- AM ST/ENGL 268(2680) Politics and Culture in the 1960s**
- AM ST/HIST/FGSS 273(2730) Women in American Society Past and Present**
- AM ST/GOVT 302(3021) Social Movements in American Politics**
- AM ST 310(3271)/GOVT 327(3271) Civil Liberties in the United States**
- AM ST 313(3181)/GOVT 318(3181)/LSP 319(3191) Racial and Ethnic Politics**
- AM ST 315(3141)/GOVT 314(3141) Prisons**
- AM ST 317(3180)/HIST 318(3180) American Constitutional Development**
- AM ST 319(3181)/GOVT 318(3181) US Congress**
- AM ST/HIST 324(3240) Varieties of American Dissent, 1880 to 1990**
- AM ST/GOVT 328(3281) U.S. Supreme Court**
- AM ST 344(3350)/HIST 335(3350) African American History**
- AM ST 357(3550)/D SOC 355(3550)/LSP 355(3550) Latinos, Law, and Identity**
- AM ST 376(3665)/GOVT 366(3685)/HIST 316(3160) American Political Thought from Madison to Malcolm X**
- AM ST/ANTHR/LSP 377(3777) The United States**
- AM ST 395(3970)/ENGL 397(3970) Policing and Prisons in American Culture**
- AM ST 423/GOVT/LSP 422(4221) Immigrants, Minorities, and Metropolitan Government**
- AM ST 430.5(4301)/HIST 448(4480)/LSP 430.5 The Rabinor Seminar**
- AM ST/HIST 440(4400) Undergraduate Seminar in Recent American History (Freedom of Speech, Censorship, Supreme Court)**

**AM ST 501(4990)/GOVT 500(4998)/PAM 406(4060) Politics and Privacy: Theory, Research, and Practice**

**ANTHR 323(3423) Kinship and Social Organization**

**ANTHR 328(3428) Conflict, Dispute Resolution, and Law in Cultural Context**

**ANTHR/LSP/AM ST 377(3777) The United States**

**ANTHR/LSP 624(6424) Ethnoracial Identity in Anthropology, Language, and Law**

**AS&RC 231(2601) African-American Social Political Thought**

**AS&RC 420(4605) Public Policy and African-American Urban Community**

**B&SOC/S&TS 205(2051) Ethical Issues in Health and Medicine**

**B&SOC/S&TS 206(2061)/PHIL 246(2460) Ethics and the Environment**

**B&SOC/S&TS/NTRES 331(3311) Environmental Governance**

**B&SOC/S&TS 407(4071) Law, Science, and Public Values**

**B&SOC/S&TS 427(4271) The Politics of Environmental Protection in America**

**B&SOC/S&TS 446(4461) Biomedical Ethics**

**COM L/NES/JWST 256(2560)/RELST 213(2211) Introduction to the Qur'an**

**COM L/RELST 326(3260) Christianity and Judaism**

**COM L/RELST 328(3280) Literature of the Old Testament**

**COM L 428/RELST 427(4280) Biblical Seminar**

**ECON 335(3350) Public Finance: The Microeconomics of Government**

**ECON 336(3360) Public Finance: Resource Allocation and Fiscal Policy**

**ECON 404(4040) Economics and the Law**

**ECON 420(4200) Economics of Family Policy: Adults**

**ECON 421(4210) Economics of Family Policy: Children**

**ENGL/AM ST 268(2680) Politics and Culture in the 1960s**

**ENGL 397/AM ST 395(3970) Policing and Prisons in American Culture**

**ENGL 402(4020) Literature as Moral Inquiry**

**FGSS/D SOC 206(2060) Gender and Society**

**FGSS/HIST 273(2730) Women in American Society, Past and Present**

**FGSS/RELST/HIST 368 (3680) Marriage and Sexuality in Medieval Europe**

**FGSS 461(4610)/FGSS 762(7620)/GOVT 462(4625)/GOVT 762(7625) Sexuality and the Law**

- GOVT 111(1111) Introduction to American Government and Politics
- GOVT/CRP/SOC 293(2930)/PHIL 193(1930) Inequality, Diversity, and Justice
- GOVT 294(2947)/PHIL 194(1940) Global Thinking
- GOVT/AM ST 302(3021) Social Movements in American Politics
- GOVT 313(3131) The Nature, Functions, and Limits of Law
- GOVT 314/AM ST 315(3141) Prisons
- GOVT 316(3161) The American Presidency
- GOVT 318(3181)/AM ST 319 U.S. Congress
- GOVT/LSP 319/AM ST 313(3191) Racial and Ethnic Politics in the United States
- GOVT 327/AM ST 310(3271) Civil Liberties in the United States
- GOVT 328(3281)/AM ST 328(3281) U.S. Supreme Court
- GOVT 341(3413)/SOC 341(3410) Modern European Society and Politics
- GOVT 362(3625)/PHIL 346(3460) Modern Political Philosophy
- GOVT 363(3633)/SOC 248(2480) Politics and Culture
- GOVT 364(3645) Politics of Nations Within
- GOVT 366/AM ST 376(3665)/HIST 316(3160) American Political Thought from Madison to Malcolm X
- GOVT 368(3685)/PHIL 347(3470) Global Justice
- GOVT 389(3898) International Law
- GOVT 393(3937) Introduction to Peace Studies
- GOVT 404(4041) American Political Development in the 20th Century
- GOVT/LSP 422/AM ST 423(4221) Immigrants, Minorities, and Metropolitan Government
- GOVT 428(4281) Government and Public Policy: An Introduction to Analysis and Criticism
- GOVT 453(4535)/S HUM 423 The Right of Prevention
- GOVT 462(4625)/762(7625)/FGSS 461(4610)/762(7620) Sexuality and the Law Seminar
- GOVT 465(4665)/PHIL 447(4470) Contemporary Political Philosophy
- GOVT 500(4998)/AM ST 501(4998)/PAM 406(4060) Politics and Policy: Theory, Research, and Practice
- HIST 202(2020) The Court, Crime, and the Constitution
- HIST/FGSS/AM ST 273(2730) Women in American Society, Past and Present
- HIST 316(3160)/AM ST 376(3665)/GOVT 366(3665) American Political thought from Madison to Malcolm X
- HIST 318/AM ST 317(3180) American Constitutional Development
- HIST/AM ST 324(3240) Varieties of American Dissent, 1880-1990
- HIST 335/AM ST 344(3350) African American History
- HIST/RELST/FGSS 368(3680) Marriage and Sexuality in Medieval Europe
- HIST 372(652)/NES 351(651)/RELST 350(3651) Law, Society, and Culture in the Middle East, 1200 to 1500
- HIST 431(631)/LSP 431(631)/LSP 431/CRP 395.72/679.72/ILRCB 402 Farmworkers
- HIST 436(4360) Conflict Resolution in Medieval Europe
- HIST/AM ST 440(4400) Undergraduate Tradition in Recent American History (Topic: freedom of speech, censorship, and the Supreme Court)
- HIST 448(4480)/AM ST/LSP 430.5(4301) The Rabinor Seminar
- HIST 453(4530)/NES/RELST 456(4657) Formation of Islamic Law
- HIST 459(4590)/659(6590) Radicals and Revolutionaries in Latin America
- HIST 472(4720)/NES 429(4929)/S HUM 428 Race in the Medieval Islamic World
- JWST/NES/RELST 223(2623) Introduction to the Bible I
- JWST/NES/RELST 229(2629) Introduction to the New Testament
- JWST/NES/RELST/COM L 256(2556) Introduction to the Qur'an
- JWST/NES 395(3895)/SOC 390(3900) Israeli Society
- LSP 431(631)/HIST 431(631)/LSP 431(4310)/CRP 395.72/679.72/ILRCB 402 Farmworkers
- LSP 319/GOVT 319/AM ST 313(3191) Racial and Ethnic Politics
- LSP 355/D SOC 355/AM ST 357(3550) Latinos, Law, and Identity
- LSP/AM ST/ANTHR 377(3777) The United States
- LSP/GOVT 422/AM ST 423(4221) Immigrants, Minorities, and Metropolitan Government
- LSP/AM ST 430.5/HIST 448(4480) The Rabinor Seminar
- LSP 431(631)/HIST 431(631)/LSP 431/CRP 395.72/679.72/ILRCB 402 Farmworkers
- LSP/ANTHR 624(6424)/LAW 723 Ethnoracial Identity in Anthropology, Language and Law
- NES/JWST/RELST 223(2623) Introduction to the Bible I
- NES/JWST/RELST 229 (2629) Introduction to the New Testament
- NES/COM L/JWST 256(2556)/RELST 213(2211) Introduction to the Qur'an
- NES/RELST 259(2559) Islam in Theory and Practice
- NES 357/RELST 356 Islamic Law and Society
- NES/JWST 395(3895)/SOC 390(3900) Israeli Society
- NES 429(4929)/S HUM 428/HIST 472(4720) Race in the Medieval Islamic World
- NES 457(4657)/RELST 457(4657)/HIST 453(4530) Formation of Islamic Law
- PHIL 145(1450) Contemporary Moral Issues
- PHIL 193(1930)/GOVT/CRP/SOC 293(2930) Inequality, Diversity, and Justice
- PHIL 194(1940)/GOVT 294(2947) Global Thinking
- PHIL 241(2410) Ethics
- PHIL 242(2420) Social and Political Philosophy
- PHIL 245(2450) Ethics and Health Care
- PHIL 246(2460)/S&TS/B&SOC 206(2061) Ethics and the Environment
- PHIL 247(2470) Ethics and Public Life
- PHIL 249(2490) Feminism and Philosophy
- PHIL 341(3410) Ethical Theory
- PHIL 342(3420) Law, Society, and Morality
- PHIL 344(3440) History of Ethics: Ancient and Medieval
- PHIL 345(3450) History of Ethics: Modern
- PHIL 346(3460)/GOVT 362(3625) Modern Political Philosophy
- PHIL 347(3470)/GOVT 368(3685) Global Justice
- PHIL 447(4470)/GOVT 465(4665) Contemporary Political Philosophy
- PHIL 448(4480) International Justice
- PSYCH 265(2650) Psychology and Law
- RELST 213(2211)/NES/COM L/JWST 256(2556) Introduction to the Qur'an
- RELST/NES/JWST 223(2623) Introduction to the Bible I
- RELST/NES/JWST 229(2629) Introduction to the New Testament
- RELST/NES 259(2559) Islam in Theory and Practice
- RELST/COM L 326(3260) Christianity and Judaism
- RELST/COM L 328(3280) Literature of the Old Testament
- RELST/HIST/FGSS 368(3680) Marriage and Sexuality in Medieval Europe
- RELST 427(4280)/COM L 428(4280) Biblical Seminar
- RELST/NES 457(4657)/HIST 453(4530) Formation of Islamic Law
- S HUM 423/GOVT 453(4535) The Right of Prevention
- S HUM 428/NES 429(4929)/HIST 472(4720) Race in the Medieval Islamic World

**S&TS/B&SOC 205(2051) Ethical Issues In Health and Medicine**

**S&TS 206(2061)/PHIL 246(2460) Ethics and the Environment**

**S&TS/B&SOC 331(3311)/NTRES 331(3310) Environmental Governance**

**S&TS 354(3541)/SOC 352(3520) The Sociology of Contemporary Culture**

**S&TS/B&SOC 407(4071) Law, Science, and Public Values**

**S&TS 411(4111) Knowledge, Technology, and Property**

**S&TS/B&SOC 427(4271) The Politics of Environmental Protection in America**

**S&TS/B&SOC 446(4461) Biomedical Ethics**

**SOC 207(2070) Problems in Contemporary Society**

**SOC 208(2208) Social Inequality**

**SOC 246(2460) Drugs and Society**

**SOC 248(2480)/GOVT 363(3633) Politics and Culture**

**SOC/CRP 293(2930)/GOVT 293(2935)/PHIL 193(1930) Inequality, Diversity, and Justice**

**SOC 326(3260) Social Policy**

**SOC 341(3410)/GOVT 341(3413) Modern European Society and Politics**

**SOC 352(3520)/S&TS 354(3541) The Sociology of Contemporary Culture**

**SOC 357(3570) Schooling and Society**

**SOC 371(3710)/D SOC 370(3700) Comparative Issues in Social Stratification**

**SOC 375(3750)/D SOC 301(3010) Theories of Society**

**SOC 390(3900)/JWST/NES 395(3895) Israeli Society**

### **College of Art, Architecture, and Planning**

**CRP/ SOC 293(2930)/GOVT 293(2935)/PHIL 193(1930) Inequality, Diversity, and Justice**

**CRP 380(3800) Environmental Politics**

**CRP 395.72/679.72/HIST 431(4310)/631/LSP 431(4310)/631/ILRCB 402 Farmworkers**

**CRP 444/544/NTRES 444(4440) Resource Management and Environmental Law**

**CRP 448(4480)/548(5480) Social Policy and Social Welfare**

**CRP 451(4510) Environmental Law**

**CRP 474(4740) Third World Urbanization**

### **College of Human Ecology**

**HD 233(2330) Children and the Law**

**HD 456(4560) Families and Social Policy**

**PAM 204(2040) Applied Public Finance**

**PAM 230(2300) Introduction to Policy Analysis**

**PAM 334(3340) Corporations, Shareholders, and Policy**

**PAM 341(3410) Economics of Consumer Law and Protection**

**PAM 383(3830) Social Welfare as a Social Institution**

**PAM 392(3920) NY State Government Affairs**

**PAM 406(4060)/GOVT 500/AM ST 501(4998) Politics and Policy: Theory, Research, and Practice**

**PAM 473(4730) Social Policy**

**PAM 552(5520) Health Care Services: Consumer and Ethical Perspectives**

### **College of Agriculture and Life Sciences**

**AEM 331(3310) Economics and Business Regulation**

**AEM 432(4320) Business and Government in the Global Marketplace**

**AIS/D SOC 311(3110) Social Movements**

**BIOGD 482(4820) Human Genetics and Society**

**COMM 428(4280) Communication Law**

**COMM 494(4940) Special Topics: Copyright in the Digital Age**

**D SOC/SOC 200(2000) Social Problems**

**D SOC/FGSS 206(2060) Gender and Society**

**D SOC 301(3010)/SOC 375(3750) Theories of Society**

**D SOC/AIS 311(3110) Social Movements**

**D SOC/LSP 355/AM ST 357(3550) Latinos, Law, and Identity**

**D SOC 370(3700)/SOC 371(3710) Comparative Issues in Social Stratification**

**EDUC 271(2710) Social and Political Context for American Education**

**NTRES 306(3060) Coastal and Oceanic Law and Policy**

**NTRES 331(3310)/S&TS/B&SOC 331(3311) Environmental Governance**

**NTRES 444(4440)/CRP 444(4440)/544 Resources Management and Environmental Law**

### **School of Industrial and Labor Relations**

**ILRCB 201(2010) Labor and Employment Law**

**ILRCB 402/HIST 431(4310)/631/LSP 431(4310)/631/CRP 395.72/679.72 Farmworkers**

**ILRCB 488(4880) Liberty and Justice for All**

**ILRCB 607(6070) Values in Law, Economics, and Industrial Relations**

**ILRCB 608(6080) Special Topics: Sex Discrimination and the Law**

**ILRCB 681(6810) International Labor Law**

**ILRCB 684(6840) Employment Discrimination and the Law**

**ILRCB 689(6890) Constitutional Aspects of Labor Law**

### **Law**

**LAW 402(4021) Competition Law and Policy**

**LAW 405(4051) The Death Penalty in America**

**LAW 408(4081) Law, Science, and Sustainability**

**LAW 648 The History of Common Law in England and America**

**LAW 690(6901) Terrorism and the Law**

**LAW 723/ANTHR 624/LSP 624(6424) Ethnoracial Identity in Anthropology, Language, and Law**

### **LESBIAN, BISEXUAL, AND GAY STUDIES**

D. Bem, S. Bem, A. Berger, B. Correll, J. Culler, I. DeVault, J. Frank, J. E. Gainor, E. Hanson, C. Howie, I. V. Hull, M. Katzenstein, T. Loos, K. March, C. A. Martin, D. Mao, S. McConnell-Ginet, K. McCullough, T. Murray, M. B. Norton, J. Peraino, M. Raskolnikov, R. Savin-Williams, A. M. Smith, A. Villarejo, R. Weil

The field of Lesbian, Bisexual, & Gay Studies is devoted to the interdisciplinary study of the social construction of sexuality. LBG Studies is founded on the premise that the social organization of sexuality is best studied from the perspectives offered by those positions that have been excluded from established cultural norms.

In addition to offering a graduate minor, the field of LBG Studies offers an undergraduate concentration, which is administered under the auspices of Feminist, Gender, & Sexuality Studies (FGSS) and which consists of four courses from the list below. Although most of the courses in LBG studies (including those on men) generally fall under the aegis of FGSS and are hence crosslisted with it, not all of the courses in FGSS are sufficiently focused enough on the social construction of sexuality per se to be part of the LBG studies concentration. In order to qualify for the concentration, courses must devote a significant portion of their time to sexuality and to questioning the cultural and historical institution of exclusive heterosexuality. Students selecting their four courses from the LBG studies subset must identify their concentration as either LBG studies or FGSS; they cannot double-count their credits and thereby use the same courses for both concentrations.

Students interested in the LBG studies concentration should contact the Lesbian, Bisexual, & Gay Studies Office in 391 Uris Hall.

### **Courses**

**ANTHR 200(1420) Cultural Diversity and Contemporary Issues**

Fall. 3 credits. M. Fiskesjo.  
For description, see ANTHR 200.

**ANTHR 321/621(3421/6421) Sex and Gender in Cross-Cultural Perspective (also FGSS 321/631[3210/6210])**

Fall. 4 credits. K. March.

For description, see ANTHR 321.

**ENGL 276(2760) Desire (also FGSS/COM L 276[2760], THETR 278[2780])**

Spring. 4 credits. Letter grades only.

E. Hanson.

For description, see ENGL 276.

**ENGL 355[3550] Decadence (also COM L/FGSS 355[3550])**

Fall. 4 credits. E. Hanson.

For description, see ENGL 355.

**[ENGL 478(4780) Intersections in Lesbian Fiction (also FGSS 477[4770], AM ST 468[4780])**

4 credits. Next offered 2007–2008.

K. McCullough.]

**FGSS 201(2010) Introduction to Feminist, Gender, and Sexuality Studies**

Fall and spring. 4 credits. S. Martin and

K. McCullough.

For description, see FGSS 201.

**FGSS 305(3050) Questioning Kin, Queering Family (also ANTHR 304[3104])**

Fall. 3 credits. L. Ramberg.

For description, see FGSS 305.

**FGSS 400(4000) Senior Seminar in Feminist, Gender, and Sexuality Studies**

Fall. 4 credits. A. Villarejo.

For description, see FGSS 400.

**FGSS 429(4290) The Sexual Politics of Religion (also RELST 424[4240])**

Spring. 4 credits. L. Ramberg.

For description, see FGSS 429.

**[FRLIT 442/642(4420/6420) Sex in French (also FGSS 432/632[4320/6320])**

4 credits. C. Howie.]

**FRLIT 449/649[4490/6490] Mystics and Mystique (also FGSS 449[4490])**

Fall. 4 credits. C. Howie.

For description, see FRLIT 449/649.

**FGSS 474(4740) Exoticism and Eroticism: Figures of the Other in 18th-Century Literature (also FRLIT 475)**

Fall. 4 credits. A. Berger.

For description, see FRLIT 475.

**FGSS 673(6730) Exoticism and Eroticism: Figures of the Other in 18th-Century Literature (also FRLIT 673[6730])**

Fall. 4 credits. A. Berger.

For description, see FRLIT 475.

**GOVT 462(4625) Sexuality and the Law (also FGSS 461[4610])**

Spring. 4 credits. A. M. Smith.

For description, see GOVT 462.

**GOVT 762(7625) Sexuality and the Law (also FGSS 762[7620])**

Spring. 4 credits. A. M. Smith.

For description, see GOVT 762.

**HD 384(3840) Gender and Sexual Minorities (also FGSS 385[3850])**

Fall. 3 credits. K. Cohen.

For description, see HD 384.

**HIST 209(2090) Seminar in Early America (also AM ST/FGSS 209[2090])**

Fall. 4 credits. M. B. Norton.

For description, see HIST 209.

**[HIST 273(2730) Women in American Society, Past and Present (also FGSS 273[2730])**

4 credits. Next offered 2007–2008.

M. B. Norton.]

**HIST 368(3680) Marriage and Sexuality in Medieval Europe (also FGSS/RELST 368[3680])**

Fall. 4 credits. P. Hyams.

For description, see HIST 368.

**[HIST 416(4160) Gender and Sex in Southeast Asia (also ASIAN 416[4416], FGSS 416[4160])**

Spring. 4 credits. Next offered 2008–2009.

T. Loos.]

**LING 244(2244) Language and Gender (also FGSS 244[2440])**

Spring. 4 credits. S. McConnell-Ginet.

For description, see LING 244.

**MUSIC 695(7311) Topics in Music: Gender, Sexuality, and Glam Rock (also FGSS 695[6950])**

Fall. 4 credits. J. Peraino.

For description, see MUSIC 695.

## LINGUISTICS

<http://ling.cornell.edu>

J. Whitman, chair (209 Morrill Hall); M. Diesing, director of graduate studies (211 Morrill Hall); W. Harbert, director of undergraduate studies (210 Morrill Hall); D. Abusch, J. Bowers, W. Browne, A. Cohn, S. Hertz, J. Legate, S. McConnell-Ginet, A. Miller, A. Nussbaum, M. Rooth, C. Rosen, M. Wagner, M. Weiss, D. Zec.

Linguistics, the systematic study of human language, lies at the crossroads of the humanities and the social sciences, and much of its appeal derives from the special combination of intuition and rigor that the analysis of language demands. The interests of the members of the Department of Linguistics and linguistic colleagues in other departments span most of the major subfields of linguistics: phonetics and phonology, the study of speech sounds; syntax, the study of how words are combined; semantics, the study of meaning; historical linguistics, the study of language change over time; and sociolinguistics, the study of language's role in social and cultural interactions.

Studying linguistics is not a matter of studying many languages. Linguistics is a theoretical discipline with ties to such areas as cognitive psychology, philosophy, logic, computer science, and anthropology. Nonetheless, knowing particular languages (e.g., Spanish or Japanese) in some depth can enhance understanding of the general properties of human language. Not surprisingly, then, many students of linguistics owe their initial interest to a period of exposure to a foreign language, and those who come to linguistics by some other route find their knowledge about languages enriched and are often stimulated to embark on further foreign language study.

Students interested in learning more about linguistics and its relationship to other

disciplines in the humanities and social sciences are encouraged to take LING 101, a general overview, which is a prerequisite for most other courses in the field, or one of the first-year writing seminars offered in linguistics (on topics such as metaphor and the science of language). LING 101 and other introductory courses fulfill the social science distribution requirement. Most 100- and 200-level courses have no prerequisites and cover various topics in linguistics (e.g., LING 170 Introduction to Cognitive Science; LING 285 Linguistic Theory and Poetic Structure) or focus on the linguistics of a particular geographic region or historical development of particular languages (e.g., LING 217 History of the English Language to 1300; LING 241 Yiddish Linguistics). Some of these courses also fulfill the breadth requirements.

Talks and discussions about linguistics are offered through the Undergraduate Linguistics Forum and the Linguistics Colloquium (sponsored by the department and the Cornell Linguistic Circle). These meetings are open to the university public and anyone wishing to learn more about linguistics is most welcome to attend.

## The Major

For questions regarding the linguistics major, contact Professor Wayne Harbert (210 Morrill Hall, 255–8441, [weh2@cornell.edu](mailto:weh2@cornell.edu)).

The prerequisite for a major in linguistics is the completion of LING 101 and either LING 301, 302, 303, or 304. The major has its own language requirement, different from that of the College of Arts and Sciences, which should be completed as early as possible: majors must complete the equivalent of two semesters of college-level study of a language that is either non-European or non-Indo-European (language study undertaken to satisfy the college requirement can also count toward the major requirement if the language meets these conditions). With approval of the department's director of undergraduate studies, this requirement may be waived for students taking the cognitive studies concentration or a double major.

The other standard requirements for the linguistics major are as follows:

1. LING 301 Introduction to Phonetics, LING 302 Introduction to Phonology, LING 303 Introduction to Syntax, and LING 304 Introduction to Semantics and Pragmatics (one of which will already have been taken as a prerequisite to the major).
2. LING 314 Historical Linguistics.
3. Three additional courses in linguistics at the 300 or 400 level, of which two must be general linguistics.
4. A course at or beyond the 300 level in the structure of a language, or LING 400 Language Typology or LING 600 Field Methods.

Some substitutions to these standard requirements are possible after consultation with your advisor and approval by the DUS.

## Honors

Applications for honors should be made during the junior year or by the start of fall semester of the senior year. For further information, please contact the DUS. Candidates for admission must have a 3.0

(B) average overall and should have a 3.2 average in linguistics courses. In addition to the regular requirements of the major, the candidate for honors will complete an honors thesis and take a final oral exam in defense of it. The thesis is usually written during the senior year but may be started in the second semester of the junior year when the student's program so warrants. The oral exam will be conducted by the honors committee, consisting of the thesis advisor and at least one other faculty member in linguistics. Members of other departments may serve as additional members if the topic makes this advisable. LING 493 and 494 may be taken in conjunction with thesis research and writing but are not required.

### First-Year Writing Seminars

For descriptions, consult the John S. Knight brochure for times, instructors, and descriptions.

### Courses

#### LING 101(1101) Introduction to Linguistics (KCM)

Fall or spring, 4 credits each semester. Fall, M. Wagner; spring, M. Disinger. Overview of the science of language, especially its theoretical underpinnings, methods, and major findings. Areas covered include: the relation between sound and meaning in human languages, social variation in language, language change over time, universals of language, and the mental representation of linguistic knowledge. Students are introduced to a wide variety of language phenomena, drawn not only from languages resembling English, but also from many that appear to be quite unlike English, such as those native to the Americas, Africa, Asia, Australia, and the South Pacific.

#### LING 109(1109) English Words: Histories and Mysteries (also CLASS 171[1609]) # (HA)

Spring, 3 credits. W. Harbert. Where do the words we use come from? This course examines the history and structure of the English vocabulary from its distant Indo-European roots to the latest in technical jargon and slang. Topics include formal and semantic change, taboo and euphemism, borrowing, new words from old, "learned" English loans from Greek and Latin, slang, and society.

#### LING 111(1111) American Sign Language I

Summer only, 4 credits. T. Galloway. Students with no previous background in American Sign Language (ASL) are introduced to the nature of a signed language and develop expressive and receptive skills in ASL. Basic grammar and vocabulary are covered, including explanations of the fundamental parts of a sign, proper use of fingerspelling, and the significance of nonmanual features. Instruction is supplemented with videotexts allowing students to begin to explore the visual literature of the Deaf community in the United States—stories, poems, and jokes that are unique to Deaf culture. Readings and class discussions acquaint students with the causes of deafness, the historical development of ASL and its linguistic status, and characteristics of deaf education both throughout history and in the present day.

#### LING 112(1112) American Sign Language II

Summer only, 4 credits. Prerequisite: LING 111 or permission of instructor. T. Galloway.

In this intermediate course, students continue to develop expressive and receptive fluency in ASL. Focus is on greater descriptive skill, developing intermediate-level narratives, and enhancing conversational ability. Advanced grammar and vocabulary is supplemented with further instruction in the linguistic structure of ASL. Readings, class discussions, and videotexts containing samples of the visual literature of the U.S. Deaf community continues students' investigation into American Deaf history and the shaping of modern Deaf culture.

#### [LING 131-132(1131-1132) Elementary Sanskrit (also CLASS 191-192[1331-1332], SANSK 131-132[1131-1132])

Next offered 2007-2008.]

#### LING 170(1170) Introduction to Cognitive Science (also COGST 101[1101], COM S 101[1710], PHIL 191[1910], PSYCH 102[1200]) (KCM)

For description, see COGST 101.

#### [LING 215/715(2215/7150) Psychology of Language (also COGST 215[2150], PSYCH 215[2150/7150]) (KCM)

For description, see PSYCH 215.]

#### LING 217(2217) History of the English Language to 1300 (also ENGL 217[2170]) # (HA)

Fall, 4 credits. W. Harbert.

Explores the development of the English language from its Indo-European beginnings through the period of Early Middle English. Topics include linguistic reconstruction, changes in sound, vocabulary and grammatical structure, external influences, and Old and Early Middle English language and literature. This course forms a sequence with LING 218, but the two may be taken independently.

#### [LING 218(2218) History of the English Language since 1300 (HA)

Spring, 4 credits. Next offered 2007-2008. W. Harbert.

Traces English from Chaucer to the present, including the development of standard English and dialects, and the rise of English as a world language.]

#### LING 236(2236) Introduction to Gaelic

Spring, 3 credits. W. Harbert.

Introduction to the Scottish Gaelic language, with some discussion of its history, structure, and current status.

#### [LING 238(2238) Introduction to Welsh

Fall, 3 credits. Next offered 2007-2008. W. Harbert.

Introduction to the Welsh language, with discussion of its history, structure, and current status, and a brief introduction to Welsh literature.]

#### [LING 241(2241) Yiddish Linguistics (SBA)

Fall, 3 credits. No previous knowledge of Yiddish required. Next offered 2007-2008. M. Disinger.

Yiddish language and culture, including structure and history of the Yiddish language, Yiddish in America, minority language issues, influence of Yiddish on present-day American English.]

#### LING 244(2244) Language and Gender (also FGSS 244[2440]) (SBA)

Spring, 4 credits. For nonmajors or majors. S. McConnell-Ginet.

Explores connections between language (use) and gender/sex systems, addressing such questions as the following: How do sex and gender affect the ways we speak, the ways we interpret and evaluate speech? How do sociocultural differences in women's and men's roles affect their language use, their relation to language change? What is meant by sexist language? How does conversation structure the social worlds of women and men? Readings draw from work in linguistics, anthropology, philosophy, psychology, literature, and general women's studies and feminist theory.

#### [LING 246/546(2246/5546) Minority Languages and Linguistics (SBA)

Fall, 4 credits. Graduate students register under LING 546. Next offered 2008-2009. W. Harbert.

Examines minority languages from linguistic, social, and political perspectives, including such issues as language death, language maintenance, bilingualism, language policy, and language rights.]

#### LING 251-252(2251-2252) Intermediate Sanskrit (also CLASS 291-292[2351-2352], SANSK 251-252[2251-2252]) @ #

Satisfies Option 1.

For description, see SANSK 251-252.

#### [LING 285/585(2285/5585) Linguistic Theory and Poetic Structure (LA)

Spring, 4 credits. Graduate students register under LING 585. Next offered 2007-2008. J. Bowers.

The aim of this course is to show how certain results of modern linguistics can usefully be applied to the analysis and interpretation of poetry.]

#### LING 301(3301) Introduction to Phonetics (KCM)

Fall, 4 credits. Prerequisite: LING 101 or permission of instructor. A. Cohn.

Introduction to the study of the physical properties of human speech sounds, including production, acoustics, and perception of speech. Provides in-depth exposure to the breadth of sounds found across human languages. Students achieve a high level of skill in phonetic transcription and some practice in reading spectrograms. An introduction to speech synthesis and automatic speech recognition is also provided. A small course project to discover the phonemes of an unknown language is undertaken.

#### LING 302(3302) Introduction to Phonology (KCM)

Spring, 4 credits. Prerequisite: LING 101 or permission of instructor. A. Cohn.

Introduction to phonology, which studies the patterning of speech sounds in human language. Emphasis is on formal devices, such as rules and representations, that capture the internal organization of speech sounds as well as their grouping into larger units, syllables, and feet.

#### LING 303(3303) Introduction to Syntax (KCM)

Fall, 4 credits. Prerequisite: LING 101 or permission of instructor. J. Legate.

Introduction to syntax, which studies how words are combined to form phrases and sentences. The course aims to give students



the ability to address questions regarding the syntactic properties that are shared by natural languages (as well as those that distinguish them) in a precise and informed way. Topics include those that lie at the heart of theoretical syntax: phrase structure, transformations, grammatical relations, and anaphora. Emphasis throughout the course is placed on forming and testing hypotheses.

**LING 304(3304) Introduction to Semantics and Pragmatics (KCM)**

Spring. 4 credits. Prerequisite: LING 303 or permission of instructor. D. Abusch.  
Examines the two major components of sentence meaning: (1) how sentences mean what they mean and (2) how they can be used to communicate more than what they (literally) mean. Investigates precise ways of describing the possible interpretations of a sentence and the relationship between meaning and syntactic structure. Topics include the representation of lexical meaning, the meaning of quantifier phrases and analyses of scope ambiguities, and classic puzzles of reference. Also examines possible applications of the theory to linguistically interesting legal cases (torts and criminal law), slips of the tongue, acquisition studies, language disorders, and connections with the philosophy of language.

**LING 308(3308) Readings in Celtic Languages**

Fall or spring, depending on demand. 2 credits. Prerequisite: permission of instructor. S-U grades only. W. Harbert.  
Reading/discussion groups in Welsh or Scottish Gaelic.

**LING 314(3314) Introduction to Historical Linguistics # (HA)**

Fall. 4 credits. Prerequisite: LING 301 or permission of instructor. M. Weiss.  
Survey of the basic mechanisms of linguistic change, with examples from a variety of languages.

**LING 315-316(3315-3316) Old Norse**

315, fall; 316, spring. 4 credits each semester. A. Angantýsson.  
Old Norse is a collective term for the earliest North Germanic literary languages: Old Icelandic, Old Norwegian, Old Danish, and Old Swedish. The richly documented Old Icelandic is the center of attention, and the purpose is twofold: the students gain knowledge of an ancient North Germanic language, important from a linguistic point of view, and gain access to the medieval Icelandic (and Scandinavian) literature. 315: The structure of Old Norse (Old Icelandic), phonology, and morphology, with reading of selections from the Prose-Edda, a 13th-century narrative based on the Eddaic poetry. 316: Extensive reading of Old Norse texts, among them selections from some of the major Icelandic family sagas: Njals saga, Grettis saga, and Egils saga, as well as the whole Hrafnkels saga.

**[LING 321(3321) History of the Romance Languages # (HA)]**

Fall. 4 credits. Prerequisites: LING 101 and qualification in any Romance language. Next offered 2007-2008. C. Rosen.  
Covers popular Latin; Pan-Romance trends in phonology, morphology, syntax, and the lexicon; regional divergence; non-Latin influences; medieval diglossia and emergence of Romance standards.]

**LING 332(3332) Philosophy of Language (also PHIL 332[3320])**

For description, see PHIL 332.

**LING 333(3333) Problems in Semantics (also PHIL/COGST 333[3330]) (KCM)**

Spring. 4 credits. Prerequisite: logic or semantics course or permission of instructor. S. McConnell-Ginet.  
Looks at problems in the semantic analysis of natural languages, critically examining work in linguistics and philosophy on particular topics of current interest. Topics for 2007 are presuppositions, events and argument structure, information structure, dynamic semantics.

**LING 347(3347) Topics in the History of English (HA)**

Fall. 4 credits. Prerequisite: LING 217, 314, course in Old or Middle English, or permission of instructor. W. Harbert.  
Treats specific topics in the linguistic history of the English language, selected on the basis of the particular interests of the students and the instructor.

**LING 390(3390) Independent Study in Linguistics**

Fall or spring. 1-4 credits, variable. Prerequisite: LING 101 and permission of instructor. Staff.  
Independent study of linguistics topics not covered in regular curriculum for undergrads.

**LING 400(4400) Language Typology (KCM)**

Spring. 4 credits. Prerequisite: LING 101. C. Rosen.  
Studies a basic question of contemporary linguistics: in what ways do languages differ, and in what ways are they all alike? Efforts are made to formalize universals of syntax and to characterize the total repertory of constructions available to natural languages. Common morphological devices and their syntactic correlates are covered. Emphasis is on systems of case, agreement, and voice.

**LING 401-402(4401-4402) Phonology I, II (KCM)**

401, fall; 402, spring. 4 credits each semester. Prerequisites: for LING 401, LING 302 or equivalent; for LING 402, LING 401 or permission of instructor. Fall, D. Zec; spring, M. Wagner.  
401 provides a basic introduction to phonological theory. The first half of the course focuses on basic principles of phonology, patterns of sounds, and their representations. In the second half, the nature of syllable structure and feature representations are explored. 402 provides further refinement of the issues investigated in 401, focusing in particular on metrical theory, lexical phonology, autosegmental phonology, and prosodic morphology.

**LING 403-404(4403-4404) Syntax I, II (KCM)**

403, fall; 404, spring. 4 credits each semester. Prerequisites: for LING 403, LING 303; for LING 404, LING 403 or permission of instructor. Fall, J. Legate; spring, M. Diesing.  
403 is an advanced introduction to syntactic theory within the principles and parameters/minimalist frameworks. Topics include phrase structure, argument structure (unaccusative verbs, unergative verbs, double object constructions), principles of word order, and the binding theory. 404 is a continuation of 403, focusing on syntactic

dependencies, including the theory of control, an examination of locality constraints on movement, covert versus overt movement, and the syntax of quantification. The purpose of the course is to develop the background needed for independent syntactic research.

**[LING 405(4405) Sociolinguistics (CA)]**

Fall. 4 credits. Prerequisite: LING 101 or permission of instructor. Next offered 2008-2009. Staff.]

**LING 409(4409) Structure of Italian (KCM)**

Spring. 4 credits. Prerequisites: LING 101 and qualification in any Romance language. C. Rosen.

**LING 411(4411) History of the Japanese Language (also ASIAN 411[4411], JAPAN 410[4410]) # @ (HA)**

Fall. 4 credits. Prerequisite: reading knowledge of Japanese. J. Whitman.  
Overview of the history of the Japanese language followed by intensive examination of issues of interest to the participants. Students should have a reading knowledge of Japanese.

**[LING 412(4412) Linguistic Structure of Japanese (also ASIAN 412[4412]) (KCM)]**

Spring. 4 credits. Prerequisites: JAPAN 102 or permission of instructor and LING 101. Next offered 2008-2009. J. Whitman.  
Introduction to the linguistic study of Japanese, with an emphasis on morphology and syntax.]

**[LING 413(4413) Applied Linguistics and Second Language Learning (KCM)]**

Spring. 4 credits. Prerequisite: at least one course in applied linguistics, linguistics, psychology, anthropology, communication, cognitive studies, education, or literary analysis; or permission of instructor. Next offered 2007-2008. Staff.  
An introduction to the field of applied linguistics with focus on different domains of language research as they bear on second language learning.]

**LING 416(4416) Structure of the Arabic Language (also NES 416[4206]) @ (KCM)**

Spring. 4 credits. M. Younes.  
For description, see NES 416.

**LING 417(4417) History of the Russian Language (also RUSSA 401[4401]) (HA)**

Spring. 4 credits. Prerequisite: permission of instructor. W. Browne.  
Phonological, morphological, and syntactic developments from Old Russian to modern Russian.

**LING 419(4419) Phonetics I (KCM)**

Fall. 4 credits. Prerequisite: LING 301 or permission of instructor. A. Miller.  
Provides a basic introduction to the study of phonetics. Topics include anatomy and physiology of the speech production apparatus, transcription and production of some of the world's sounds, basic acoustics, computerized methods of speech analysis, acoustic characteristics of sounds, speech perception, speech synthesis, and stress and intonation.

**LING 420(4420) Phonetics II (KCM)**

Spring. 4 credits. Prerequisite: LING 419. A. Miller.  
Continuation of Phonetics I, providing a more detailed survey of some areas in acoustic

and articulatory phonetics. Topics include feature theory, vocal tract acoustics, quantal theory, speaker normalization, theories of speech perception, coarticulation, theories of speech production, and prosody. In addition, a number of "hands-on" projects are part of the course.

**LING 421(4421) Semantics I (KCM)**

Spring. 4 credits. Prerequisite: LING 304. D. Abusch.

Introduces methods for theorizing about meaning within generative grammar. These techniques allow the creation of grammars that pair syntactic structures with meanings. Students look at several empirical areas in detail, among them complementation (combining heads with their arguments), modification, conjunction, definite descriptions, relative clauses, traces, bound pronouns, and quantification. An introduction to logical and mathematical concepts used in linguistic semantics (e.g., set theory, functions and their types, and the lambda notation for naming linguistic meanings) is included in the course.

**LING 422(4422) Semantics II (KCM)**

Fall. 4 credits. Prerequisite: LING 421 or permission of instructor. M. Rooth. Uses the techniques introduced in Semantics I to analyze linguistic phenomena, including quantifier scope, ellipsis, and referential pronouns. Temporal and possible worlds semantics are introduced and used in the analysis of modality, tense, and belief sentences. The phenomena of presupposition, indefinite descriptions, and anaphora are analyzed in a dynamic compositional framework that formalizes the idea that sentence meaning effects a change in an information state.

**LING 423(4423) Morphology (KCM)**

Spring. 4 credits. Prerequisite: LING 101 or permission of instructor. J. Legate. Addresses the basic issues in the study of words and their structures. Provides an introduction to different types of morphological structures with examples from a wide range of languages. Special emphasis is given to current theoretical approaches to morphological theory.

**[LING 424(4424) Computational Linguistics (also COGST 424[4470], COM S 324[3420]) (MQR)]**

Fall. 4 credits. Recommended: COM S 114. Next offered 2007-2008. M. Rooth. Introduces methods for doing a language computationally, including parsing and representation of syntactic analyses; computational morphology; probabilistic grammars; feature constraint formalisms for syntax; treebank methodology.]

**LING 425(4425) Pragmatics (also PHIL 435[4350]) (KCM)**

Fall. 4 credits. Prerequisite: LING 304 or PHIL 231, or permission of instructor. D. Abusch. Introduction to aspects of linguistic meaning that have to do with context and with the use of language. Topics include context change semantics and pragmatics, presupposition and accommodation, conversational implicature, speech acts, and the pragmatics of definite descriptions and quantifiers.

**[LING 427(4427) Structure of Hungarian (also HUNGR 427[4427]) (KCM)]**

Fall. 4 credits. Prerequisite: LING 101. Next offered 2008-2009. W. Browne.]

**[LING 428/628(4428/6628) Connectionist Psycholinguistics (also COGST 428, PSYCH 428/628[4280/6280])]**

Next offered 2007-2008. For description, see PSYCH 428.]

**[LING 430(4430) Structure of Korean (also ASIAN/KOREA 430[4430]) (KCM)]**

Spring. 4 credits. Prerequisite: KOREA 102 or linguistics course. No previous knowledge of Korean required. Next offered 2008-2009. J. Whitman. Intensive examination of the syntax and phonology of a non-Indo-European language with the objective of testing principles of current linguistic theory.]

**[LING 431(4431) Structure of an African Language (KCM)]**

Spring. 4 credits. Prerequisite: LING 101 or permission of instructor. Next offered 2007-2008. A. Miller. Survey of the grammar of an African language in light of current linguistic theory.]

**LING 432(4432) Middle Korean (also KRLIT 432[4432]) @ # (LA)**

Spring. 4 credits. Offered alternate years. Prerequisite: KOREA 202 or equivalent. J. Whitman.

Introduction to the premodern Korean language. Focuses on the earliest *hangeul* texts of the 15th century, but also introduces materials written in Korean using Chinese characters before the 15th century, including *hyangga*. No previous background in linguistics is required, but students should have a command of written Korean of at least the third-year level.

**[LING 433(4433) The Lesser-Known Romance Languages (also ROM S 433[4430]) (KCM)]**

Spring. 4 credits. Prerequisites: LING 101 and qualification in any Romance language. Next offered 2007-2008. C. Rosen. Surveys several Romance languages/dialects, examining sound systems, grammars, and historical evolution from Latin. Readings represent both the modern languages and their earliest attested stages.]

**LING 436(4436) Language Development (also COGST/PSYCH 436[4360], HD 337[3370]) (KCM)**

For description, see COGST 436.

**[LING 437(4437) Celtic Linguistic Structures (KCM)]**

Spring. 4 credits. Prerequisite: LING 403. Next offered 2007-2008. W. Harbert. Treats selected topics in the syntax and morphosyntax of the modern Celtic languages.]

**[LING 441(4441) Introduction to Germanic Linguistics (also GERST 441[4410]) (HA)]**

Spring. 4 credits. Prerequisite: LING 101 or permission of instructor. Next offered 2008-2009. W. Harbert. Survey of major issues in historical Germanic linguistics.]

**[LING 443[4443] Linguistic Structure of Russian (also RUSSA 403[4403]) (KCM)]**

Fall. 4 credits. Prerequisites: reading knowledge of Russian. Next offered 2007-2008. W. Browne. Synchronic analysis of the structure of modern Russian.]

**LING 450(4500) Lab Course: Language Development (also COGST 450[4500], HD 437[4370], PSYCH 437[4370])**

Spring. 2 credits. For description, see COGST 450.

**LING 455(4455) Greek Dialects (also CLASS 425[4455]) (KCM)**

Fall. 4 credits. A. Nussbaum. For description, see CLASS 425.

**[LING 456(4456) Archaic Latin (also CLASS 426[4456]) (LA)]**

Next offered 2007-2008. For description, see CLASS 426.]

**[LING 457(4457) Homeric Philology (also CLASS 427[4457]) # (LA)]**

Next offered 2008-2009. For description, see CLASS 427.]

**LING 459(4459) Mycenaean Greek (also CLASS 429[4459]) (LA)]**

Spring. 4 credits. M. Weiss. For description, see CLASS 429.

**[LING 460(4460) Sanskrit Comparative Grammar (also CLASS 490[4490]) (KCM)]**

Fall. 4 credits. Prerequisite: reasonable familiarity with classical Sanskrit morphology. Next offered 2007-2008. A. Nussbaum. Survey of the historical phonology and morphology of Sanskrit in relation to the Indo-Iranian and Indo-European comparative evidence.]

**LING 474(4474) Introduction to Natural Language Processing (also COGST 474, COM S 474[4740])**

Fall. 4 credits. C. Cardie. For description, see COM S 474.

**LING 493(4493) Honors Thesis Research**

Fall. 4 credits. Staff. May be taken before or after LING 494, or may be taken independently.

**LING 494(4494) Honors Thesis Research**

Spring. 4 credits. Staff. May be taken as a continuation of, or before, LING 493.

**[LING 501(6150) Issues in Biological Info Processing (also COGST 501[6150], PSYCH 501)]**

Next offered 2007-2008. For description, see COGST 501.]

**[LING 530(5530) Representation of Structure in Vision and Language (also COGST/PSYCH 530[6300])]**

Next offered 2007-2008. For description, see PSYCH 530.]

**LING 600(6600) Field Methods**

Spring. 4 credits. Prerequisites: LING 401 and 403 or permission of instructor. A. Cohn and J. Legate. Elicitation, recording, and analysis of data from a native speaker of a non-Western language not generally known to students.

**[LING 601(6601) Topics in Phonological Theory]**

Spring. 4 credits, variable. Prerequisites: LING 401 and one higher-level phonology course. Next offered 2007–2008. Staff.

Selected topics in current phonological theory.]

**[LING 602(6602) Topics in Morphology]**

Fall. 4 credits. Prerequisites: LING 401 or 403 or permission of instructor. Next offered 2007–2008. Staff.

Selected topics in current morphological theory.]

**LING 604(6604) Research Workshop**

Fall. 2 credits. Requirement for third-year linguistics graduate students. S-U grades only. M. Wagner.

Provides a forum for presentation and discussion of ongoing research, and development of professional skills. Participants must enroll in a concurrent independent study with a special committee member, or a relevant workshop.

**[LING 606(6606) Historical Syntax]**

Fall. 4 credits. Prerequisite: LING 403. Next offered 2008–2009. J. Whitman.]

**[LING 609(6609) SLA and the Asian Languages (also ASIAN 610[6610])]**

Next offered 2007–2008.]

**[LING 615(6615) Topics in Semantics]**

Fall. 4 credits. Prerequisite: LING 421 or permission of instructor. Next offered 2007–2008. D. Abusch.

Selected topics in semantic theory, focusing on recent literature.]

**LING 616(6616) Topics in Syntactic Theory**

Fall. 4 credits, variable. Prerequisite: LING 404 or permission of instructor. M. Diesing.

Examination of recent developments in syntactic theory, including "minimalist" approaches to phrase structure, derivations/representations and the nature of economy conditions, and parametric differences.

**[LING 617–618(6617–6618) Hittite]**

617, fall; 618, spring. 4 credits each semester. Prerequisites: for LING 617, permission of instructor; for LING 618, LING 617 or permission of instructor. Next offered 2007–2008. M. Weiss.

Introduction to the cuneiform writing system and the grammar of Hittite, followed by the reading of selected texts.]

**[LING 619(6619) Rigveda]**

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2008–2009. Staff.]

**[LING 621(6621) Avestan and Old Persian]**

Fall. 4 credits. Prerequisite: basic knowledge of Sanskrit forms and morphology syntax. Next offered 2008–2009. M. Weiss.

Linguistically oriented readings of Old Persian and Avestan.]

**LING 623–624(6623–6624) Old Irish I, II**

623, fall; 624, spring. 4 credits each semester. Prerequisite: for LING 624, LING 623 or permission of instructor. M. Weiss.

**[LING 625(6625) Middle Welsh]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2008–2009. W. Harbert.

Students develop a reading knowledge of Middle Welsh through translating selections from prose and poetry. No familiarity with Welsh is assumed.]

**[LING 631(6631) Comparative Indo-European Linguistics]**

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2008–2009. Staff. Introduction to the comparative grammar of the Indo-European languages.]

**LING 633(6633) Language Acquisition Seminar (also COGST/HD 633[6330])**

Fall. 1–4 credits. Prerequisite: LING 436 or equivalent or permission of instructor. B. Lust.

This seminar reviews and critiques current theoretical and experimental studies of first language acquisition, with a concentration on insights gained by cross-linguistic study of this area. Attention is also given to the development of research proposals.

**[LING 635–636(6635–6636) Indo-European Workshop]**

635, fall; 636, spring. 4 credits each semester. Prerequisite: permission of instructor. Next offered 2007–2008. M. Weiss.

An assortment of subjects intended for students with previous training in Indo-European linguistics.]

**[LING 637(6637) Introduction to Tocharian]**

Fall. 4 credits. Prerequisite: knowledge of other ancient IE language and historical linguistics methods. Next offered 2008–2009. M. Weiss.

Introduction to the grammar of Tocharian A and B.]

**LING 645(6645) Gothic**

Fall. 4 credits. Prerequisite: LING 101. Offered every three years. W. Harbert.

Linguistic structure of Gothic, with extensive readings of Gothic texts.

**LING 646(6646) Old High German, Old Saxon (also GERST 658[6580])**

Spring. 4 credits. Prerequisite: LING 101. Highly recommended: reading knowledge of Modern German. Offered every three years. W. Harbert.

Combines a survey of the linguistic history and structure of Old High German and Old Saxon with extensive readings from the major documents in which they are recorded.

**LING 648(6648) Speech Synthesis (also INFO 648[6648])**

Spring. 4 credits. Prerequisite: LING 401, 419, or permission of instructor. Offered alternate years. S. Hertz.

Investigates the nature of the acoustic structure of speech synthesis, using speech as a tool for exploring this structure. A particular acoustic model is proposed, developed, and motivated by considering the relationship between phonological and acoustic structure, speech timing, phonetic universals, coarticulation, and speech perception. The primary tool for investigation is the Delta System, a powerful software system for investigating phonology and phonetics through speech synthesis. The course is meant for graduate students and advanced undergraduate students in linguistics, but may also be of interest to students in psychology/psycholinguistics, computer science, and cognitive studies.

**[LING 649(6649) Structure of Old English]**

Fall. 4 credits. Prerequisite: LING 441. Offered every three years; next offered 2007–2008. W. Harbert.

Linguistic overview of Old English, with emphasis on phonology, morphology, and syntax.]

**[LING 661(6661) Old Church Slavonic (also RUSSA 601[6601])]**

Fall. 4 credits. Prerequisite: knowledge of Slavic or ancient Indo-European language. Prerequisite to LING 662 and 671. Next offered 2007–2008. W. Browne.

Grammar and reading of basic texts.]

**[LING 662(6662) Old Russian Texts (also RUSSA 602[6602])]**

Spring. 4 credits. Prerequisite: LING 661. Next offered 2007–2008. W. Browne.

Grammatical analysis and close reading of Old Russian texts.]

**[LING 671(6671) Comparative Slavic Linguistics (also RUSSA 651[6651])]**

Fall. 4 credits. Prerequisites: LING 661 taken previously or simultaneously, or permission of instructor. Offered alternate years; next offered 2007–2008. W. Browne.]

**LING 700(7700) Seminar**

Fall or spring. Credit TBA.

Seminars are offered according to faculty interest and student demand. Topics for 2006–2007 include: semantics; computational linguistics; language acquisition; and the nature of the interfaces between phonetics, phonology, and syntax.

**LING 701–702(7701–7702) Directed Research**

701, fall; 702, spring. 1–4 credits. Times TBA. Staff.

## MATHEMATICS

www.math.cornell.edu

D. Barbasch, chair; A. Back, Y. Berest, L. Billera, D. Bock, K. Brown, K. Calta, X. Cao, S. Chase, R. Connelly, R. K. Dennis, R. Durrett, E. Dynkin, L. Gross, J. Guckenheimer, A. Hatcher (DUS), D. Henderson, T. Holm, J. Hubbard, J. Hwang, Y. Ilyashenko, P. Kahn, M. Kassabov, G. Lawler, A. Lozano-Robledo, G. Michler, C. Muscalu, A. Nerode, M. Nussbaum, A. Pantano, I. Peeva, R. Ramakrishna, E. Rassart, T. Riley, L. Rogers, L. Saloff-Coste, A. Schatz, S. Sen, R. A. Shore, R. Sjamaar, J. Smillie, B. Speh, M. E. Stillman (DGS), R. Strichartz, E. Swartz, M. Terrell, R. Terrell, W. Thurston, A. Vladimirovsky, K. Vogtmann, L. Wahlbin, J. West. Emeritus: J. Bramble, M. Cohen, C. Earle, R. Farrell, H. Kesten, G. R. Livesay, M. Morley, L. E. Payne, A. Rosenberg, M. Sweedler.

Mathematics is the language of modern science; basic training in the discipline is essential for those who want to understand, as well as for those who want to take part in, the important scientific developments of our time. Acquaintance with mathematics is also extremely useful for students in the social sciences and valuable for anyone interested in the full range of human culture and the ways of knowing the universe in which we live.

The Department of Mathematics faculty has strong groups specializing in algebra, number theory, combinatorics, real and complex

analysis, Lie groups, topology and geometry, logic, probability and statistics, mathematical physics, and applied mathematics. Related departments at Cornell have specialists in computer science, operations research, linear programming, and game theory, and courses in these topics can be integrated readily into the mathematics major.

The department offers a rich variety of undergraduate courses, and many of its beginning graduate courses are suitable for advanced undergraduates as well. Under some conditions, a student may carry out an independent reading and research project for college credit under the supervision of a faculty member.

Members of the department are available to discuss with students the appropriate course for their levels of ability and interest, and students are urged to avail themselves of this help.

Students who want to take any of the courses numbered 300 or above are invited to confer, before registering, with the instructor concerned. The level of a course is indicated by the first digit of the course number: roughly, 1, 2, indicate underclass courses; 3, 4, upperclass courses; 5, professional level and mathematics education courses; 6, 7, graduate courses. The subject matter of courses is often indicated by the second digit: 0, general; 1, 2, analysis; 3, 4, algebra and combinatorics; 5, 6, topology and geometry; 7, probability and statistics; 8, logic; 9, other.

Midterm grades, when required, will be S or U only, except in special circumstances. In courses with numbers below 700, students will receive letter grades, with the exception of nonmathematics majors who have requested an S-U grade.

### Advanced Placement

Secondary school students are strongly urged to take one of the two advanced placement exams of the College Entrance Examination Board in their senior year. Freshmen who have had some calculus but who have not taken an advanced placement exam should take the placement exam in mathematics offered at Cornell just before the beginning of classes in the fall. Anyone with any knowledge of calculus should carefully read "Advanced Placement," p. 7.

### The Major

The mathematics major adapts to a number of purposes. It can emphasize the theoretical or the applied. It can be appropriate for professionals and nonprofessionals alike, and can be broad or narrow. It can also be combined easily with serious study in another subject in the physical, biological, or social sciences by means of a double major and/or concentration. For example, a double major in mathematics and computer science is facilitated by the concentration in computer science (requirement 4, option b) described below. This concentration permits a student to use certain computer science courses to satisfy the requirements of both majors. Questions concerning the major should be brought to a departmental representative.

#### Prerequisites

The traditional prerequisites are MATH 221-222, 223-224, or 293-294. Normally students will be admitted to the major only when they have grades of B- or better in all 200-

level mathematics courses taken. Alternative prerequisites are MATH 213 and 231, normally with grades of B+ or better.

#### Requirements

There are five requirements for the major:

1. COM S 100. Students are urged to take this course before the end of their sophomore year.
2. Two courses in algebra. Eligible courses are  
MATH 431 or 433  
MATH 432 or 434  
MATH 437  
MATH 332 or 336  
(Credit for both MATH 332 and 336 will be granted only if both were taken during or before spring 2002.)
3. Two courses in analysis. Eligible courses are MATH 311, 321, 323, 413, 414, 418, 420, 422, 424, 425, 428.
4. Five further high-level mathematical courses. Two-credit courses count as half courses. For students graduating in May 2007 or later, 500-level MATH courses will not normally count toward the major. In rare cases, exceptions are made. Students should consult their advisors. The seven alternatives (a-g) below do not exhaust the possibilities. A mathematics major interested in a concentration in a subject different from those below may develop a suitable individual program in consultation with his or her major advisor.

#### a. Concentration in Mathematics:

- i. Four additional MATH courses numbered 300 or above.
- ii. One course dealing with mathematical models. Any course from outside mathematics with serious mathematical content and dealing with scientific matters. Serious mathematical content includes, but is not limited to, extensive use of calculus or linear algebra. Any course from another department that would satisfy one of the other concentrations may be used. In addition, COM S 211, MATH 335/COM S 480, MATH/BIOEE 362, MATH 384/PHIL 330, MATH 481/PHIL 431, MATH 482/PHIL 432, MATH 483/PHIL 436, MATH/COM S 486, PHYS 116, 208, 213, or 217 may be used, but no other 100-level physics course, nor PHYS 207 or 209, may be used. Some courses in biology, chemistry, and other fields may be used.

#### b. Concentration in Computer Science: Five additional courses from (iii) and (iv) below, of which at least one is from (iii) and three are from (iv).

- iii. Mathematics courses numbered 300 or above.
- iv. Computer science courses with significant mathematical content. Eligible courses are: COM S 321, 322, 381, 400, 411, 421, 426, 427, 428, at most one of 465 and 467, 468, 474, 478, 480, 481, 482, 483, and 486. Students graduating in January 2007 or earlier may use

any COM S course numbered 300 or above to fulfill this requirement.

- c. **Concentration in Economics:** Five additional courses from (v), (vi), and (vii) below, as follows: one course from (v), three courses from (vi), and a fifth course from any of (v), (vi), or (vii). However, MATH 472 and ECON 319 cannot both be used to satisfy these requirements.
  - v. Mathematics courses numbered 300 or above.
  - vi. Economics courses with significant mathematical content. Eligible courses are ECON 319, 320, 325, 327, 368 (formerly 467), 416, 419, 450 (also AEM 450), 476, 477, 609, 610, 613, 614, 619, 620, 676, 677, 717, 748, 749, 756. For students graduating in May 2007 or later, only two of the econometrics courses (320, 325, 327, 748, 749) are allowed.
  - vii. Courses in operations research with significant mathematical content and dealing with material of interest in economics; e.g., OR&IE 320, 321, 432, 435, 474, and 476. However, the student may, with the advisor's approval, select an OR&IE course that satisfies the basic intent of the requirement but is not in this list.
- d. **Concentration in Mathematical Biology:** Five additional courses from (viii) and (ix) below, with three courses from (viii) and two courses from (ix).
  - viii. Biology courses that have mathematical content or provide background necessary for work at the interface between biology and mathematics. Examples include BIOBM/COM S 321, BIOEE/MATH 362, BIOEE 460, BIOGD 481, 484, 487, BIONB 330, 422, BTRY 382, 408, 409, 482. (BTRY 408 and 409 cannot be taken for credit with MATH 471 and 472.)
  - ix. Mathematics courses numbered above 300. Particularly appropriate are MATH 420 and 471.
- e. **Concentration in Mathematical Physics:** Five additional courses from (x) and (xi) below, of which at least one is from (x) and three are from (xi).
  - x. Mathematics courses in analysis, geometry, algebra and combinatorics, probability and statistics, and mathematical logic. Eligible courses are MATH 311, 321, 323, 401, 413, 414, 420, 418 or 422, 424, 425, 428, 431 or 433, 432 or 434, 437, 441, 442, 450, 451, 452, 453, 454, 455, 471, 472, 481, 482, 483, 486.
  - xi. Physics courses that make significant use of advanced mathematics. Eligible courses are PHYS 314, 316, 317, 318, 323, 327, 341, 443, 444, 445, 451, 454, 455, 456, 457, 480, 481.
- f. **Concentration in Operations Research:** Five additional courses from (xii) and (xiii) below, of which at least one is from (xii) and three are from (xiii).

- xii. Mathematics courses numbered 300 or above.
- xiii. Courses in operations research in which the primary focus involves mathematical techniques. Eligible courses are: OR&IE 320, 321, 360, 361, 431, 432, 434, 435, 436, 451, 462, 483. Many operations research graduate courses are also allowed. Students should consult with their advisors.

g. **Concentration in Statistics:** Five additional courses from (xiv), (xv), and (xvi) below, which include both from (xv) and at least two from (xvi). MATH 171 is recommended as an additional course, not counting toward the requirements. It should be taken, or audited, before or simultaneously with MATH 471.

xiv. Mathematics courses numbered 300 or above.

xv. MATH 471 and 472.

xvi. Courses in other departments with significant content in probability and statistics, complementing (xiv). Eligible courses are BTRY 302 and 482; OR&IE 361, 462, 464, 468, 469, 473, 474, and 476 (counted as half a course here); ILRST 312, 410, and 411; and ECON 320. Many graduate courses co-listed in the Department of Statistical Science are also allowed (e.g., BTRY 602, 603, and 604). Students should consult their advisors.

A course may be counted toward the mathematics major only if it is taken for a letter grade and a grade of C- or better is received for that course.

Major advisors can alter these requirements upon request from an advisee, provided the intent of the requirements is met.

#### Senior Thesis

A senior thesis can form a valuable part of a student's experience in the mathematics major. It is intended to allow students to cover significant areas of mathematics not covered in course work, or not covered there in sufficient depth. The work should be independent and creative. It can involve the solution of a serious mathematics problem, or it can be an expository work, or variants of these. Both the process of doing independent research and mathematics exposition, as well as the finished written product and optional oral presentation, can have a lasting positive impact on a student's educational and professional future.

#### Double Majors

The Departments of Computer Science, Economics, and Physics all permit double majors with the mathematics major, allowing the courses listed under the corresponding concentrations above to be counted for both majors. Students should consult the appropriate departments for any further conditions.

#### Honors Program

The Department of Mathematics awards honors (cum laude) and high honors (magna cum laude and summa cum laude) to graduating mathematics majors who have

demonstrated outstanding ability in the major program.

The awards are determined by the Mathematics Major Committee in the latter part of the semester before graduation. The committee will primarily be looking for excellent performance in mathematics courses, particularly in challenging courses at the 400 level or beyond. Participation in the honors seminar (MATH 401) for one semester, or independent study at a high performance level can also contribute to honors. Students interested in honors should consult their major advisors concerning suitable courses.

Outstanding performance in graduate classes or an excellent senior thesis can also contribute to high honors. Students interested in high honors should consult their major advisors and the chair of the department's Mathematics Major Committee during the second semester of their junior year.

### Teacher Education in Mathematics

For information on the various possibilities for students considering teaching mathematics in schools, go to [www.math.cornell.edu/Undergraduate/Teaching](http://www.math.cornell.edu/Undergraduate/Teaching).

### Studying Mathematics Outside the Major

The College of Arts and Sciences and the Department of Mathematics offer no minor or concentration in mathematics for students who are not math majors. However, some other scientific departments in the college offer, within their own majors, concentrations in mathematics and mathematics-related fields. A student interested in such a concentration should consult the director of undergraduate studies of his or her major department.

The College of Engineering offers a minor in applied mathematics that is open to any undergraduate in that college. The minor is sponsored jointly by the Department of Mathematics and the Department of Theoretical and Applied Mechanics, and is administered by the latter department. Engineering students interested in this minor should contact Professor Richard Rand of the Department of Theoretical and Applied Mechanics (255-7145; [rrh2@cornell.edu](mailto:rrh2@cornell.edu)).

The Department of Mathematics welcomes into its upper-level courses students from all colleges, schools, and departments at Cornell. In particular, undergraduates who wish to pursue serious study of mathematics, whether within or to complement their own major fields, are encouraged to consult with the department. The department's director of undergraduate studies and other faculty can provide assistance in selecting appropriate areas of study and individual courses.

### Distribution Requirement

The mathematics courses that can be used to satisfy the Mathematics and Quantitative Reasoning part of the Arts College distribution requirements are indicated by the symbol "(MQR)".

## Basic Sequences

### Precalculus

Description	Courses
1. Algebra and trigonometry to prepare students for calculus	MATH 109* or EDUC 005*
2. Algebra, analytic geometry, elements of calculus	EDUC 115*, MATH 100*

\*MATH 100, MATH 109, EDUC 005, and EDUC 115 do not carry credit for graduation in the Arts College.

Students who want a semester of calculus after EDUC 115 or MATH 100 may take MATH 106 or 111. Noncalculus alternatives are MATH 105 or 171.

### Calculus

Description	Mathematics Courses
1. Standard three-semester sequence for students who do not expect to take advanced courses in mathematics	111-112-213
2. Calculus for engineers (also taken by some physical science majors)	191-192-293-294

3. Several sequences are possible for prospective mathematics majors and others who expect to take advanced courses in mathematics: 111-112-221-222, 111-122-221-222, 111-122-223-224 or some mix of these courses. Students may also take the engineering sequence 191-192-293-294. Students are encouraged to consult with their advisors.

MATH 191 may be substituted for 112. The two-year sequences include some linear algebra. Students who take the three-semester sequence 111-112-213 may learn some linear algebra by taking MATH 231.

### Special-Purpose Sequences

Description	Mathematics Courses
1. Finite mathematics and calculus for life and social science majors	105-106
2. Other possible finite mathematics and calculus sequence	105-111
3. Calculus and statistics sequences	106-171 111-171

Students who want to take two semesters of calculus are advised to take the first two semesters of one of the three calculus sequences. Students with excellent performance in MATH 106 may follow that course with MATH 112 or 122. The courses in each of the calculus and statistics sequences may be taken in either order, since no calculus background is required for MATH 171. Each of the sequences listed here satisfies the mathematics requirement for most medical schools.

*Switching between calculus sequences is often difficult, especially at the 200 level. Students should not attempt such a switch without consulting the director of undergraduate studies.*



## Courses with Overlapping Content

Because the department offers many courses with overlapping content, students must choose their courses carefully to ensure that they will receive credit for each course they take. Listed below are groups of courses that have similar content. Students will receive credit for only one of the courses in each group.

106, 111  
112, 122, 191  
192, 213, 222, 224  
221, 223, 231, 294  
332, 335, 336\*  
431 and 433  
432 and 434

\*Credit for both MATH 332 and MATH 336 will be granted only if both were taken during or before spring 2002.

**Note:** Courses with overlapping content are not necessarily equivalent courses. Students are encouraged to consult a mathematics faculty member when choosing between them.

## Fees

In some courses there may be a small fee for photocopying materials to be handed out to students.

## Summer Courses

A list of mathematics courses usually offered every summer can be found in the School of Continuing Education and Summer Sessions section of this catalog. Students interested in taking summer courses in mathematics should consult the Department of Mathematics web site ([www.math.cornell.edu](http://www.math.cornell.edu)). A tentative summer listing may be available as early as October.

## Undergraduate Course Offerings

Please visit [www.math.cornell.edu](http://www.math.cornell.edu) for further information and up-to-the-minute corrections.

Foundation courses: 105, 106, 111, 112, 122, 191, 192, 213, 221, 222, 223, 224, 231, 293, 294

Mathematics Education: 408, 451

History of Mathematics: 403

General and Liberal Arts Courses: 103, 134, 135, 171, 201, 304, 401, 408

Analysis: 311, 321, 413, 414, 418

Algebra and Number Theory: 332, 335, 336, 431, 432, 433, 434, 437

Combinatorics: 441, 442, 455

Geometry and Topology: 356, 450, 451, 452, 453, 454

Probability and Statistics: 171, 275, 471, 472

Mathematical Logic: 281, 384, 481, 482, 483, 486

Applied Analysis and Differential Equations: 323, 362, 420, 422, 424, 425, 428

### MATH 005(0005) Academic Support for MATH 105

Fall, 1 transcript credit only; cannot be used toward graduation. Reviews material presented in MATH 105 lectures, provides problem-solving techniques and tips as well as prelim review. Provides further instruction for students who need reinforcement. Not a substitute for MATH 105 lectures or recitations.

### MATH 006(0006) Academic Support for MATH 106

Spring, 1 transcript credit only; cannot be used toward graduation. Reviews material presented in MATH 106 lectures, provides problem-solving techniques and tips as well as prelim review. Provides further instruction for students who need reinforcement. Not a substitute for MATH 106 lectures or recitations.

### MATH 011(0011) Academic Support for MATH 111

Fall, spring, 1 transcript credit only; cannot be used toward graduation. Reviews material presented in MATH 111 lectures, provides problem-solving techniques and tips as well as prelim review. Provides further instruction for students who need reinforcement. Not a substitute for MATH 111 lectures or recitations.

### MATH 012(0012) Academic Support for MATH 112

Fall, spring, 1 transcript credit only; cannot be used toward graduation. Reviews material presented in MATH 112 lectures, provides problem-solving techniques and tips as well as prelim review. Provides further instruction for students who need reinforcement. Not a substitute for MATH 112 lectures or recitations.

### MATH 100(1000) Calculus Preparation

Fall, spring, 2 transcript credits only; cannot be used toward graduation. Introduces a wide variety of topics of algebra and trigonometry that have applications in various disciplines. Emphasis is on the development of linear, polynomial, rational, trigonometric, exponential, and logarithmic functions. Students will have a better understanding of the behavior of these functions in their application to calculus because of the strong emphasis on graphing. Application of these mathematical ideas is addressed in problem-solving activities.

### MATH 103(1103) Mathematical Explorations (MQR)

Fall, spring, summer, 3 credits. For students who wish to experience how mathematical ideas naturally evolve. The homework consists of the students actively investigating mathematical ideas. The course emphasizes ideas and imagination as opposed to techniques and calculations. Topics vary depending on the instructor and are announced ([www.math.cornell.edu](http://www.math.cornell.edu)) several weeks before the semester begins. Some assessment is done through writing assignments.

### MATH 105(1105) Finite Mathematics for the Life and Social Sciences (MQR)

Fall, 3 credits. Prerequisite: three years high school mathematics, including trigonometry and logarithms. Introduction to linear algebra, probability, and Markov chains that develops the parts of the theory most relevant for applications. Specific topics include equations of lines, the method of least squares, solutions of linear systems, matrices; basic concepts of probability, permutations, combinations, binomial distribution, mean and variance, and the normal approximation to the binomial distribution. Examples from biology and the social sciences are used.

### MATH 106(1106) Calculus for the Life and Social Sciences (MQR)\*

Spring, 3 credits. Prerequisite: readiness for calculus, such as can be obtained from three years of high school mathematics (including trigonometry and logarithms) or from MATH 100, MATH 109, or EDUC 115. For students planning to take MATH 112, MATH 111 is recommended rather than 106.

Introduction to differential and integral calculus, partial derivatives, elementary differential equations. Examples from biology and the social sciences are used.

### MATH 109(1109) Precalculus Mathematics

Summer, 3 transcript credits only; cannot be used toward graduation. Designed to prepare students for MATH 111. Reviews algebra, trigonometry, logarithms, and exponentials.

### MATH 111(1110) Calculus I (MQR)\*

Fall, spring, summer, 4 credits. Prerequisite: MATH 109 or three years of high school mathematics, including trigonometry and logarithms. Topics include functions and graphs, limits and continuity, differentiation and integration of algebraic, trigonometric, inverse trig, logarithmic, and exponential functions; applications of differentiation, including graphing, max-min problems, tangent line approximation, implicit differentiation, and applications to the sciences; the mean value theorem; and antiderivatives, definite and indefinite integrals, the fundamental theorem of calculus, substitution in integration, the area under a curve. Graphing calculators are used, and their pitfalls are discussed, as applicable to the above topics. MATH 111 can serve as a one-semester introduction to calculus or as part of a two-semester sequence in which it is followed by MATH 112 or 122.

### MATH 112(1120) Calculus II (MQR)\*

Fall, spring, 4 credits. Prerequisite: MATH 111 with grade of C or better or excellent performance in MATH 106. Those who do well in MATH 111 and expect to major in mathematics or strongly mathematics-related field should take 122 instead of 112.

Focuses on integration: applications, including volumes and arc length; techniques of integration, approximate integration with error estimates, improper integrals, differential equations (separation of variables, initial conditions, systems, some applications). Also covers infinite sequences and series: definition and tests for convergence, power series, Taylor series with remainder, and parametric equations.

### MATH 122(1220) Honors Calculus II (MQR)\*

Fall, 4 credits. Prerequisite: one semester of calculus with high performance or permission of department. Students planning to continue with MATH 213 are advised to take 112 instead of this course. Takes a more theoretical approach to calculus than MATH 112. Topics include differentiation and integration of elementary transcendental functions, techniques of integration, applications, polar coordinates, infinite series, and complex numbers, as well as an introduction to proving theorems.

\*See the list of courses with overlapping content at the end of the introduction.

**MATH 134(1340) Mathematics and Politics**

Fall, spring, 4 credits.

We apply mathematical reasoning to some problems arising in the social sciences. We discuss game theory and its applications to political and historical conflicts. Power indices are introduced and used to analyze some political institutions. The problem of finding a fair election procedure to choose among three or more alternatives is analyzed.

**MATH 135(1350) The Art of Secret Writing (MQR)**

Fall, spring, summer, 3 credits.

Prerequisite: three years high school mathematics.

Examines classical and modern methods of message encryption, decryption, and cryptanalysis. Mathematical tools are developed to describe these methods (modular arithmetic, probability, matrix arithmetic, number theory), and some of the fascinating history of the methods and people involved is presented.

**MATH 171(1710) Statistical Theory and Application in the Real World (MQR)**

Fall, spring, summer, 4 credits.

Prerequisite: high school mathematics. No previous familiarity with computers presumed. No credit if taken after ECON 319, 320, or 321.

Introductory statistics course discussing techniques for analyzing data occurring in the real world and the mathematical and philosophical justification for these techniques. Topics include population and sample distributions, central limit theorem, statistical theories of point estimation, confidence intervals, testing hypotheses, the linear model, and the least squares estimator. The course concludes with a discussion of tests and estimates for regression and analysis of variance (if time permits). The computer is used to demonstrate some aspects of the theory, such as sampling distributions and the Central Limit Theorem. In the lab portion of the course, students learn and use computer-based methods for implementing the statistical methodology presented in the lectures.

**MATH 191(1910) Calculus for Engineers (MQR)**

Fall, spring, summer, 4 credits.

Prerequisite: three years high school mathematics including trigonometry and logarithms and at least one course in differential and integral calculus.

Essentially a second course in calculus. Topics include techniques of integration, finding areas and volumes by integration, exponential growth, partial fractions, infinite sequences and series, and power series.

**MATH 192(1920) Multivariable Calculus for Engineers (MQR)\***

Fall, spring, summer, 4 credits.

Prerequisite: MATH 191.

Introduction to multivariable calculus. Topics include partial derivatives, double and triple integrals, line integrals, vector fields, Green's theorem, Stokes' theorem, and the divergence theorem.

**MATH 201(2010) Invitation to Higher Math: Algebra and Geometry (MQR)**

Spring, 3 credits.

Provides a preview of some of the more advanced parts of mathematics that do not involve calculus. Topics are chosen for their intrinsic interest and beauty rather than practical utility. One theme is to see some of the strange and surprising mathematical universes that can be constructed when one is not confined to the everyday real world. Another theme is the rich interplay between algebra and geometry, how each illuminates the other. A high point is a geometric proof that there is no general formula for solving polynomial equations of degree five and greater such as the well-known quadratic formula. Intended for students who may be considering a math major, or who just like math and are good at it.

**MATH 213(2130) Calculus III (MQR)\***

Fall, spring, 4 credits. Prerequisite: MATH 112, 122, or 191.

Designed for students who wish to master the basic techniques of multivariable calculus, but whose major will not require a substantial amount of mathematics. Topics include vectors and vector-valued functions; multivariable and vector calculus including multiple and line integrals; first- and second-order differential equations with applications; systems of differential equations; and elementary partial differential equations. The course may emphasize different topics in the syllabus in different semesters.

**MATH 221(2210) Linear Algebra (MQR)\***

Fall, spring, 4 credits. Prerequisite: two semesters of calculus with high performance or permission of department. Recommended for students who plan to major in mathematics or a related field. For a more applied version of this course, see MATH 231.

Topics include vector algebra, linear transformations, matrices, determinants, orthogonality, eigenvalues, and eigenvectors. Applications are made to linear differential equations.

**MATH 222(2220) Multivariable Calculus (MQR)\***

Fall, spring, 4 credits. Prerequisite: MATH 221. Recommended for students who plan to major in mathematics or a related field. Differential and integral calculus of functions in several variables, line and surface integrals as well as the theorems of Green, Stokes, and Gauss.

**MATH 223(2230) Theoretical Linear Algebra and Calculus (MQR)\***

Fall, 4 credits. Prerequisite: two semesters of calculus with grade of A- or better, or permission of instructor.

MATH 223-224 provides an integrated treatment of linear algebra and multivariable calculus designed for students who have been highly successful in their previous calculus courses. The material is presented at a higher theoretical level than in 221-222. Topics in 223 include vectors, matrices, and linear transformations; differential calculus of functions of several variables; inverse and implicit function theorems; quadratic forms, extrema, and manifolds; multiple and iterated integrals.

**MATH 224(2240) Theoretical Linear Algebra and Calculus (MQR)\***

Spring, 4 credits. Prerequisite: MATH 223.

Topics include vector fields; line integrals; differential forms and exterior derivative; work, flux, and density forms; integration of forms over parametrized domains; and Green's, Stokes', and divergence theorems.

**MATH 231(2310) Linear Algebra with Applications (MQR)\***

Fall, spring, 3 credits. Prerequisite: MATH 111 or equivalent. Students who plan to major in mathematics should take MATH 221 or 294.

Introduction to linear algebra for students who wish to focus on the practical applications of the subject. A wide range of applications are discussed and computer software may be used. The main topics are systems of linear equations, matrices, determinants, vector spaces, orthogonality, and eigenvalues. Typical applications are population models, input/output models, least squares, and difference equations.

**MATH 275(2750) Living in a Random World (MQR)**

Spring, 3 credits. Prerequisite: one semester of calculus. Some familiarity with integration and differentiation is useful, but the equivalent of a one-semester course in calculus is more than enough.

Concentrates on applications of probability in the physical, biological, and social sciences, and to understanding the world around us (e.g., games, lotteries, option pricing, and opinion polls).

**MATH 281(2810) Deductive Logic (also PHIL 331(3310)) (MQR)**

Fall, 4 credits. H. Hodes.

For description, see PHIL 331.

**MATH 293(2930) Differential Equations for Engineers (MQR)**

Fall, spring, summer, 4 credits.

Prerequisite: MATH 192. Taking MATH 293 and 294 simultaneously is not recommended.

Introduction to ordinary and partial differential equations. Topics include: first-order equations (separable, linear, homogeneous, exact); mathematical modeling (e.g., population growth, terminal velocity); qualitative methods (slope fields, phase plots, equilibria, and stability); numerical methods; second-order equations (method of undetermined coefficients, application to oscillations and resonance, boundary-value problems and eigenvalues); Fourier series; linear partial differential equations (heat flow, waves, the Laplace equation); and linear systems of ordinary differential equations.

**MATH 294(2940) Linear Algebra for Engineers (MQR)\***

Fall, spring, summer, 4 credits.

Prerequisite: MATH 192. Taking MATH 293 and 294 simultaneously is not recommended.

Linear algebra and its applications. Topics include matrices, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and inner product spaces; applications include brief introductions to difference equations, Markov chains, and systems of linear ordinary differential equations. May include computer use in solving problems.

\*See the list of courses with overlapping content at the end of the introduction.

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**MATH 304(3040) Prove It! (MQR)**

Spring. 4 credits. Prerequisite: MATH 221, 223, 294, or permission of instructor.

In mathematics, the methodology of proof provides a central tool for confirming the validity of mathematical assertions, functioning much as the experimental method does in the physical sciences. In this course, students learn various methods of mathematical proof, starting with basic techniques in propositional and predicate calculus and in set theory and combinatorics, and then moving to applications and illustrations of these via topics in one or more of the three main pillars of mathematics: algebra, analysis, and geometry. Since cogent communication of mathematical ideas is important in the presentation of proofs, the course emphasizes clear, concise exposition. This course is useful for all students who wish to improve their skills in mathematical proof and exposition, or who intend to study more advanced topics in mathematics.

**MATH 311(3110) Introduction to Analysis (MQR)**

Fall, spring. 4 credits. Prerequisites: MATH 221-222, 223-224, or 192 and 294.

Provides a transition from calculus to real analysis. Topics include rigorous treatment of fundamental concepts in calculus: including limits and convergence of sequences and series, compact sets; continuity, uniform continuity and differentiability of functions. Emphasis is placed upon understanding and constructing mathematical proofs.

**MATH 321(3210) Manifolds and Differential Forms (MQR)**

Fall. 4 credits. Prerequisites: multivariable calculus and linear algebra (e.g., MATH 221-222, 223-224, or 192 and 294).

A manifold is a type of subset of Euclidean space that has a well-defined tangent space at every point. Such a set is amenable to the methods of multivariable calculus. After a review of some relevant calculus, this course investigates manifolds and the structures that they are endowed with, such as tangent vectors, boundaries, orientations, and differential forms. The notion of a differential form encompasses such ideas as surface and volume forms, the work exerted by a force, the flow of a fluid, and the curvature of a surface, space, or hyperspace. The course re-examines the integral theorems of vector calculus (Green, Gauss, and Stokes) in the light of differential forms and apply them to problems in partial differential equations, topology, fluid mechanics, and electromagnetism.

**MATH 323(3230) Introduction to Differential Equations (MQR)**

Fall. 4 credits. Prerequisites: multivariable calculus and linear algebra (e.g., MATH 221-222, 223-224, or 192 and 294), or permission of instructor.

Intended for students who want a brief one-semester introduction to the theory and techniques of both ordinary and partial differential equations. Topics for ordinary differential equations may include initial-value and two-point boundary value problems, the basic existence and uniqueness theorems, continuous dependence on data, stability of fix-points, numerical methods, special functions. Topics for partial differential equations may include the Poisson, heat and wave equations, boundary and initial-boundary value problems, maximum

principles, continuous dependence on data, separation of variables, Fourier series, Green's functions, numerical methods, transform methods.

**MATH 332(3320) Algebra and Number Theory (MQR)\***

Fall. 4 credits. Prerequisite: MATH 221, 223, 231 or 294.

Covers various topics from number theory and modern algebra. Usually includes most of the following: primes and factorization, Diophantine equations, congruences, quadratic reciprocity, continued fractions, rings and fields, finite groups, and an introduction to the arithmetic of the Gaussian integers and quadratic fields. Motivation and examples for the concepts of abstract algebra are derived primarily from number theory and geometry.

**MATH 335(3350) Introduction to Cryptology (also COM S 480[4870]) (MQR)**

Fall, spring. 3 credits. Prerequisites: MATH 221-222, 223-224, or 192 and 294, and COM S 100 or equivalent.

Introduction to the algorithmic and mathematical concepts of cryptanalysis. Topics include security vs. feasibility and different types of cryptographic attack, elementary probability, number theory, cryptographic hash functions, and secret and public key cryptography.

**MATH 336(3360) Applicable Algebra (MQR)\***

Spring, summer. 4 credits. Prerequisite: MATH 221, 223, 231, or 294.

Introduction to the concepts and methods of abstract algebra and number theory that are of interest in applications. Covers the basic theory of groups, rings and fields and their applications to such areas as public-key cryptography, error-correcting codes, parallel computing, and experimental designs. Applications include the RSA cryptosystem and use of finite fields to construct error-correcting codes and Latin squares. Topics include elementary number theory, Euclidean algorithm, prime factorization, congruences, theorems of Fermat and Euler, elementary group theory, Chinese remainder theorem, factorization in the ring of polynomials, and classification of finite fields.

**MATH 356(3560) Groups and Geometry (MQR)**

Spring. 4 credits. Prerequisite: MATH 221, 223, 231 or 294. Prior knowledge of group theory is not a prerequisite.

A geometric introduction to the algebraic theory of groups, through the study of symmetries of planar patterns and 3-dimensional regular polyhedra. Besides studying these algebraic and geometric objects themselves, the course also provides an introduction to abstract mathematical thinking and mathematical proofs, serving as a bridge to the more advanced 400-level courses. Abstract concepts covered include: axioms for groups; subgroups and quotient groups; isomorphisms and homomorphisms; conjugacy; group actions, orbits, and stabilizers. These are all illustrated concretely through the visual medium of geometry.

**[MATH 362(3620) Dynamic Models in Biology (also BIOEE 362[3620]) (MQR)]**

Spring. 4 credits. Prerequisite: two semesters of introductory biology (BIO G 101-102, 105-106, 107-108, 109-110, or equivalent) and completion of math requirements for biological sciences major or equivalent. Next offered 2007-2008.

For description, see BIOEE 362.]

**MATH 401(4010) Honors Seminar: Topics in Modern Mathematics (MQR)**

Spring. 4 credits. Prerequisite: two mathematics courses numbered 300 or higher or permission of instructor.

Participatory seminar aimed primarily at introducing senior and junior mathematics majors to some of the challenging problems and areas of modern mathematics. Helps students develop research and expository skills in mathematics, which is important for careers in any field that makes significant use of the mathematical sciences (i.e., pure or applied mathematics, physical or biological sciences, business and industry, medicine). Content varies from year to year.

**MATH 403(4030) History of Mathematics # (MQR)**

Spring. 4 credits. Prerequisite: two mathematics courses above 300, or permission of instructor.

Survey of the development of mathematics from antiquity to the present, with an emphasis on the achievements, problems, and mathematical viewpoints of each historical period and the evolution of such basic concepts as number, geometry, construction, and proof. Readings from original sources in translation. Students are required to give oral and written reports.

**[MATH 408(4080) Mathematics in Perspective (MQR)]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008.

Re-examines very basic mathematics from an advanced perspective, emphasizing the connections between branches and ties of current mathematical interest. Emphasis on communication of mathematics.]

**MATH 413(4130) Honors Introduction to Analysis I (MQR)**

Fall, spring. 4 credits. Prerequisite: high level of performance in MATH 221-222, 223-224, or 192 and 294 and familiarity with proofs. Students who do not intend to take MATH 414 are encouraged to take MATH 413 in spring.

Introduction to the rigorous theory underlying calculus, covering the real number system and functions of one variable. Based entirely on proofs. The student is expected to know how to read and, to some extent, construct proofs before taking this course. Topics typically include construction of the real number system, properties of the real number system, continuous functions, differential and integral calculus of functions of one variable, sequences and series of functions.

**MATH 414(4140) Honors Introduction to Analysis II (MQR)**

Spring. 4 credits. Prerequisite: MATH 413.

Proof-based introduction to further topics in analysis. Topics may include the Lebesgue measure and integration, functions of several variables, differential calculus, implicit function theorem, infinite dimensional normed

\*See the list of courses with overlapping content at the end of the introduction.

and metric spaces, Fourier series, ordinary differential equations.

**MATH 418(4180) Introduction to the Theory of Functions of One Complex Variable (MQR)**

Spring. 4 credits. Prerequisite: MATH 223–224, 311, or 413 or permission of instructor.

Theoretical and rigorous introduction to complex variable theory. Topics include complex numbers, differential and integral calculus for functions of a complex variable including Cauchy's theorem and the calculus of residues, elements of conformal mapping. Students interested in the applications of complex analysis should consider MATH 422.

**MATH 420(4200) Differential Equations and Dynamical Systems (MQR)**

Fall, spring. 4 credits. Prerequisite: high level of performance in MATH 221–222, 223–224, 192 and 294, or permission of instructor.

Covers ordinary differential equations in one and higher dimensions: qualitative, analytic, and numerical methods. Emphasis is on differential equations as models and the implications of the theory for the behavior of the system being modeled and includes an introduction to bifurcations.

**MATH 422(4220) Applied Complex Analysis (MQR)**

Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, 192 and 294, or 213 and 231. Undergraduates who plan to attend graduate school should take MATH 418.

Covers complex variables, Fourier transforms, Laplace transforms and applications to partial differential equations. Additional topics may include an introduction to generalized functions.

**MATH 424(4240) Wavelets and Fourier Series (MQR)**

Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, 192 and 294, or permission of instructor.

Both Fourier series and wavelets provide methods to represent or approximate general functions in terms of simple building blocks. Such representations have important consequences, both for pure mathematics and for applications. Fourier series use *natural* sinusoidal building blocks and may be used to help solve differential equations. Wavelets use *artificial* building blocks that have the advantage of localization in space. A full understanding of both topics requires a background involving Lebesgue integration theory and functional analysis. This course presents as much as possible on both topics without such formidable prerequisites. The emphasis is on clear statements of results and key ideas of proofs, working out examples, and applications. Related topics that may be included are Fourier transforms, Heisenberg uncertainty principle, Shannon sampling theorem, and Poisson summation formula.

**[MATH 425(4250) Numerical Analysis and Differential Equations (MQR)]**

Fall. 4 credits. Prerequisite: MATH 221–222, 223–224, or 192 and 294, one course numbered 300 or higher in mathematics and COM S 100, or permission of instructor. Next offered 2007–2008.

Introduction to the fundamentals of numerical analysis: error analysis, interpolation, direct and iterative methods for systems of

equations, numerical integration. Applications to solving differential equations.]

**MATH 428(4280) Introduction to Partial Differential Equations (MQR)**

Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, or 192 and 294, or permission of instructor.

Topics are selected from first-order quasilinear equations, classification of second-order equations, with emphasis on maximum principles, existence, uniqueness, stability, Fourier series methods, approximation methods.

**MATH 431(4310) Linear Algebra (MQR)\***

Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294. Undergraduates who plan to attend graduate school in mathematics should take MATH 433–434.

Introduction to linear algebra, including the study of vector spaces, linear transformations, matrices, and systems of linear equations. Additional topics are quadratic forms and inner product spaces, canonical forms for various classes of matrices and linear transformations.

**MATH 432(4320) Introduction to Algebra (MQR)\***

Spring. 4 credits. Prerequisite: MATH 332, 336, 431 or 433, or permission of instructor. Undergraduates who plan to attend graduate school in mathematics should take MATH 433–434.

Introduction to various topics in abstract algebra, including groups, rings, fields, factorization of polynomials and integers, congruences, and the structure of finitely generated abelian groups. Optional topics are modules over Euclidean domains and Sylow theorems.

**MATH 433(4330) Honors Linear Algebra (MQR)\***

Fall. 4 credits. Prerequisite: high level of performance in MATH 221, 223, 231, or 294.

Honors version of a course in advanced linear algebra, which treats the subject from an abstract and axiomatic viewpoint. Topics include vector spaces, linear transformations, polynomials, determinants, tensor and wedge products, canonical forms, inner product spaces, and bilinear forms. Emphasis is on understanding the theory of linear algebra; homework and exams include at least as many proofs as computational problems. For a less theoretical course that covers approximately the same subject matter, see MATH 431.

**MATH 434(4340) Honors Introduction to Algebra (MQR)\***

Spring. 4 credits. Prerequisite: MATH 332, 336, 431, or 433, or permission of instructor.

Honors version of a course in abstract algebra, which treats the subject from an abstract and axiomatic viewpoint, including universal mapping properties. Topics include groups, groups acting on sets, Sylow theorems; rings, factorization: Euclidean rings, principal ideal domains and unique factorization domains, the structure of finitely generated modules over a principal ideal domain, fields, and Galois theory. The course emphasizes understanding the theory with proofs in both homework and exams. An optional computational component using the computer

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language GAP is available. For a less theoretical course that covers similar subject matter, see MATH 432.

**MATH 437(4370) Computational Algebra**

Fall. 4 credits. Prerequisite: linear algebra (MATH 294, or MATH 221, or MATH 431).

Introduction to Gröbner bases theory, which is the foundation of many algorithms in computational algebra. In this course, students learn how to compute a Gröbner basis for polynomials in many variables. Covers the following applications: solving systems of polynomial equations in many variables, solving diophantine equations in many variables, 3-colorable graphs, and integer programming. Such applications arise, for example, in computer science, engineering, economics, and physics.

**MATH 441(4410) Introduction to Combinatorics I (MQR)**

Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294.

Combinatorics is the study of discrete structures that arise in a variety of areas, particularly in other areas of mathematics, computer science, and many areas of application. Central concerns are often to count objects having a particular property (e.g., trees) or to prove that certain structures exist (e.g., matchings of all vertices in a graph). The first semester of this sequence covers basic questions in graph theory, including extremal graph theory (how large must a graph be before one is guaranteed to have a certain subgraph) and Ramsey theory (which shows that large objects are forced to have structure). Variations on matching theory are discussed, including theorems of Dilworth, Hall, König, and Birkhoff, and an introduction to network flow theory. Methods of enumeration (inclusion/exclusion, Möbius inversion, and generating functions) are introduced and applied to the problems of counting permutations, partitions, and triangulations.

**[MATH 442(4420) Introduction to Combinatorics II (MQR)]**

Spring. 4 credits. Prerequisite: MATH 221, 223, 231, or 294. Next offered 2007–2008.

Continues 441, although formally independent. Latin squares, combinatorial designs, classical finite geometries and combinatorial geometries (matroids). Partially ordered sets, Möbius inversion, Polya counting theory.]

**MATH 450(4500) Matrix Groups**

Fall. 4 credits. Prerequisite: MATH 221–222, 223–224, or 192 and 294.

An introduction to a topic that is central to mathematics and important in physics too, although usually taught only at the graduate level as in MATH 650, Lie Groups. The objects of study are certain classes of matrices, such as orthogonal, unitary, or symplectic matrices. These classes have both algebraic structure (groups) and geometric/topological structure (manifolds). Thus the course will be a mixture of algebra and geometry/topology, with a little analysis as well. Concrete examples will be emphasized, as is appropriate for an undergraduate introduction. Background not included in the official prerequisites will be developed as needed.

**MATH 451(4510) Euclidean and Spherical Geometry (MQR)**

Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294, or permission of instructor.



Covers topics from Euclidean and spherical (non-Euclidean) geometry. Nonlecture, seminar-style course organized around student participation.

**[MATH 452(4520) Classical Geometries (MQR)**

Spring. 4 credits. Prerequisite: MATH 221, 223, 231, or 294, or permission of instructor. Offered alternate years; next offered 2007-2008.

Introduction to hyperbolic and projective geometry—the classical geometries that developed as Euclidean geometry was better understood.]

**MATH 453(4530) Introduction to Topology (MQR)**

Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294, plus at least one mathematics course numbered 300 or above, or permission of instructor.

Topology may be described briefly as qualitative geometry. This course begins with basic point-set topology, including connectedness, compactness, and metric spaces. Later topics may include the classification of surfaces (such as the Klein bottle and Möbius band), elementary knot theory, or the fundamental group and covering spaces.

**MATH 454(4540) Introduction to Differential Geometry (MQR)**

Spring. 4 credits. Prerequisites: MATH 221-222, 223-224, or 293-294, plus at least one mathematics course numbered 300 or above. MATH 453 is not a prerequisite.

Differential geometry involves using calculus to study geometric concepts such as curvature and geodesics. This introductory course focuses on the differential geometry of curves and surfaces. It may also touch upon the higher-dimensional generalizations, Riemannian manifolds, which underlie the study of general relativity.

**MATH 455(4550) Applicable Geometry (MQR)**

Spring. 4 credits. Prerequisite: good introduction to linear algebra (e.g., MATH 221, 223, 231, or 294) or permission of instructor. Does not assume students know the meaning of all words in the following description.

Introduction to the theory of  $n$ -dimensional convex polytopes and polyhedra and some of its applications, with an in-depth treatment of the case of 3-dimensions. Discusses both combinatorial properties (e.g., face counts) as well as metric properties (e.g., rigidity). Covers theorems of Euler, Cauchy, and Steinitz, Voronoi diagrams and triangulations, convex hulls, cyclic polytopes, shellability and the upper-bound theorem. Relates these ideas to applications in tiling, linear inequalities and linear programming, structural rigidity, computational geometry, hyperplane arrangements and zonotopes.

**MATH 471(4710) Basic Probability (MQR)**

Fall, spring. 4 credits. Prerequisites: one year of calculus. Recommended: some knowledge of multivariate calculus.

Introduction to probability theory, which prepares the student to take MATH 472. The course begins with basics: combinatorial probability, mean and variance, independence, conditional probability, and Bayes formula. Density and distribution functions and their properties are introduced. The law of large numbers and the central limit theorem are

stated and their implications for statistics are discussed.

**MATH 472(4720) Statistics (MQR)**

Spring. 4 credits. Prerequisites: MATH 471 and knowledge of linear algebra (e.g., MATH 221). Recommended: some knowledge of multivariable calculus.

Statistics have proved to be an important research tool in nearly all of the physical, biological, and social sciences. This course serves as an introduction to statistics for students who already have some background in calculus, linear algebra, and probability theory. Topics include parameter estimation, hypothesis testing, and linear regression. The course emphasizes both the mathematical theory of statistics and techniques for data analysis that are useful in solving scientific problems.

**MATH 481(4810) Mathematical Logic (also PHIL 431(4310)) (MQR)**

Spring. 4 credits. Prerequisites: MATH 222 or 223 and preferably some additional course involving proofs in mathematics, computer science, or philosophy.

First course in mathematical logic providing precise definitions of the language of mathematics and the notion of proof (propositional and predicate logic). The completeness theorem says that we have all the rules of proof we could ever have. The Gödel incompleteness theorem says that they are not enough to decide all statements even about arithmetic. The compactness theorem exploits the finiteness of proofs to show that theories have unintended (nonstandard) models. Possible additional topics: the mathematical definition of an algorithm and the existence of noncomputable functions; the basics of set theory to cardinality and the uncountability of the real numbers.

**MATH 486(4860) Applied Logic (also COM S 486(4860)) (MQR)**

Spring. 4 credits. Prerequisites: MATH 221-222, 223-224, or 192 and 294; COM S 280 or equivalent (e.g., MATH 332, 336, 432, 434, or 481); and additional course in mathematics or theoretical computer science.

Covers propositional and predicate logic; compactness and completeness by tableaux, natural deduction, and resolution. Other possible topics include equational logic; Herbrand Universes and unification; rewrite rules and equational logic, Knuth-Bendix method and the congruence-closure algorithm and lambda-calculus reduction strategies; topics in Prolog, LISP, ML, or Nuprl; and applications to expert systems and program verification.

**MATH 490(4900) Supervised Reading and Research**

Fall, spring. 1-6 credits.

Supervised reading and research by arrangement with individual professors. Not for material currently available in regularly scheduled courses.

**Professional-Level and Mathematics Education Courses**

**[MATH 505(5050) Educational Issues in Undergraduate Mathematics**

Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Next offered 2007-2008.

Examines various educational issues in undergraduate mathematics and the

relationship of these issues to the mathematics itself. The precise choice of topics varies, but the intent is that a balance of different views be presented and discussed.]

**MATH 507(5070) Teaching Secondary Mathematics: Theory and Practices**

Spring. 4 credits.

Provides direct experience of new approaches, curricula, and standards in mathematics education. Discussion of articles, activities for the secondary classroom, and videotape of classroom teaching are tied to in-class exploration of math problems. Experience in the computer lab, examining software environments and their use in the mathematics classroom is included. Participants are expected to write short papers, share ideas in class, and present their opinions on issues.

**MATH 508(5080) Mathematics for Secondary School Teachers**

Fall, spring. 1-6 credits. Prerequisite: secondary school mathematics teachers or permission of instructor.

Examination of the principles underlying the content of the secondary school mathematics curriculum, including connections with the history of mathematics and current mathematics research.

**Graduate Courses**

Many of our graduate courses are topics courses for which descriptions are not included here; however, during each pre-enrollment period a schedule of graduate courses to be offered the following semester is posted at [www.math.cornell.edu/Courses/courses.html](http://www.math.cornell.edu/Courses/courses.html). This web site includes course descriptions that are often more detailed than those included here, as well as a means for interested students to participate in the process of selecting meeting times.

**MATH 611(6110) Real Analysis**

Fall. 4 credits.

MATH 611-612 are the core analysis courses in the mathematics graduate program. 611 covers measure and integration and functional analysis.

**MATH 612(6120) Complex Analysis**

Spring. 4 credits.

MATH 611-612 are the core analysis courses in the mathematics graduate program. 612 covers complex analysis, Fourier analysis, and distribution theory.

**MATH 613-614(6130-6140) Topics in Analysis**

613, fall; 614, spring. 4 credits each.

**MATH 615(6150) Mathematical Methods in Physics**

Fall. 4 credits. Prerequisite: for undergraduates, permission of instructor. Intended for graduate students in physics or related fields. Recommended: a strong advanced calculus course and at least two years of general physics.

Assumes knowledge of elements of finite dimensional vector space theory, complex variables, separation of variables in partial differential equations, and Fourier series. Designed to give a working knowledge of the principal mathematical methods used in advanced physics. Covers Hilbert space, generalized functions, Fourier transform, Sturm-Liouville problem in ODE, Green's functions, and asymptotic expansions.



# **MATH 617(6170) Dynamical Systems**

Fall. 4 credits. Generally offered every two years.

Topics include existence and uniqueness theorems for ODEs; Poincaré-Bendixon theorem and global properties of two-dimensional flows; limit sets, nonwandering sets, chain recurrence, pseudo-orbits and structural stability; linearization at equilibrium points: stable manifold theorem and the Hartman-Grobman theorem; and generic properties: transversality theorem and the Kupka-Smale theorem. Examples include expanding maps and Anosov diffeomorphisms; hyperbolicity: the horseshoe and the Birkhoff-Smale theorem on transversal homoclinic orbits; rotation numbers; Herman's theorem; and characterization of structurally stable systems.

# **MATH 618(6180) Smooth Ergodic Theory**

Spring. 4 credits.

Topics include invariant measures; entropy; Hausdorff dimension and related concepts; hyperbolic invariant sets: stable manifolds, Markov partitions and symbolic dynamics; equilibrium measures of hyperbolic attractors; ergodic theorems; Pesin theory: stable manifolds of nonhyperbolic systems; Liapunov exponents; and relations between entropy, exponents, and dimensions.

# **[MATH 619-620(6190-6200) Partial Differential Equations**

619, fall; 620, spring. 4 credits each semester. Next offered 2007-2008.

Covers basic theory of partial differential equations.]

# **MATH 621(6210) Measure Theory and Lebesgue Integration**

Fall. 4 credits.

Covers measure theory, integration, and  $L_p$  spaces.

# **MATH 622(6220) Applied Functional Analysis**

Spring. 4 credits. Not offered every year. Covers basic theory of Hilbert and Banach spaces and operations on them. Applications.

# **[MATH 628(6280) Complex Dynamical Systems**

Fall. 4 credits. Prerequisite: MATH 418. Next offered 2007-2008.

This course covers various topics in the dynamics of analytic mappings in one complex variable, such as Julia and Fatou sets, the Mandelbrot set and selected additional topics.]

# **MATH 631(6310) Algebra**

Fall. 4 credits. Assumes familiarity with material of standard undergraduate course in abstract algebra.

MATH 631-632 are the core algebra courses in the mathematics graduate program. 631 covers group theory, especially finite groups; rings and modules; ideal theory in commutative rings; arithmetic and factorization in principal ideal domains and unique factorization domains; introduction to field theory; tensor products and multilinear algebra. (Optional topic: introduction to affine algebraic geometry.)

# **MATH 632(6320) Algebra**

Spring. 4 credits. Prerequisite: MATH 631. MATH 631-632 are the core algebra courses in the mathematics graduate program. 632 covers Galois theory, representation theory of finite groups, introduction to homological algebra. Familiarity with the material of a standard

undergraduate course in abstract algebra will be assumed.

# **MATH 633(6330) Noncommutative Algebra**

Fall. 4 credits.

Covers Wedderburn structure theorem, Brauer group, and group cohomology.

# **[MATH 634(6340) Commutative Algebra**

Spring. 4 credits. Next offered 2007-2008.

Covers Dedekind domains, primary decomposition, Hilbert basis theorem, and local rings.]

# **MATH 649(6490) Lie Algebras**

Fall. 4 credits.

Topics include nilpotent, solvable and reductive Lie algebras; enveloping algebras; root systems; Coxeter groups; and classification of simple algebras.

# **[MATH 650(6500) Lie Groups**

Fall. 4 credits. Next offered 2007-2008.

Topics include topological groups, Lie groups; relation between Lie groups and Lie algebras; exponential map, homogeneous manifolds; and invariant differential operators.]

# **MATH 651(6510) Algebraic Topology**

Spring. 4 credits.

One of the core topology courses in the mathematics graduate program. An introductory study of certain geometric processes for associating algebraic objects such as groups to topological spaces. The most important of these are homology groups and homotopy groups, especially the first homotopy group or fundamental group, with the related notions of covering spaces and group actions. The development of homology theory focuses on verification of the Eilenberg-Steenrod axioms and on effective methods of calculation such as simplicial and cellular homology and Mayer-Vietoris sequences. If time permits, the cohomology ring of a space may be introduced.

# **MATH 652(6520) Differentiable Manifolds I**

Fall. 4 credits. Prerequisites: advanced calculus, linear algebra (MATH 431), point-set topology (MATH 453).

One of the core topology courses in the mathematics graduate program. Introduction to geometry and topology from a differentiable viewpoint, suitable for beginning graduate students. The objects of study are manifolds and differentiable maps. The collection of all tangent vectors to a manifold forms the tangent bundle, and a section of the tangent bundle is a vector field. Alternatively, vector fields can be viewed as first-order differential operators. Students study flows of vector fields and prove the Frobenius integrability theorem. In the presence of a Riemannian metric, the notions of parallel transport, curvature, and geodesics are developed. Students examine the tensor calculus and the exterior differential calculus and prove Stokes' theorem. If time permits, de Rham cohomology, Morse theory, or other optional topics are introduced.

# **[MATH 653(6530) Differentiable Manifolds II**

Spring. Prerequisites: MATH 652 or equivalent. Next offered 2007-2008.

Advanced topics from differential geometry and differential topology selected by instructor. Examples of eligible topics include transversality, cobordism, Morse theory, classification of vector bundles and principal

bundles, characteristic classes, microlocal analysis, conformal geometry, geometric analysis and partial differential equations, and Atiyah-Singer index theorem.]

# **MATH 661(6610) Geometric Topology**

Fall. 4 credits.

Introduction to some of the more geometric aspects of topology and its connections with group theory. Possible topics include surface theory, 3-manifolds, knot theory, geometric and combinatorial group theory, hyperbolic groups, and hyperbolic manifolds.

# **[MATH 662(6620) Riemannian Geometry**

Spring. 4 credits. Next offered 2007-2008.

Topics include linear connections, Riemannian metrics and parallel translation; covariant differentiation and curvature tensors; the exponential map, the Gauss Lemma and completeness of the metric; isometries and space forms, Jacobi fields and the theorem of Cartan-Hadamard; the first and second variation formulas; the index form of Morse and the theorem of Bonnet-Myers; the Rauch, Hessian, and Laplacian comparison theorems; the Morse index theorem; the conjugate and cut loci; and submanifolds and the Second Fundamental form.]

# **MATH 671(6710) Probability Theory I**

Fall. 4 credits. Prerequisite: knowledge of Lebesgue integration theory, at least on real line. (Students can learn this material by taking parts of MATH 413-414 or 621.)

Conditional expectation, martingales, Brownian motion. Other topics such as random walks and ergodic theory, depending on time and interest of the students and the instructor.

# **MATH 672(6720) Probability Theory II**

Spring. 4 credits. Prerequisite: MATH 671.

Content will vary from year to year. Course may be taken more than once for credit. Previously, topics have been chosen from stochastic calculus, diffusion processes, martingale problems, weak convergence, and Markov processes in continuous time.

# **MATH 674(6740) Introduction to Mathematical Statistics**

Spring. 4 credits. Prerequisites: MATH 671 (measure theoretic probability) and OR&IE 670, or permission of instructor.

Topics include an introduction to the theory of point estimation, hypothesis testing and confidence intervals, consistency, efficiency, and the method of maximum likelihood. Basic concepts of decision theory are discussed; the key role of the sufficiency principle is highlighted and applications are given for finding Bayesian, minimax, and unbiased optimal decisions. Modern computer-intensive methods like the bootstrap receive some attention, as do simulation methods involving Markov chains. The parallel development of some concepts of machine learning is exemplified by classification algorithms. An optional section may include nonparametric curve estimation and elements of large sample asymptotics.

# **MATH 675(6750) Statistical Theories Applicable to Genomics**

Fall. 4 credits.

Focuses on statistical concepts useful in genomics (e.g., microarray data analysis) that involve a large number of populations. Topics include multiple testing and closed testing (the cornerstone of multiple testing), family-wise error rate, false discovery rate (FDR)

of Benjamini and Hochberg, and Storey's papers relating to pFDR. Also discussed are the shrinkage technique or the Empirical Bayes approach, equivalent to the BLUP in a random effect model, which is a powerful technique, taking advantage of a large number of populations. A related technique, which allows use of the same data to select and make inferences for the selected populations (or genes), is discussed. If time permits, there may be some lectures about permutation tests, bootstrapping, and QTL identification.

**MATH 681(6810) Logic**

Spring. 4 credits.

Covers basic topics in mathematical logic, including propositional and predicate calculus; formal number theory and recursive functions; completeness and incompleteness theorems, compactness and Skolem-Löwenheim theorems. Other topics as time permits.

**[MATH 703(7030) Topics in the History of Mathematics]**

Spring. 4 credits. Prerequisites: undergraduate algebra and analysis. Next offered 2008-2009.

Topics in the history of modern mathematics at the level of *Evolution of Mathematics in the 19th Century* by Klein, *Abrege D'Histoire Des Mathematiques 1700-1900* by Dieudonné, and *Source Book of Classical Analysis* by Birkhoff.]

**MATH 711-[712]([7110]-[7120]) Seminar in Analysis**

711, fall; 712, spring. 4 credits. 712 next offered 2007-2008.

**MATH 713(7130) Functional Analysis**

Fall. 4 credits.

Covers topological vector spaces, Banach and Hilbert spaces, and Banach algebras. Additional topics selected by instructor.

**MATH 715(7150) Fourier Analysis**

Spring. 4 credits.

**[MATH 717(7170) Applied Dynamical Systems (also T&AM 776[7760])]**

Spring. 4 credits. Recommended: T&AM 675, MATH 617, or equivalent. Next offered 2007-2008.

Topics include review of planar (single-degree-of-freedom) systems; local and global analysis; structural stability and bifurcations in planar systems; center manifolds and normal forms; the averaging theorem and perturbation methods; Melnikov's method; discrete dynamical systems, maps and difference equations, homoclinic and heteroclinic motions, the Smale Horseshoe and other complex invariant sets; global bifurcations, strange attractors, and chaos in free and forced oscillator equations; and applications to problems in solid and fluid mechanics.]

**[MATH 722(7220) Topics in Complex Analysis]**

Fall. 4 credits. Next offered 2008-2009.

Selections of advanced topics from complex analysis, such as Riemann surfaces, complex dynamics, and conformal and quasiconformal mapping. Course content varies.]

**[MATH 728(7280) Seminar in Partial Differential Equations]**

Spring. 4 credits. Next offered 2008-2009.]

**MATH [731]-732([7310]-7320) Seminar in Algebra**

731, fall; 732, spring. 4 credits each semester. 731 next offered 2007-2008.

**MATH 735(7350) Topics in Algebra**

Fall, spring. 4 credits.

Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Course content varies.

**MATH 737(7370) Algebraic Number Theory**

Fall. 4 credits.

**MATH 739(7390) Topics in Algebra**

Spring. 4 credits.

Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Content varies.

**MATH 740(7400) Homological Algebra**

Fall. 4 credits.

**MATH 751-752(7510-7520) Bernstein Seminar in Topology**

751, fall; 752, spring. 4 credits each semester.

**MATH 753(7530) Algebraic Topology II**

Fall. 4 credits.

Continuation of 651. The standard topics most years are cohomology, cup products, Poincaré duality, and homotopy groups. Other possible topics include fiber bundles, fibrations, vector bundles, and characteristic classes. May sometimes be taught from a differential forms viewpoint.

**MATH 755-756(7550-7560) Topology and Geometric Group Theory Seminar**

755, fall; 756, spring. 4 credits each semester.

**MATH [757]-758([7570]-7580) Topics in Topology**

757, fall; 758, spring. 4 credits each semester. 757 next offered 2007-2008.

Selection of advanced topics from modern algebraic, differential, and geometric topology. Content varies.

**MATH 761-762(7610-7620) Seminar in Geometry**

761, fall; 762, spring. 4 credits each semester. Either 761 or 762 generally offered every year.

**MATH 767(7670) Algebraic Geometry**

Spring. 4 credits.

**MATH 771-772(7710-7720) Seminar in Probability and Statistics**

771, fall; 772, spring. 4 credits each semester.

**[MATH 774(7740) Statistical Learning Theory]**

Fall. 4 credits. Prerequisites: basic mathematical statistics (MATH 674 or equivalent) and measure theoretic probability (MATH 671). Next offered 2007-2008.

The course aims to present the developing interface between machine learning theory and statistics. Topics are classification and pattern recognition, support vector machines, neural networks, tree methods, and boosting.]

**MATH 777-778(7770-7780) Stochastic Processes**

777, fall; 778, spring. 4 credits each semester.

**MATH 781-782(7810-7820) Seminar in Logic**

781, fall; 782, spring. 4 credits each semester.

**[MATH 783(7830) Model Theory]**

Spring. 4 credits. Next offered 2007-2008.

Introduction model theory at the level of the books by Hodges or Chang and Keisler.]

**MATH 784(7840) Recursion Theory**

Spring. 4 credits.

Covers theory of effectively computable functions; classification of recursively enumerable sets; degrees of recursive unsolvability; applications to logic; hierarchies; recursive functions of ordinals and higher type objects; generalized recursion theory.

**MATH 787(7870) Set Theory**

Fall. 4 credits.

First course in axiomatic set theory at the level of the book by Kunen.

**MATH 788(7880) Topics in Applied Logic**

Fall. 4 credits.

Covers applications of the results and methods of mathematical logic to other areas of mathematics and science. Topics vary each year; some recent examples are: automatic theorem proving, formal semantics of programming and specification languages, linear logic, constructivism (intuitionism), nonstandard analysis, and automata theory. This year the course will cover Kolmogorov complexity and algorithmic information theory. We use the theory of algorithms to define the complexity of an individual finite bit string. This is then applied to infinite bit strings via their initial segments, and we get a notion of algorithmically random real number. Further topics include prefix complexity, a priori probability and Shannon entropy.

**MATH 790(7900) Supervised Reading and Research**

Fall, spring. 1-6 credits.

## MEDIEVAL STUDIES

P. R. Hyams, director; F. M. Ahl, R. Brann, C. Brittain, E. W. Browne, O. Falk, A. S. Galloway, A. B. Groos, K. Haines-Eitzen, W. E. Harbert, T. D. Hill, C. Howie, W. J. Kennedy, S. MacDonald, M. Migiel, J. M. Najemy, J. A. Peraino, S. Pinet, D. S. Powers, M. Raskolnikov, E. Rebillard, C. Robinson, C. Ruff, S. Senderovich, S. M. Toorawa, S. Zacher, Emeritus: A. M. Colby-Hall, J. J. John, C. V. Kaske, P. I. Kuniholm, W. Wetherbee.

## Undergraduate Study in Medieval Studies

Course work in medieval studies enhances the student's enjoyment and understanding of the artistic and material relics of the Middle Ages: Gregorian chant, illuminated manuscripts and stained glass windows, Gothic cathedrals, Crusader castles, and picturesque towns cramped within ancient walls. Students discover the serious realities involved in, and shaped by, Arthurian tales of brave knights and fair ladies, dungeons, dragons, and other marvels. Students can analyze and appreciate the horrors of the Black Death, triumphs in courtly love and pitched battle, swords and scimitars, caliphs and popes, fear of demons and djinns, and the reassuring presence of angels. Students can study all this and more very well in English, but see below for how to acquire the medieval languages that so enhance the experience.

The period saw many of the foundational choices that have, for good and ill, made the world what it is today. Many of our current

challenges in the fields of law, human rights, attitudes toward power, authority, gender relations, and sexual mores derive from the ways in which these and other questions were formulated a millennium ago. It actually makes good sense to think out your positions on today's world through study of the less complicated but intriguing medieval West, with whose successes and failures we must still contend. Serious investigation of exotic materials marks this concentration out as a unique addition to Cornell's training. The Medieval Studies Program houses a lively undergraduate association, *Quodlibet*, that arranges frequent lectures on medieval topics and an annual celebratory Reading of prose and poetry in many medieval languages.

The "middle" in "Middle Ages" comes from its position between antiquity and the "modern" period, in a schema created for European and Western conditions. Our concentration, however, is more properly inclusive and treats a time span from roughly the fifth century into the 16th and ranges from Western Europe and the Mediterranean to China and Japan. To discover the vibrant state of medieval studies today, students should look at the extraordinary range of scholarly, but accessible, web sites that have sprung up all over the Internet. (They can start from *Cornucopia* noted below.) Cornell possesses a wealth of resources to introduce students to every corner of the field.

Many students feel bound to choose their majors with an eye to future careers and earning potential. While this concentration provides strong interdisciplinary breadth to many majors (e.g., classics, all modern languages, history, music, philosophy), and is excellent preparation for graduate study in a medieval field, science majors do well too. The program provides encouragement, guidance, and an avenue for intelligent appreciation of an important part of all our pasts.

Undergraduates who wish to undertake an independent major or concentration in medieval studies should consult the director of the program, 259 Goldwin Smith Hall, 255-8545, [medievalst@cornell.edu](mailto:medievalst@cornell.edu).

The undergraduate concentration in medieval studies shall consist of five medieval courses (at the 200 level or above) in at least two different disciplines, of which up to two may also count toward the major.

## Medieval Languages

Medieval texts (like all others) become most lively and informative when read in the original, and Cornell fortunately offers many courses for students interested in acquiring the relevant skills: Medieval Latin, Old English, Middle English, Gothic, Old Saxon, Old High German, Middle High German, Old Norse-Icelandic, Old Irish, Middle Welsh, Old Occitan (Provençal), Old French, Medieval Spanish, Medieval Italian, Old Russian, Old Church Slavonic, Classical Arabic, Medieval Hebrew, Classical Chinese, and Classical Japanese.

Some medieval languages require study of a modern language (e.g., French for Old Occitan and Old French) or a classical language (Classical Latin for Medieval Latin) as background. Students interested in a concentration in Medieval Studies should begin the study of a medieval language as

early as possible, so that they may be able to study texts in the original before they graduate. Students are advised to consult the sponsoring departments for information about the prerequisites for various medieval languages.

## Graduate Study

The Medieval Studies Program offers both an interdisciplinary and a literary comparative Ph.D. in medieval studies. Disciplinary fields of concentration offered within the Field of medieval studies are medieval archaeology, medieval history, medieval history of art, medieval literature, medieval music, medieval philology and linguistics, and medieval philosophy. Information about the graduate program in medieval studies is available from the field coordinator ([medievalst@cornell.edu](mailto:medievalst@cornell.edu)), and at *Cornucopia*, the program's web site ([www.arts.cornell.edu/medieval](http://www.arts.cornell.edu/medieval)).

## Medieval Studies Courses: Graduate and Undergraduate

Courses in various aspects of medieval studies are offered every year in several cooperating departments, including Art History, Asian Studies, Classics, Comparative Literature, English, German Studies, History, Linguistics, Music, Near Eastern Studies, Philosophy, Romance Studies, Russian Literature, and by the Society for the Humanities. For descriptions, please see the home department. The current year's offerings are:

**ART H 309(3250) Introduction to Dendrochronology (also ARKEO 309[3090], CLASS 330[3750])**  
Spring. 4 credits. S. Manning.

**ASIAN 241(2241) China's Literary Heritage: An Introduction in Translation**  
Spring. 3 credits. D. X. Warner.

**CHLIT 213(2213) Classical Chinese**  
Fall. 3 credits. R. McNeal.

**CHLIT 214(2214) Introduction to Classical Chinese**  
Spring. 3 credits. D. X. Warner.

**CHLIT 307(3307) Readings in Classical Chinese Literature**  
Fall. 4 credits. B. Rusk.

**CHLIT 420(4420) Tang Poetry: Themes and Contexts**  
Fall. 4 credits. D. X. Warner.

**CHLIT 615(6615) Seminar: Ideas and Literature of Medieval China**  
Spring. 4 credits. D. X. Warner.

**CLASS 412(4202) Seneca's Letters**  
Spring. 4 credits. C. Brittain.

**CLASS 632(7682) Topics in Ancient History: Religion and Authority in Late Antique North Africa (also HIST 630[6300])**  
Fall. 4 credits. E. Rebillard.

**CLASS 680(7272) The Intellectual World of Rome in the Fourth and Fifth Centuries C.E.**  
Spring. 4 credits. E. Rebillard.

**COM L 356(3560) Renaissance Literature (also ENGL 320[3200])**  
Spring. 4 credits. W. J. Kennedy.

**COM L 450/650(4500/6500) Renaissance Poetry (also ITAL 450/650[4500/6500])**  
Spring. 4 credits. W. J. Kennedy.

**ENGL 311/611(3110/6110) Old English**  
Fall. 4 credits. T. Hill.

**ENGL 312/612(3120/6120) Beowulf**  
Spring. 4 credits. S. Zacher.

**ENGL 319(3190) Chaucer**  
Spring. 4 credits. M. Raskolnikov.

**ENGL 321(3210) Spenser and Malory**  
Spring. 4 credits. C. Kaske.

**ENGL 414(4140) Bodies in the Middle Ages: Incarnation and Performance**  
Spring. 4 credits. M. Raskolnikov.

**ENGL 606(6060) The Alliterative Tradition**  
Spring. 4 credits. A. Galloway.

**ENGL 607(6070) Medieval Psychology: Dream Visions and the Question of the Medieval Unconscious**  
Fall. 4 credits. M. Raskolnikov.

**ENGL 608(6080) Wisdom and Law**  
Fall. 4 credits. T. Hill.

**ENGL 710(7100) Advanced Topics in Old English**  
Fall. 4 credits. T. Hill.

**FRLIT 354(3540) Sad Songs: Medieval Melancholia**  
Spring. 4 credits. C. Howie.

**FRLIT 449/649(4490/6490) Mystics and Mystique (also FGSS 449/649[4490/6490])**  
Fall. 4 credits. C. Howie.

**GERST 405-406(4050-4061) Introduction to Middle High German Literature**  
405, fall; 406, spring. 4 credits each semester. A. Groos.

**GERST 410/610(4100/6100) Senior Seminar: Early Modern City Culture**  
Fall. 4 credits. A. Groos.

**HIST 210(2100) The Government of God**  
Fall. 4 credits. O. Falk.

**HIST 227(2271) Sophomore Seminar: Family Life in Renaissance Italy**  
Spring. 4 credits. J. Najemy.

**HIST 277(2771) Getting Medieval I: The Early Middle Ages**  
Fall. 4 credits. O. Falk.

**HIST 278(2772) Getting Medieval II: The Later Middle Ages**  
Spring. 4 credits. O. Falk.

**HIST 285(2850) From Medievalism to Modernity (also JWST 253[2850])**  
Fall. 4 credits. V. Caron.

**HIST 350(3500) The Italian Renaissance (also ITAL 221[2210])**  
Spring. 4 credits. J. Najemy.

**HIST 351(3510) Machiavelli (also ITAL 351[3510])**  
Fall. 4 credits. J. Najemy.

**HIST 368(3680) Marriage and Sexuality in Medieval Europe (also FGSS 368[3680], RELST 368[3680])**  
Fall. 4 credits. P. Hyams.

**HIST 456/656(4560/6560) Topics in Medieval Historiography**  
Spring. 4 credits. O. Falk.

**HIST 468(4680) Love and Sex in Renaissance Italy (also ITALL 468[4680])**  
Fall. 4 credits. J. Najemy.

**HIST 469/669(4691/6691) The Old English Laws (also ENGL 419[4190])**  
Fall. 4 credits. P. Hyams and T. Hill.

**ITALL 303(3030) Italian in Pre-Modern Times**  
Spring. 4 credits. M. Migiel.

**ITALL 340(3400) History of the Grotesque**  
Fall. 4 credits. C. Howie.

**ITALL 355/655(3550/6550) He Said, She Said: The Battle of the Sexes in Medieval and Renaissance Writing (also FRLIT 355/655[3550/6550], FGSS 356[3560])**  
Spring. 4 credits. M. Migiel and K. Long.

**JPLIT 406(4406) Introduction to Classical Japanese**  
Fall. 4 credits. K. Selden.

**LING 109(1109) English Words: Histories and Mysteries**  
Spring. 3 credits. W. Harbert.

**LING 217(2217) History of the English Language to 1300**  
Fall. 4 credits. W. Harbert.

**LING 236(2236) Introduction to Scottish Gaelic**  
Spring. 3 credits. W. Harbert.

**LING 308(3308) Readings in Celtic Languages**  
Fall. 2 credits. W. Harbert.

**LING 315-316(3315-3316) Old Norse**  
315, fall; 316, spring. 4 credits each term.  
A. Angantytsson.

**LING 347(3347) Topics in the History of English**  
Fall. 4 credits. W. Harbert.

**LING 417(4417) History of the Russian Language (also RUSSA 401[4401])**  
Spring. 4 credits. W. Browne.

**LING 623(6623) Old Irish I**  
Fall. 4 credits. M. Weiss.

**LING 645(6645) Gothic**  
Fall. 4 credits. W. Harbert.

**LING 646(6646) Old High German/Old Saxon (also GERST 658[6580])**  
Spring. 4 credits. W. Harbert.

**MEDVL 413/613(4103/6103) Survey of Medieval Latin Literature (also LATIN 413/613[4213/7213])**  
Fall. 4 credits. C. Ruff.

The Survey of Medieval Latin Literature will focus on the intellectual culture of western monasticism from the foundations of a Christian curriculum in late antiquity through the 12th century—a theme which encompasses grammar, exegesis, monastic rules, hagiography, royal and ecclesiastical documents, letter exchange, preaching, and much more. We will begin with Donatus, Augustine, Cassiodorus, and the Rule of St. Benedict; sample early medieval hagiography and foundational documents of the Carolingian *renovatio*; and then move on to

more extended reading of selected texts of Aelred of Rievaulx, Peter the Venerable, and Bernard of Clairvaux. The term will finish on a lighter note with some satirical prose and verse. Students should come to the course with a firm grasp of Latin grammar; advanced topics in syntax will be reviewed as necessary, and we will treat linguistic developments in post-classical Latin and matters of style and versification as they arise.

**MEDVL 421/621(4201/6201) Topics in Medieval Latin Literature (also LATIN 423/623[4223/7223])**

Spring. 4 credits. C. Ruff.

In Spring 2007, Topics in Medieval Latin Literature will explore the Latin Troy Tradition. Texts and authors will include Ovid's *Heroides*; Statius's *Achilleid*; the *Ilias Latina*; Baudri of Bourgueil; Joseph of Exeter; Guido delle Colonne; and others. We will consider the medieval commentary traditions on ancient and medieval authors as well as the literary and political uses to which the Troy legend was put in the later Middle Ages. The spring course will begin with somewhat simpler texts and give students a chance to build their skills as the course progresses, but will move fairly rapidly towards extended reading from more difficult authors. Substantial attention will be devoted to increasing students' fluency in reading Latin quantitative verse. While the primary focus of the course will be on the Latin tradition, students with interests in the various vernacular Troy traditions will be welcome and encouraged to present seminar papers and pursue research projects related to those traditions.

**MEDVL 612(6102) Latin Paleography (also LATIN 622[7222])**

Fall. 4 credits. C. Ruff.

Latin Paleography will be devoted in approximately equal measure to the dating, localization, and reading of scripts, and to codicological methods in the study of medieval manuscripts. The primary emphasis will be on Latin bookhands from late antiquity to the invention of printing, but students with interests in earlier or later periods or vernacular texts will have a chance to work on projects in their areas of specialization. We will also spend some time on current manuscript-based research in ancient and medieval literacy and the informational structure of the manuscript page (word division, punctuation, layout, apparatus, glossing, etc.).

**MEDVL 777(7770) Medieval Studies Proseminar**

Fall and spring. 2 credits each term. Staff.

This reconceived course is designed to introduce graduate students from the Medieval Studies Program and other interested parties to some of the many different approaches available for studying different aspects of the middle ages. It is especially intended to alert students to methodologies and materials outside their previous training. It will also help students to build up a professional knowledge of bibliographic and other essentials for future teaching and research. Different faculty will present every other week during the year.

**MEDVL 801 Directed Study—Individual**

Fall and spring. Up to 4 credits. Staff.

**MEDVL 802 Directed Study—Group**  
Fall and spring. Up to 4 credits. Staff.

**NES 214(2212) Qur'an and Commentary (also RELST 214[2212])**  
Spring. 3 credits. D. Powers.

**NES 251(2651) Holy War, Crusade, and Jihad in Judaism, Christianity, and Islam (also HIST 269[2691], COM L 231[2310], JWST 251[2651], RELST 251[2651])**  
Fall. 3 credits. R. Brann.

**NES 255(2655) Introduction to Islamic Civilization (also HIST 253[2530], RELST 255[2655])**  
Fall. 3 credits. D. Powers.

**NES 265(2565) Law, Society and Culture in the Middle East (also HIST 222[2220], RELST 265[2565])**  
Spring. 4 credits. D. Powers.

**NES 445(4545) Gender, Sexuality & the Body in Late Antiquity (also FGSS 447[4470], RELST 445[4545])**  
Fall. 4 credits. K. Haines-Eitzen.

**NES 457(4657) Seminar in Islamic History: The Formation of Islamic Law (also HIST 453[4530], RELST 457[4657])**  
Fall. 4 credits. D. Powers.

**NES 630(6230) Judeo-Arabic Literature (also JWST 630[6230])**  
Fall. 4 credits. R. Brann.

**PHIL 415(4150) Medieval Philosophy**  
Spring. 4 credits. S. MacDonald.

**SANSK 251-252(2251-2252) Intermediate Sanskrit (also CLASS 291-292[2351-2352], LING 251-252[2251-2252])**  
251, fall; 252, spring. 3 credits each term.  
A. Ruppel.

**SPANL 217(2170) Readings in Medieval/Early Modern Spanish**  
Fall. 4 credits. M. A. Garcés.

**SPANL 234(2340) Faith, Love and Adventure in Medieval Spain**  
Spring. 4 credits. S. Pinet.

## MODERN EUROPEAN STUDIES CONCENTRATION

Sydney Van Morgan, coordinator

Students from any college may choose an undergraduate concentration in modern European studies to complement any major. The purpose of the concentration is to provide a coherent structure for students with an interest in interdisciplinary study in the field of European studies.

The concentration has three tracks: European politics, economics, and society; modern European history; and European culture. The requirements for the concentration are:

1. Competence in at least one modern European language, Romance, Germanic, or Slavic (i.e., completion of a 300-level course or equivalent with a grade of at least B-, or demonstration of an advanced level of competence in an oral proficiency interview test where available).
2. Completion of two out of three interdisciplinary core courses:

**GOVT/SOC 341(3410) Modern European Society and Politics**

Fall. 4 credits. S. Van Morgan.

**HIST 271(2271) The Politics of Violence in 20th-Century Europe**

Spring. 4 credits. H. Case.

**NES 438(4738) Imagining the Mediterranean**

Fall. 4 credits. G. Holst-Warhaft.

Under certain conditions, students may be permitted to substitute other courses for those listed above.

3. Completion of one course in modern (post-1789) European history.
4. Two additional courses in any of the three areas, which may include a senior seminar (400 level).
  - a. Courses in European and comparative politics, anthropology, sociology, feminist, gender and sexuality (FGSS) studies, and related courses in the School of Hotel Administration, the College of Agriculture and Life Sciences, and the School of Industrial and Labor Relations.
  - b. Courses in modern European history (post-1789).
  - c. Courses in (post-1789) English and European literatures, comparative literature, semiotics, FGSS, fine arts, architecture, music, philosophy, and film and theatre arts.

Only two courses may be used to satisfy requirements for both the major and the concentration. Courses satisfying the breadth and distribution requirements in the College of Arts and Sciences, however, *may* be applied to the concentration. Students interested in completing a research project under the European Summer Research Program may apply for the Wood Fellowship in their junior year. All concentrators are encouraged to participate in the Language House Program and to spend a semester or more in a program of study in Europe. Courses taken abroad may be applied to the concentration if they are approved for Cornell credit.

Departmental advisors include D. Greenwood (anthropology); C. Otto (architecture); S. Christopherson (CRP); G. Fields (economics); D. Schwarz (English); A. Schwarz (German studies); S. Tarrow (government/sociology); J. Weiss (history); C. Rosen (linguistics); N. Zaslaw (music); T. Campbell (romance studies); G. Shapiro (Russian literature); D. Bathrick (theatre, film, dance).

For a complete list of relevant courses and seminars, and any further information, contact Sydney Van Morgan, coordinator of the Modern European Studies Concentration, at the Institute for European Studies, 120 Uris Hall, 255-7592, [sydney.morgan@cornell.edu](mailto:sydney.morgan@cornell.edu), [www.einaudi.cornell.edu/Europe](http://www.einaudi.cornell.edu/Europe).

**MUSIC**

R. Harris-Warrick, chair; R. Sierra, director of undergraduate studies (338 Lincoln Hall, 255-3663); J. Peraino, director of graduate studies (116 Lincoln Hall, 255-5059); J. Armstrong, X. Bjerken, B. Boettcher, K. Ernste, J. Haines-Eitzen, M. Hatch, C. Johnston Turner, J. Kellock, C. Kim, P. Merrill, S. Pond, A. Richards, R. Riley, S. Stucky, K. Taavola, S. Tucker, J. Webster, M. Yampolsky, D. Yearsley, N. Zaslaw. Emeritus: M. Bilson, J. Hsu, K. Husa, S. Monosoff, R. Palmer, D. Rosen, T. Sokol, M. Stith

Office: 255-4097

Web site: [www.arts.cornell.edu/music/](http://www.arts.cornell.edu/music/)**Musical Performance and Concerts**

Musical performance is an integral part of Cornell's cultural life and an essential part of its undergraduate academic programs in music. The department encourages music making through its offerings in individual instruction and through musical organizations and ensembles that are directed and trained by members of the faculty. Students from all colleges and departments of the university join with music majors in all of these ensembles:

**Vocal ensembles**

Chamber Singers  
Chorale  
Chorus  
Glee Club  
Sage Chapel Choir  
World Music Choir

**Instrumental ensembles**

Chamber Music Ensembles  
Chamber Orchestra  
Symphony Orchestra  
Jazz Ensembles  
Jazz Combos  
Chamber Winds  
Wind Ensemble  
Wind Symphony  
Gamelan  
Middle Eastern Music Ensemble  
World Drum and Dance Ensemble  
Steel Band

Information about requirements, rehearsal hours, and conditions for academic credit can be found in the following listings for the Department of Music. Announcements of auditions are posted during registration each fall semester and, where appropriate, each spring semester as well.

The university is also home to many student-run musical organizations not affiliated with the Department of Music, including the Big Red Marching Band and Big Red Pep Band, the Cornell Savoyards, and several a cappella groups. Information is available directly from each group.

The Department of Music and the Faculty Committee on Music sponsor more than 100 formal and informal concerts each year by Cornell's ensembles, faculty, and students and by distinguished visiting artists. The great majority of these concerts are free and open to the public. Lectures and concerts are listed at [www.arts.cornell.edu/music/](http://www.arts.cornell.edu/music/). Additional information is available through the events office (255-4760).

**Nonmajors**

In addition to its performing, instructional, and concert activities, the department offers numerous courses for nonmajors, many of

which carry no prerequisites and presuppose no previous formal training in music. Consult the following course listings, and for further information consult Professor R. Sierra, director of undergraduate studies (255-3663), or the department office, 101 Lincoln Hall (255-4097).

**The Major**

The major carries the study of music to an advanced level through the integration of performance, music theory, and music history. It is designed to accommodate both students who are oriented toward eventual graduate or professional work in music and those who wish to take a more general approach, often in conjunction with a major in another department.

Students contemplating a major in music should arrange for placement examinations and advising in the department as early as possible, preferably during the freshman orientation period. Information is available from the director of undergraduate studies. Prerequisites for admission to the major are completion of MUSIC 152 and 154, preferably by the end of the freshman year (the sophomore year is possible, but reduces flexibility), with an overall grade of B- or better in each course. In consultation with the director of undergraduate studies, students are expected to have chosen an advisor from among the department faculty before acceptance into the major; admission to the major is decided by the faculty as a whole. Students majoring in music then design their course of study with their advisor.

Music majors must complete the Core Curriculum plus at least two electives. The Core Curriculum serves as the basis for focus in specific areas, such as composition, performance, jazz studies, vernacular music, Western art music, or Asian music. Students may, however, choose electives that reflect a more broadly based study. Those intending to pursue graduate study or professional work in music are advised to take further courses in addition to the two required electives.

The Core Curriculum consists of courses:

1. in music theory: MUSIC 251, 252, 253, 254
2. in music history: MUSIC 207, 208, 300, 400
3. in performance: four semesters of participation in a musical organization or ensemble sponsored by the department of music (MUSIC 331 through 346 and 421 through 448)

Electives: at least 8 credits from the following:

1. in music theory: courses among the theory listings at the 300 level or above
2. in music history: MUSIC 374 through 399, 401 and above.
3. in performance: MUSIC 322 or 323

**Honors.** The honors program in music is intended to provide special distinction for the department's ablest undergraduate majors. Qualified students are invited to become candidates by the faculty early in the second semester of their junior year. As soon as possible thereafter, the student forms a committee of three or more faculty members to guide and evaluate the honors work. In their senior year, candidates enroll in MUSIC 401-402 with the chair of the honors committee as instructor. Candidates



are encouraged to formulate programs that allow them to demonstrate their musical and scholarly abilities, culminating in an honors thesis, composition, or recital, to be presented not later than April 1 of the senior year. A comprehensive examination administered by the candidate's committee is held not later than April 20. The level of honors conferred is based primarily on the candidate's performance in the honors program, and secondarily on the candidate's overall record in departmental courses and activities.

### Computing in the Arts Undergraduate Concentration

A concentration in Computing in the Arts with an emphasis on music is available both to music majors and to students majoring in other subjects. For more information, contact the department office, 101 Lincoln Hall (255-4097).

### Distribution Requirement

College of Arts and Sciences students may apply either one or two music department courses toward the distribution requirement in Literature and the Arts (LA) or Cultural Analysis (CA), as noted. Neither first-year seminars nor advanced placement credit count toward this requirement.

If one music course is counted for distribution, it must carry at least 3 credits, and it may not be in musical performance (MUSIC 321, 322, or 323) or in organizations and ensembles (MUSIC 331 through 348 and 421 through 448). Any two of the 2-credit courses MUSIC 361, 362, 363 count as one course for this purpose.

If two music courses are counted for distribution in LA, they must total at least 6 credits, and at least one of the courses must be academic (as described in the preceding paragraph), not performance-oriented. The second "course," however, may comprise either up to 4 credits earned in performance (MUSIC 321, 322, or 323) or up to 4 credits earned in organizations and ensembles (MUSIC 331 through 348 and 421 through 448), but not both.

### Facilities

**Music Library.** The Sidney Cox Library of Music and Dance in Lincoln Hall has an excellent collection containing approximately 140,000 periodicals, books, scores, and parts; 60,000 sound and video recordings; and a microfilm collection of early printed and manuscript sources. Its depth and breadth serve the needs of a wide variety of users on the campus and its computer lab (designed specifically for music uses), listening, and video viewing facilities are open to all members of the Cornell community. Highlights of the research collection include early opera libretti and scores, 18th-century keyboard and chamber music, 17th- and 18th-century books on music, and an archive of American popular song from 1850 to 1950. In addition, the Carl A. Kroch Library houses, in the Division of Rare and Manuscript Collections, a collection of musical manuscripts and early printed books on music.

**Concert Halls.** The Department of Music sponsors more than 100 concerts annually. Cornell's principal concert halls are Bailey Hall Auditorium (about 1,400, currently under

renovation), Sage Chapel (about 800), and Barnes Hall Auditorium (about 280).

### Rehearsal Spaces and Practice Rooms.

Departmental ensembles rehearse primarily in Lincoln Hall, Barnes Hall, and Sage Chapel. Twenty-six studios in Lincoln Hall are available for individual practice by pianists, vocalists, and instrumentalists who are members of the Cornell community. Of these, eight have grand pianos, six have upright pianos, and two have percussion instruments.

To guarantee practice times, a practice room must be reserved. Practice-room fees for a room with a grand piano are \$80 per semester for up to 12 hours weekly. A \$20 cash deposit must be made for a key to the grand piano practice rooms, which is refunded upon return of the key. Fees for a room with either an upright piano or percussion instruments are \$60 per semester for up to 12 hours weekly, and fees for a room without a piano are \$25 per semester for up to 12 hours weekly. The fee for use of the pipe organs is \$60 per semester for up to 12 hours weekly. All fees are nonrefundable and are not prorated.

**Instruments.** Six concert grand pianos are available for performances in the various concert halls, plus the following historical keyboard instruments: a modern copy of an 18th-century fortepiano by Johann Andreas Stein, a new fortepiano by Robert McNulty, a Broadwood grand piano from 1827, an 1824 Conrad Graf fortepiano replica, an 1868 Erard grand, one Dowd and one Hubbard harpsichord, and a Challis clavichord. Four distinctive organs are available to qualified individuals for lessons and practice: a small Italian organ (1746) and a two-manual mechanical-action instrument (1972), both in Anabel Taylor Chapel; a three-manual symphonic organ (1941) in Sage Chapel; and an 18th-century German-style chamber organ (2003) in Barnes Hall. In addition, the Music Department owns a limited number of string, wind, and percussion instruments that may be rented by members of the department's ensembles.

**Electroacoustic Music Center.** The Center comprises five studios each outfitted with state-of-the-art hardware and software for music recording, creation, and experimentation. Macintosh, Windows, and Linux operating systems are represented. A variety of MIDI and OSC (Open Sound Control) devices are available for live and interactive performance interests. Available software includes commercial, open source, and custom-designed in-house applications. Max/MSP, PD(PureData), Steinberg Cubase, Ardour, Reason, Csound, Peak, Audacity, and Abelton Live are represented alongside dozens of modular utilities. Video editing and DVD creation are available using Final Cut Pro and Cinelerra. The primary studio hosts a multichannel hardware/software environment (up to 12 channels) for ambisonic mixing, 5.1 surround mixing and mastering, and "vbat" localization techniques. In addition, the Center operates its own server with space for data backup, website hosting, and remote login.

**Digital Music Program Workstations.** There are four Power Macintosh workstations available for qualified students. Two are project/entry-level studios that use Digital Performer, SoundDiver, Peak, Reason, and other software packages. The MIDI hardware includes a Proteus 2000, Korg O5R/W, Access Virus b, and an Alesis QS8.1 keyboard controller. The

other two workstations are more advanced. In addition to the software above, they use Final Cut Pro and Pro Tools. The MIDI hardware includes an E-Mu Platinum Sampler, a Novation SuperNova II, and a Kurzweil K2600 (with sampling) keyboard controller. Also included are several plug-in packages.

### Introductory Courses

#### MUSIC 100(1100) Elements of Musical Notation

Fall or spring, weeks 2-5. 1 credit.

Corequisite: any 3-credit music course and permission of instructor. Staff.

This four-week course, given at the beginning of each semester, fulfills the requirement of basic pitch, rhythm, and score-reading skills needed for some introductory courses and 200-level courses with prerequisites.

#### [MUSIC 101(1311) Popular Music in America: A Historical Survey (also AM ST 105(1131)) # (LA)]

Spring. 3 credits. Next offered 2007-2008. S. Pond.]

#### MUSIC 102(1101) Fundamentals of Music (LA)

Fall. 3 credits. No previous training in music required. M. Hatch.

An introduction to the theory of music from around the world: the structures of melody and rhythm (pulse, meter, scales, modes, texture, timbre, harmony, form) and the influences of audiences, music technologies (including instruments), reasons, and contexts for music making on instrumental and vocal music from classical, folk, traditional, and popular music of Asia, Africa, Europe, and the Americas. Extensive listening and video examples.

#### MUSIC 103(1301) Introduction to World Music I: Africa and the Americas (also LSP 100[1301], LAT A 103[1030]) @ (CA)

Spring. 3 credits. No previous training in music required. S. Pond.

Exploration of folk, popular, and traditional musical genres of the Western Hemisphere, particularly the African diaspora. Examines both the elements of musical styles and the features of society that influence music. Listening assignments are major components of the course.

#### [MUSIC 104(1302) Introduction to World Music II: Asia @ (CA)]

Spring. 3 credits. No previous training in music required. Next offered 2007-2008. M. Hatch.

An exploration of folk, popular, and traditional musical genres from South, Southeast, and East Asia.]

#### MUSIC 105(1105) Introduction to Music Theory (LA)

Fall. 3 credits. Recommended: experience in reading music; students may take MUSIC 100 concurrently. J. Webster.

An elementary, self-contained introduction to the theory of Western art music, emphasizing fundamental musical techniques, theoretical concepts, and their application. Intervals, scales, triads; basic concepts of tonality and form; extensive listening to music in various styles; analysis of representative works of Bach, Mozart, Beethoven, and Debussy.

**[MUSIC 107(1201) Hildegard to Handel # (LA)]**

Fall. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. Next offered 2007–2008. N. Zaslaw.]

**[MUSIC 108(1202) Mozart to Minimalism # (LA)]**

Spring. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. N. Zaslaw.

A survey of Western art music in many genres from the second half of the 18th century to the present. Composers whose music is studied include Haydn, Mozart, Beethoven, Schubert, Schumann, Mendelssohn, Berlioz, Chopin, Wagner, Verdi, Liszt, Brahms, Mahler, Debussy, Strauss, Stravinsky, Bartok, Ives, Webern, Messiaen, Copland, Bernstein, Stucky, and Sierra.

**Music Theory**

Students contemplating the music major are strongly advised to take MUSIC 151, 152, 153, and 154 in the freshman year; in any case MUSIC 152 and 154 must be completed no later than the end of the sophomore year.

**[MUSIC 151(2101) Tonal Theory I (LA)]**

Fall. 3 credits. Prerequisites: admission by departmental placement exam and concurrent enrollment in or previous credit for MUSIC 153, or equivalent. Intended for students expecting to major in music and other qualified students. D. Yearsley.

Detailed study of the fundamental elements of modal and tonal music: rhythm, scales, intervals, triads; melodic principles and two-part counterpoint; diatonic harmony and four-part voice leading; basic formal structures. Study engages different repertoires, including Western art music as well as non-Western and popular traditions.

**[MUSIC 152(2102) Tonal Theory II (LA)]**

Spring. 3 credits. Prerequisites: MUSIC 151 and 153 or equivalent; concurrent enrollment in or previous credit for MUSIC 154. Intended for students expecting to major in music and other qualified students. A grade of B- or better in MUSIC 152 is required for admission to music major. K. Taavola.

Continued study of voice leading and harmonic progression, including diatonic modulation; analysis of binary and ternary forms as well as jazz, blues, and pop phrase models.

**[MUSIC 153(2103) Musicianship I]**

Fall. 2 credits. Pre- or corequisite: MUSIC 151. Intended for students expecting to major in music and other qualified students. D. Yearsley.

Sight singing: diatonic melodies in treble, alto, and bass clefs. Keyboard: scales, triads, seventh chords, short diatonic chord progressions. Dictation: intervals, rhythms; short diatonic melodies; short diatonic chorale phrases. Score reading: two parts using treble, alto, and bass clefs. Musical terms: tempo markings and rhythmic terminology.

**[MUSIC 154(2104) Musicianship II]**

Spring. 2 credits. Pre- or corequisite: MUSIC 152. Intended for students expecting to major in music and other qualified students. A grade of B- or better in MUSIC 154, and failure in no individual musicianship components of the course, are required for admission to the music major. K. Taavola.

Sight singing: longer melodies in three clefs, including diatonic modulation. Keyboard: diatonic chord progressions and sequences. Dictation: intervals, rhythms; longer melodies; chorale phrases with diatonic modulation. Score reading: three parts using treble, alto, and bass clefs. Transcriptions of pop, jazz, and other genres.

**[MUSIC 204(2111) Physics of Musical Sound (also PHYS 204[1204]) (PBS)]**

Spring. 3 credits. K. Selby.  
For description, see PHYS 204.

**[MUSIC 251(3101) Tonal Theory III (LA)]**

Fall. 3 credits. Prerequisites: MUSIC 152 and 154 or equivalent. Corequisite: MUSIC 253. K. Taavola.

Continuation of diatonic and introduction to chromatic harmony; species counterpoint; composition in small forms.

**[MUSIC 252(3102) Tonal Theory IV (LA)]**

Spring. 3 credits. Prerequisites: MUSIC 251 and 253 or equivalent. Corequisite: MUSIC 254. K. Taavola.

Study of and composition in larger forms, including sonata form; systematic study of chromatic harmony, voice-leading, and modulation; composition in chromatic style.

**[MUSIC 253(3103) Musicianship III]**

Fall. 2 credits. Pre- or corequisite: MUSIC 251. K. Taavola.

Sight singing: melodies with chromaticism in treble, alto, tenor, and bass clefs. Keyboard: diatonic modulation, chromatic chords. Dictation: melodies with modulation; chorale phrases with secondary dominants and other chromatic chords. Score reading: four parts using treble, alto, tenor, and bass clefs. Musical terms: orchestral ranges, terms, clefs, and transpositions.

**[MUSIC 254(3104) Musicianship IV]**

Spring. 2 credits. Pre- or corequisite: MUSIC 252. K. Taavola.

Sight singing: melodies in four clefs, including modality and chromatic modulation. Keyboard: chromatic sequences, chromatic modulations, improvised modulations employing diatonic pivot chords. Dictation: intervals, rhythms, short melodies, and short, diatonic chorale phrases. Score reading: four parts, including transposing instruments. Musical terms: other terms in French, German, and Italian.

**[MUSIC 361(3111) Jazz Improvisation I]**

Spring. 2 credits. Prerequisite: MUSIC 151 or permission of instructor. P. Merrill.

An introduction to fundamental jazz theory, technique, and applied skills. Class work and assignments emphasize basic nomenclature, diatonic seventh chords, upper-structures, modes of the major scale, linear style and melodic motive development, feel, cycles, and phrase construction. Performance, composition, analysis, listening, and ear training.

**[MUSIC 362(3112) Jazz Improvisation II]**

Fall. 2 credits. Prerequisite: MUSIC 361. P. Merrill.

Continuation of jazz theory, technique, and applied skills. Class work and assignments emphasize altered upper-structures and dominants, chords and modes of melodic minor, harmonic minor, substitutions, and advanced rhythmic development. Performance, composition, analysis, transcribing, listening, and ear training.

**[MUSIC 365(3115) Jazz Piano]**

Spring. 2 credits. Prerequisite: MUSIC 151 or permission of instructor. P. Merrill.  
An introduction to jazz keyboard technique, including reading chord symbols, comping, bass line construction, and soloing. This course is intended primarily for jazz instrumentalists with little or no keyboard experience and pianists with little or no jazz experience.

**[MUSIC 451(4101) Counterpoint # (LA)]**

Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Next offered 2008–2009. S. Stucky.]

**[MUSIC 452(4102) Topics in Music Analysis (also MUSIC 602[6101]) (LA)]**

Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Next offered 2007–2008. K. Taavola.]

**[MUSIC 453(4111) Composition (LA)]**

Fall. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. R. Sierra.  
Study of music composition through the use of traditional forms such as variation and sonata. The student is required to write original pieces for solo and chamber ensembles.

**[MUSIC 454(4112) Composition in Recent Styles (LA)]**

Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. R. Sierra.  
Through analysis, repertoire from the 20th and 21st centuries furnishes models for composing new works. Styles and techniques are drawn from composers such as Debussy, Bartok, Schoenberg, Copland, and Adams. Recommended (though not required) before taking MUSIC 454; when both 453 and 454 are offered, they form a full-year sequence.

**[MUSIC 455(4121) Conducting (LA)]**

Fall. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Next offered 2007–2008. C. Kim.

Covers fundamentals of score reading, score analysis, rehearsal procedures, and conducting technique; instrumental and choral contexts.]

**[MUSIC 456(4122) Orchestration (LA)]**

Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Next offered 2008–2009. R. Sierra.

Orchestration based on 19th- and 20th-century models.]

**[MUSIC 457(4103) 20th-Century Musical Languages (LA)]**

Fall. 4 credits. Prerequisites: MUSIC 252 and 254. Next offered 2007–2008. K. Taavola.]

**[MUSIC 458(4123) Jazz Arranging (LA)]**

Fall. 4 credits. Prerequisite: MUSIC 358 or permission of instructor. Next offered 2007–2008. P. Merrill.

A survey of jazz arranging techniques for the big band.]

**Music in History and Culture****[MUSIC 221(1312) History of Rock Music (also AM ST 223[1312]) (LA)]**

Spring. 3 credits. No previous training in music required. J. Peraino.

This course examines the development and cultural significance of rock music from its origins in blues, gospel, and Tin Pan Alley up to present-day genres of alternative rock and hip hop.

**[MUSIC 222(1313) A Survey of Jazz (also AM ST 222(1313)) (LA)**

Fall. 3 credits. Next offered 2007-2008.  
S. Pond.

This course addresses jazz from two perspectives: the various sounds of jazz, as well as the historical streams—musical and cultural—that have contributed to its development.]

**[MUSIC 245(1341) Gamelan in Indonesian History and Cultures (also ASIAN 245[2245], VISST 244[2744]) @ (LA)**

Fall or spring. 3 credits. Prerequisite: permission of instructor. No previous knowledge of musical notation or performance experience necessary. Fall, staff; spring, M. Hatch.

An introduction to Indonesia through its art. Elementary techniques of performance on the Indonesian *gamelan*; a general introduction to Indonesian history and cultures, and the sociocultural contexts for the arts there. Several short papers and one longer research report are required. Instruction by visiting Balinese musician.

**[MUSIC 261(2221) Bach and Handel # (LA)**

Fall. 3 credits. Prerequisite: any 3-credit music course or permission of instructor. Next offered 2007-2008. Staff.]

**[MUSIC 262(2222) Haydn and Mozart # (LA)**

Fall. 3 credits. Prerequisite: any 3-credit music course or permission of instructor. J. Webster.

A survey of the lives, works, and historical roles of Joseph Haydn and Wolfgang Amadeus Mozart. Attention is also given to developments in musical style 1750-1800, and to intellectual currents such as the Enlightenment, the aesthetics of music, and changing concepts of genius.

**[MUSIC 263(2223) Beethoven # (LA)**

Spring. 3 credits. Prerequisite: any 3-credit music course or permission of instructor. Next offered 2008-2009. J. Webster.]

**[MUSIC 264(2231) Musical Romantics # (LA)**

Spring. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. Next offered 2007-2008. D. Rosen.]

**[MUSIC 272(2245) Words and Music (also GERST 342[3420]) # (LA)**

Spring. 4 credits. Next offered 2008-2009. A. Groos.

For description, see GERST 342.]

**[MUSIC 274(2241) Opera (also THETR 273[2730]) # (LA)**

Spring. 3 credits. R. Harris-Warrick.

An introduction to opera through the examination of six major works of the operatic repertory by such composers as Mozart, Donizetti, Verdi, Wagner, Bizet, Puccini, and Britten, with attention to the interaction of the words, music, and visual elements. With two of the operas studied, we will trace the development of the opera libretto from the play or short story upon which it is based. We will compare and critique some of the different productions available on video and DVD recordings and, for Donizetti's *Lucia di Lammermoor*, in live performance.

**[MUSIC 276(2242) The Orchestra and Its Music # (LA)**

Spring. 3 credits. Prerequisite: any 3-credit music course or permission of instructor. Next offered 2008-2009. N. Zaslav.

The music of, and the social structures supporting, large instrumental ensembles in the Western world from the 16th century to the present.]

**[MUSIC 277(2243) The Piano and Its Music (LA)**

Fall or spring. 3 credits. Prerequisite: one semester of music theory (MUSIC 105, equivalent course, or equivalent experience) or permission of instructors. Next offered 2008-2009. Staff.]

**[MUSIC 407(4511) Early Dance (also DANCE 407[4399])**

Fall. 1 credit. Next offered 2007-2008. R. Harris-Warrick.]

**[MUSIC 408(4512) Music and Choreography (also DANCE 324[3530]) (LA)**

Spring. 3 credits. Attendance at dance concerts and music concerts required. A. Fogelsanger.

For description, see DANCE 324.

**Music History Courses for Majors and Qualified Nonmajors****[MUSIC 207(3201) Survey of Western Music I # (LA)**

Fall. 3 credits. Pre- or corequisite: MUSIC 151/153 or permission of instructor. A. Richards.

A survey of Western music and its social contexts from the beginning of notation (circa 900) to 1700. Topics include sacred chant, secular song, polyphony, madrigals, early opera, and the development of independent instrumental music. The course emphasizes listening and comprehension of genres and styles, and is intended for music majors and qualified nonmajors.

**[MUSIC 208(3202) Survey of Western Music II # (LA)**

Spring. 3 credits. Pre- or corequisite: MUSIC 152/154 or permission of instructor. A. Richards.

A survey of Western music and its social contexts from 1700 to the present. Topics include the decline of church music, the rise of public concerts and opera, the evolution of the orchestra, and modernism in the 20th century. The course, which emphasizes listening and comprehension of genres and styles, is intended for music majors and qualified nonmajors.

**[MUSIC 300(3211) Proseminar in Musicology (LA)**

Spring. 4 credits. D. Yearsley.

Introduction to methods in musicology, including historiography, criticism, approaches to vernacular and non-western musics, and gender studies.

**[MUSIC 374(3222) Opera and Culture (also GERST 374[3740], ITALA 374) # (LA)**

Spring. 4 credits. Prerequisite: any 3-credit music course or proficiency in German or Italian. Next offered 2008-2009. A. Groos.

For description, see GERST 374.]

**[MUSIC 381(3231) Topics in Western Art Music to 1750 #**

Fall. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Next offered 2007-2008. Staff.]

**[MUSIC 382(3232) Topics in Western Art Music 1750-Present**

Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Next offered 2007-2008. Staff.]

**[MUSIC 386(3301) Topics in Popular Music and Jazz**

Spring. 4 credits. Prerequisite: MUSIC 152/154 or permission of instructor. S. Pond.

This course addresses various topics, centering on the post-World War II years to ca. 1970. Topic for 2007: Post-bebop jazz. Using the "bebop revolution" as a beginning point, we examine style movements (including cubop, cool and West Coast jazz, avant-garde jazz, modalism, and fusion) in light of changing aesthetics, sociopolitical movements, and intersections with other musics of the time. Reading (historical, biographical, and critical) and listening assignments are major components of the course. There are no midterm or final exams; however, quizzes and research papers are required.

**[MUSIC 390(3242) Culture of the Renaissance II (also COM L 362[3620], ENGL 325[3250], HIST 364[3640], ART H 351[3420], FRLIT 362[3620]) # (CA)**

Fall. 4 credits. Next offered 2007-2008. K. Long and W. J. Kennedy.]

**[MUSIC 398-399(3901) Independent Study in Music History**

398, fall; 399, spring. 4 credits. Prerequisite: MUSIC 152 and permission of instructor. Staff.

Advanced study of various topics in music history. Students enrolling in MUSIC 398-399 participate in, but do not register for, an approved 200-level music history course and, in addition, pursue independent research and writing projects.

See also "Independent Study and Honors."

**[MUSIC 400(4211) Senior Seminar**

Fall. 4 credits. J. Peraino.

Topic: Critical approaches to popular music. This course introduces and compares various methods of studying popular music, including historical, analytical, sociological, ethical, and cultural. The focus will be on styles and performers within the genres of rock 'n' roll and rap.

**[MUSIC 410(4222) Music and Monstrous Imaginings # (LA)**

Fall. 4 credits. Next offered 2008-2009. A. Richards.]

**[MUSIC 411(2244) The Organ in Western Culture # (LA)**

Fall. 4 credits. Prerequisite: permission of instructor. Next offered 2007-2008. A. Richards and D. Yearsley.]

**[MUSIC 418(4181) Psychology of Music (also PSYCH 418[4180]) (KCM)**

Spring. 3 or 4 credits, depending on whether student elects to do an independent project. C. L. Krumhansl.

For description, see PSYCH 418.

**[MUSIC 492(4231) Music and Queer Identity (CA)]**

Spring. 4 credits. Next offered 2008–2009.  
J. Peraino.]

**[MUSIC 493(4232) Women and Music (also FGSS 496(4960)) (CA)]**

Spring. 4 credits. Next offered 2007–2008.  
J. Peraino.]

**Digital Music and New Media****MUSIC 120(1421) Introduction to Digital Music (LA)**

Fall. 3 credits. Limited enrollment.  
Prerequisite: permission of instructor.  
Recommended: ability to read music.  
K. Ernste.

A composition-based introduction to computer hardware and software for digital sound and digital media. Fundamentals of MIDI sequencing and other techniques for producing electroacoustic music. Each student creates several short compositions.

**MUSIC 165(1465) Computing in the Arts (also COM S/CIS/ENGRI 165(1610))**

Spring. 3 credits. G. Bailey.  
For description, see COM S 165.

**MUSIC 220(2421) Computers in Music Performance (LA)**

Spring. 3 credits. Limited enrollment.  
Prerequisite: permission of instructor.  
K. Ernste.

A course in live performance and real-time, interactive sound manipulation techniques both in concert and over networks. Students will work individually or in small groups toward realizing short pieces that utilize tools and ideas from the course. MUSIC 220 is appropriate as a continuation for those who have taken MUSIC 120 but is open to others by permission.

**[MUSIC 320(3421) Scoring the Moving Image Using Digital Technology (LA)]**

Spring. 4 credits. Prerequisite: MUSIC 120 with grade of B or higher and MUSIC 251.  
Next offered 2007–2008. K. Ernste.]

**MUSIC 355(3431) Sound Design and Digital Audio (also THETR/DANCE 368(3680)) (LA)**

Fall. 4 credits. W. Cross.  
For description, see THETR 368.

**MUSIC 356(3441) Digital Performance (also THETR 369(3690)) (LA)**

Spring. 4 credits. W. Cross.  
For description, see THETR 369.

**Independent Study and Honors****MUSIC 301–302(4901) Independent Study in Music**

301, fall; 302, spring. Credit TBA.  
Prerequisite: departmental approval;  
experience in proposed area of study.  
Staff.

See also MUSIC 398–399 under “Music in History and Culture.”

**MUSIC 401–402(4911) Honors in Music**

401, fall; 402, spring. 8 credits per year.  
Prerequisite: senior honors candidates.  
Staff.

See “Honors” under “The Major” at the beginning of the MUSIC listings.

**Musical Instruction**

Cornell faculty members offer individual instruction in voice, organ, harpsichord, piano and fortepiano, violin, viola, cello, and some brass and woodwind instruments to those students advanced enough to do college-level work in these instruments. Lessons are available by audition only. They may be taken either without credit (MUSIC 321) or with credit (MUSIC 322 or 323). All students studying with Cornell faculty members must enroll in MUSIC 321, 322, or 323. Other instruments may sometimes be studied for credit outside Cornell, but also by audition only (see MUSIC 321–323, Secs 9 and 10).

**Lessons for beginners.** The Department of Music can recommend outside teachers for those who wish to begin studying voice or an instrument. No credit is available for beginning instruction.

**Auditions.** Auditions are held at the beginning of each semester for lessons for advanced students. Contact the music department office in 101 Lincoln Hall for information.

**Earning academic credit for lessons.** For every 4 credits earned in MUSIC 322, the student must have earned, or currently be earning, at least 3 credits in another music course (excluding MUSIC 322, 323, 331–348, or 421–448). These 3 credits must be earned before, or simultaneously with, the first 2 credits in 322; they cannot be applied retroactively. Only music courses taught at Cornell (or approved transfer courses from other colleges or universities) may be used to satisfy this requirement.

**Fees.** The fee for a one-hour lesson (or two half-hour lessons) weekly, with or without credit, is \$480 per semester. For a one-half hour lesson weekly (without credit only), the fee is \$240. All fees are nonrefundable once lessons begin, even if the course is subsequently dropped.

**Lessons taken outside Cornell.** Under certain conditions, advanced students may earn credit for lessons taken outside Cornell. An audition is required, and no credit can be granted for beginning instruction. For further information, read the description of MUSIC 322–323, Secs 9 and 10, and contact the Music Department office.

**Scholarships.** Music majors receive a scholarship of up to \$480 per semester. Any member of department-sponsored ensembles may, with the permission of the director of the ensemble, receive a partial scholarship to help defray the cost of the lessons. All scholarships are intended only for lessons in the student's primary performing medium. Scholarship forms, available in the music department office, are to be returned to the office within the first three weeks of classes.

**MUSIC 321–322–323(3501–3502–4501) Individual Instruction**

Prerequisite: advanced students only; may register after successful audition with instructor, or, if student needs to study outside Cornell, with appropriate faculty sponsor. Students should contact instructor or music department office for audition information. Students may register for these courses in successive semesters or years.

**MUSIC 321(3501)**

Fall or spring. 0 credits each semester.  
See section listing below for instructors.  
Students who pass a successful audition to

study with Cornell faculty, but either wish to take only a half-hour lesson per week or cannot receive credit for lessons, must enroll in MUSIC 321. S-U grades only.

**MUSIC 322(3502)**

Fall or spring. 2 credits each semester.  
See section listing below for instructors. Students earn 2 credits each semester for one-hour lesson (or two half-hour lessons) per week, accompanied by appropriate practice schedule. Credit may be earned only in conjunction with academic music courses; see “Earning Academic Credit for Lessons,” above. Letter grades only.

**MUSIC 323(4501)**

Fall or spring. 4 credits each semester. See section listing below for instructors. Open only to juniors and seniors majoring in music and graduate students in music. The section numbers listed below apply to MUSIC 321, 322, or 323, depending on the instrument studied.

Sec 01 Voice. J. Kellock.

Sec 02 Organ. A. Richards.

Sec 03 Piano. X. Bjerken and Staff.

Sec 04 Harpsichord. A. Richards and D. Yersley.

Sec 05 Violin or Viola. V. Gellev.

Sec 06 Cello. J. Haines-Eitzen.

Sec 07 Brass. Staff.

Sec 08 Woodwinds. Staff.

Sec 09/Sec 10 Individual Instruction Outside Cornell.

All the standard orchestral and band instruments, keyboard instruments, guitar, and voice may, under certain conditions, be studied for credit with outside teachers. This course is available primarily for the study of instruments not taught at Cornell and when there is limited enrollment in MUSIC 321 and 322. Prior approval and audition by a member of the faculty in the department are required, and credit may be earned only as described under “Earning academic credit for lessons,” above. Additionally, a departmental petition must be completed by the end of the third week of classes. For information and a list of approved teachers, consult the department office, 101 Lincoln Hall.

**Musical Organizations and Ensembles**

Students may participate in musical organizations and ensembles throughout the year. Permission of the instructor is required, and admission is by audition only (usually at the beginning of each semester), except that the Sage Chapel Choir and the Cornell Gamelan Ensemble are open to all students without prior audition. Registration is permitted in two of these courses simultaneously and students may register in successive years, but no student may earn more than 8 credits in these courses. Membership in these musical organizations and ensembles is also open to qualified students who wish to participate without earning credit.

**MUSIC 331–332(3601) Sage Chapel Choir**

331, fall; 332, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester. No audition required. R. Riley.  
Open to all students and members of the university. Varied and demanding repertoire. The Sage Chapel Choir sings regularly in the

Sunday service of worship, which is broadcast on 870 WHCU-AM radio, and on special occasions throughout the year.

**MUSIC 333-334(3602) Chorus**

333, fall; 334, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. S. Tucker.

A treble-voice chorus specializing in music for women's voices and in mixed-voice repertory.

**MUSIC 335-336(3603) Glee Club**

335, fall; 336, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. S. Tucker.

A male-voice chorus specializing in music for men's voices and in mixed-voice repertory.

**MUSIC 338(3631) Wind Symphony**

Fall and spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition.

C. Johnston Turner and J. Miller.

**MUSIC 339-340(3615) Jazz Ensemble II**

339, fall; 340, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. P. Merrill.

Study and performance of classic and contemporary big band literature. Rehearsal once a week with one to two performances a semester.

**MUSIC 342(3633) Wind Ensemble**

Fall and spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition.

C. Johnston Turner.

**MUSIC 343-344(3621) Symphony Orchestra**

343, fall; 344, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. C. Kim.

Study and performance of a broad repertoire of orchestral works from Beethoven to the present.

**MUSIC 345-346(2541) Advanced Instruction—Gamelan**

345, fall; 346, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester. Limited enrollment. Prerequisite: permission of instructor. Fall, staff; spring, M. Hatch.

Concentrated instruction for students in advanced techniques of performance on the Indonesian *gamelan*.

**[MUSIC 348(3611) World Music Choir**

Spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester. Prerequisite: permission of instructor. Next offered 2007-2008. S. Tucker.

A mixed-voice chorus whose repertoire is drawn from Africa, Central America, South America, the Caribbean, Eastern Europe, and Asia. Music reading skills are not necessary, but a good ear is essential.)

**MUSIC 421-422(4621) Chamber Orchestra**

421, fall; 422, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. C. Kim.

Study and performance of chamber orchestra works from the baroque period to the present.

**MUSIC 423-424(4616) Jazz Combos**

423, fall; 424, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. P. Merrill.

Study and performance of classic and contemporary small-group jazz.

**MUSIC 431-432(3614) Middle Eastern Music Ensemble (also NES 447-448[4947-4948])**

431, fall; 432, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: permission of instructor.

M. Hatch.

Performance of diverse musical traditions from the Middle East. Instruction in individual instruments (oud, ney, kanoun, and percussion) and group rehearsals, culminating in one or two performances per semester. Songs are taught in several languages, with the assistance of local language and diction teachers.

**MUSIC 433-434(3613) Steel Band**

433, fall; 434, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: background in music and permission of instructor. J. Armstrong.

This performance group specializes in traditional Caribbean steel drum repertoire and beyond.

**MUSIC 435-436(3612) World Drum and Dance Ensemble**

435, fall; 436, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: permission of instructor.

J. Armstrong.

This group specializes in traditional music from West Africa and the Caribbean. Drumming techniques, song, and dance styles are incorporated into each semester's activities. No previous percussion experience is necessary.

**MUSIC 437-438(4631) Chamber Winds**

437, fall; 438, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Corequisites: enrollment in one course drawn from MUSIC 333-344, 439, 440, and permission of instructor. Coordinator: C. Johnston Turner.

Flexible instrumentation ensembles perform original woodwind, brass, and percussion music. The ensembles participate in Wind Symphony and Wind Ensemble concerts in addition to several chamber concerts throughout the year.

**MUSIC 439-440(4615) Jazz Ensemble I**

439, fall; 440, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. P. Merrill.

Study and performance of classic and contemporary big band literature. Rehearsals twice a week with two to four performances per semester.

**MUSIC 441-442(4651) Chamber Music Ensembles**

441, fall; 442, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition.

Coordinator: M. Yampolsky.

Study and performance of chamber music works from duos to octets, for pianists, string, and wind players.

**MUSIC 443-444(3604) Chorale**

443, fall; 444, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. J. Miller.

Study and performance of selected choral music for mixed voices.

**MUSIC 445-446(4641) Gamelan Ensemble**

445, fall; 446, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: permission of instructor. Fall, staff; spring, M. Hatch.

Advanced performance on the Indonesian *gamelan*. Tape recordings of *gamelan* and elementary number notation are provided. Some instruction by visiting Balinese artist.

**MUSIC 447-448(4601) Chamber Singers**

447, fall; 448, spring. Either 0 credits, S-U, or 1 credit, letter grade, each semester.

Prerequisite: successful audition. Staff.

A mixed-voice chamber choir specializing in Renaissance and 20th-century music.

**Graduate Courses**

Open to qualified undergraduates by permission of instructor.

**MUSIC 601(6201) Introduction to Bibliography and Research**

Fall. 4 credits. B. Boettcher.

This course explores the nature of the discipline and introduces the many types of bibliographic tools, both printed and electronic, needed to pursue research in music.

**[MUSIC 602(6101) Analytical Technique (also MUSIC 452[4102])**

Spring. 4 credits. Next offered 2007-2008. K. Taavola.]

**[MUSIC 603(6202) Editorial Practice**

Spring. 4 credits. Next offered 2008-2009. Staff.]

**MUSIC 604(6301) Introduction to Ethnomusicology**

Spring. 4 credits. Also open to graduate students in anthropology, linguistics, psychology, sociology, Africana, Asian Studies, and other cognate fields by permission of instructor. M. Hatch.

This course surveys a spectrum of issues central to the field, including but not limited to issues of identity and representation, methods of musical and cultural analysis, area studies, applied ethnomusicology, and intersections with other fields in the humanities and social sciences.

**MUSIC 620(6420) Techniques for Computer Music**

Fall. 4 credits. Prerequisite: permission of instructor. K. Ernste.

Intended principally for doctoral students in music composition but open to others by permission. The course presents a practical overview of both classical and state-of-the-art techniques for computer music including digital synthesis, signal processing and sound manipulation, analysis and resynthesis, spatialization, and real-time and/or interactive applications. Students will produce several short studio projects as well as one larger piece to be presented in a final concert.

**[MUSIC 653(7101) Topics in Tonal Theory and Analysis**

Spring. 4 credits. Next offered 2008-2009. J. Webster.]

**[MUSIC 654(7102) Topics in Post-Tonal Theory and Analysis**

Spring. 4 credits. Next offered 2007-2008. K. Taavola.]



**MUSIC 656(7121) Advanced Orchestral Technique**

Fall. 4 credits. S. Stucky.

Intensive analysis of orchestral scores by such composers as Debussy, Ravel, Stravinsky, Dutilleux, Boulez, Lutoslawski, Berio, Takemitsu, Druckman, Knussen, Benjamin, Adams, Saariaho, and Lindberg, with an emphasis on modern instrumental techniques, gestures, and textures. Composition exercises aimed at harnessing these discoveries for the students' own work. Designed for doctoral candidates in composition; others admitted by permission only.

**MUSIC 657-658(7111) Composition**

657, fall; 658, spring. 4 credits each semester. R. Sierra and S. Stucky.

**MUSIC 659(6421) Electroacoustic Composition**

Spring. 4 credits. Prerequisite: permission of instructor. K. Ernste.

Intended principally for doctoral students in music composition but open to others by permission. Depending on students' backgrounds and interests, the course may include an introduction to electroacoustic composing, an emphasis on aesthetic issues associated with the field, interactivity and real-time performance, software instrument design, performance controllers, or other topics.

**[MUSIC 677(7221) Mozart: His Life, Works, and Times**

Fall. 4 credits. Next offered 2007–2008. N. Zaslaw.]

**[MUSIC 680(7301) Topics in Ethnomusicology**

Spring. 4 credits. Also open to graduate students in anthropology, linguistics, psychology, sociology, Africana Studies, Asian Studies, and other cognate fields by permission of instructor. Next offered 2007–2008. S. Pond.]

**[MUSIC 681(7201) Seminar in Medieval Music**

Fall. 4 credits. Next offered 2007–2008. J. Peraino.]

**[MUSIC 683(7231) Music and Postmodern Critical Theory**

Fall. 4 credits. Next offered 2008–2009. J. Peraino.]

**[MUSIC 684(7202) Seminar in Renaissance Music**

Fall. 4 credits. Next offered 2008–2009. R. Harris-Warrick.]

**[MUSIC 686(7203) Seminar in Baroque Music**

Spring. 4 credits. Next offered 2007–2008. D. Yearsley.]

**MUSIC 688(7204) Seminar in Classical Music**Spring. 4 credits. J. Webster.  
Topic: Haydn.**MUSIC 689(7205) Seminar in Music of the Romantic Era**Spring. 4 credits. A. Gross and D. Rosen.  
Topic: The operas of Puccini.**[MUSIC 690(7206) Seminar in Music of the 20th Century**

Fall and spring. 4 credits. Next offered \*2007–2008. Staff.]

**MUSIC 691-692(7501) Historical Performance**

691, fall; 692, spring. 4 credits each semester. Prerequisite: permission of instructor. M. Bilson.

Lessons on the major instrument with supplementary study and research on related subjects.

**[MUSIC 693(7211) Seminar in Performance Practice**

Fall. 4 credits. Next offered 2008–2009. N. Zaslaw.]

**MUSIC 695(7311) Gender, Sexuality, and Glam Rock (also FGSS 695[6950])**

Fall. 4 credits. J. Peraino.

This course will examine the history and legacy of glam rock, with a focus on the use of music, fashion, and performance as a means of exploring non-normative gender and sexual identities. Key artists and groups include the Velvet Underground, Marc Bolan, David Bowie, Roxy Music, Queen, Iggy pop, and the New York Dolls. Cinematic treatments of glam rock, such as Velvet Goldmine and Hedwig and the Angry Inch, will also be considered. Readings will be drawn from cultural, gender and sexuality studies as well as musicology.

**MUSIC 697-698(7901) Independent Study and Research**

697, fall; 698, spring. Credit TBA. Staff.

**MUSIC 785(7103) History of Music Theory**

Fall. 4 credits. K. Taavola.

Issues and problems in the history of music theory; topics vary from year to year. Topic for 2006: Esoteric French and German theory in the 19th and 20th centuries.

**[MUSIC 787(7232) History and Criticism**

Spring. 4 credits. Next offered 2008–2009. A. Richards.]

**MUSIC 901-902(9901) Thesis Research**

901, fall; 902, spring. Up to 6 credits each semester. TBA. S-U grades only.

Limited to doctoral students in music who have passed the Admission to Candidacy exam.

**NEAR EASTERN STUDIES**

K. Haines-Eitzen, chair, R. Brann (director of graduate studies), H. Elaqad, I. Gocheleishvili, C. Monroe, L. Monroe, D. I. Owen (director of Program of Jewish Studies); D. S. Powers, N. Scharf, S. Shoer, D. Starr (director of undergraduate studies), S. M. Toorawa, M. Younes, J. Zorn. Joint faculty: M. Bernal (emeritus), G. Holst-Warhaft, C. Robinson

**The Department**

The Department of Near Eastern Studies (409 White Hall, 255-6275) offers courses in Near Eastern civilization including archaeology, history, religions, languages, and literatures. These course offerings treat the Near East from the dawn of history to the present and emphasize methods of historical, cultural, and literary analysis. Students are encouraged to take an interdisciplinary approach to the religions and cultures of the region and their articulation during antique, late antique, medieval, and modern times. For more information, please visit [www.arts.cornell.edu/nese/](http://www.arts.cornell.edu/nese/).

**Distribution Requirements**

Any two Near Eastern Studies history or archaeology courses at the 200, 300, or 400 level that form a reasonable sequence or combination satisfy the distribution requirement in the social sciences/history. Any two Near Eastern Studies civilization or literature courses at the 200, 300, or 400 level that form a reasonable sequence or combination satisfy the distribution requirement in the humanities. NES 197 or 251 plus any other Near Eastern Studies course will constitute a sequence to fulfill the distribution requirement in either social sciences/history or humanities, depending on the second course used in combination with 197 or 251. All 200- or 300-level language courses may fulfill the humanities requirement.

**The Major**

A major in Near Eastern Studies offers students the opportunity to explore the languages, literatures, cultures, religions, and history of the Near East/Middle East from antiquity to the modern day. The major is designed both to acquaint students broadly with the region and its cultures as well as to study a particular subfield in depth.

**Prerequisites**

- The applicant for admission to the major in Near Eastern Studies must have completed at least two Near Eastern Studies content courses, one of which can be a language course. Students are strongly encouraged to enroll in language courses and/or NES 251 or 254 either before signing into the major or early on in their major.
- Prospective majors must meet with the director of undergraduate studies before submitting a major application.
- To qualify as a major, a cumulative grade average of C or better is required.

**Major Requirements**

For students graduating in the Classes of 2006 or earlier, consult the department. The precise sequence and combination of courses chosen to fulfill the major is selected in consultation with the student's advisor. All majors must satisfy the following requirements (no course may be used to satisfy two requirements; S-U option not permitted):

1. Two years of one Near Eastern language or, in exceptional cases, one year of two Near Eastern languages
2. Nine 3- or 4-credit NES courses, which must include the following:
  - a. NES 251 Judaism, Christianity, and Islam or NES 254 Introduction to Near Eastern Civilizations
  - b. NES 460 Junior/Senior Proseminar: Theory and Method in Near Eastern Studies
  - c. Seven additional courses, of which
    - i. three must fulfill temporal breadth, defined as: one course whose chronological parameters fall within the period 3000 BCE to 600 CE, one course whose chronological parameters fall within the period 600 CE to 1800 CE, and one course whose chronological parameters fall between 1800 CE and the

present. The following are examples (a complete list may be obtained in the department office):

#### 3000 BCE to 600 CE

- NES 223 Introduction to the Hebrew Bible
- NES 229 Introduction to the New Testament
- NES 244 Introduction to Ancient Judaism
- NES 261 Ancient Seafaring
- NES 266 Jerusalem through the Ages
- NES 320 Women in the Hebrew Bible
- NES 360 Ancient Iraq
- NES 323 Reinventing Biblical Narrative
- NES 394 Gender, Sexuality, and the Body in Early Christianity

#### 600 CE to 1800 CE

- NES 214 Qur'an and Commentary
- NES 234 Muslims and Jews in Confluence and Conflict
- NES 256 Introduction to the Qur'an
- NES 273 History of the Middle East: 13th to 18th Centuries
- NES 339 Islamic Spain
- NES 351 Law, Society, and Culture in the Middle East
- NES 418 Seminar in Islamic History

#### 1800 CE to the present

- NES 235 Jews and Arabs in Contact and Conflict: The Modern Period
- NES 274 History of the Modern Middle East: 19th to 20th Centuries
- NES 319 Crime and Conflict in the Modern Arabic Novel
- NES 385 Middle Eastern Cities
- NES 393 History of Jews and Christians in the Modern Middle East
- NES 397 History of the Israeli-Palestinian Conflict
- NES 493 Cosmopolitan Alexandria

- ii. A maximum of three of these seven courses can be at the 200 level; a minimum of four must be at the 300 level or above.

- iii. One of the 300-level or above courses must be a research seminar (courses are designated with ®). The following are examples (a complete list can be found in the department office):

- 339 Islamic Spain: Culture and Society @ # (CA) ®
- 385 Middle Eastern Cities: History, Society, and Culture @ # (HA) ®
- 394 Gender, Sexuality, and the Body in Early Christianity @ # (CA) ®
- 427 New York, Paris, Baghdad: Poetry of the City ®
- 457 Formation of Islamic Law @ # (HA) ®

- iv. Note: a maximum of two independent studies can be applied to the major; a maximum of two non-cross-listed courses may be applied to the major; a maximum of two courses may receive credit for more than one major; a maximum of

15 credits of relevant, departmentally approved course work taken overseas or at another university may be applied to the major.

For students graduating in the classes of 2006 or earlier, consult the department.

**Honors.** Candidates for the degree of Bachelor of Arts with honors in Near Eastern Studies must fulfill the requirements of the appropriate major study and enroll in the honors course, NES 499, in the fall and spring semesters of their senior year. For admission to the honors program, candidates must have a cumulative average of B+ or better and have demonstrated superior performance overall in Near Eastern Studies courses. After consulting their major advisor, candidates should submit an outline of their proposed honors work to the department **during the second semester of their junior year.** The Near Eastern Studies main office has more specific guidelines for the honors thesis.

**Study abroad.** Near Eastern Studies majors may choose to study in the Near East during their junior year. There are various academic programs in the countries of the Near East that are recognized by the Department of Near Eastern Studies and that allow for the transfer of credit. Archaeological fieldwork on Cornell-sponsored projects in the Near East may also qualify for course credit.

### First-Year Writing Seminars

For descriptions, consult the John S. Knight Institute brochure for times, instructors, and descriptions.

### Language Courses

#### Arabic

#### NES 111-112(1201-1202) Elementary Arabic I and II (also AS&RC 111/112[1104/1105])

111, fall; 112, spring. 4 credits each semester. Limited to 18 students per section. Prerequisite: for NES 112, NES 111 or permission of instructor. M. Younes and staff.

Provides a thorough grounding in all language skills: listening, speaking, reading, and writing. It starts with spoken Arabic and gradually integrates Modern Standard Arabic in the form of listening and reading texts. Emphasis is on learning the language through using it in meaningful contexts. Students who successfully complete the two-semester sequence are able to (1) understand and actively participate in simple conversations involving basic practical and social situations (e.g., introductions, greetings, school, home and family, work, simple instructions); (2) read Arabic material of limited complexity and variety (e.g., simple narrative and descriptive texts, directions); (3) write notes and short letters describing an event or a personal experience. An important objective of the course is to familiarize students with basic facts about the geography, history, and culture of the Arab world.

#### NES 113-210(1203-2200) Intermediate Arabic I and II (also AS&RC 113/212[1106/2101])

113, fall; 210, spring. 4 credits each semester. *NES 210 @ satisfies Option 1.* Limited to 18 students per section. Prerequisites: for NES 113, one year of Arabic or permission of instructor; for NES 210, NES 113 or permission of instructor. Letter grades recommended. M. Younes and staff.

Sequel to NES 111-112. Continued development of the four language skills through extensive use of graded materials on a wide variety of topics. Increased attention is given to developing native-like pronunciation and grammatical accuracy, but the main focus is on developing communication skills. The student who successfully completes 210 is able to: (1) understand and express himself or herself in Arabic in situations beyond the basic needs; (2) read and comprehend written Arabic of average difficulty; (3) write a letter, a summary of a report, or a reading selection. An appreciation of Arabic literature and culture is sought through the use of authentic materials.

#### NES 133-134(1211-1212) Introduction to Qur'anic and Classical Arabic (also RELST 133-134[1211-1212]) (LA)

133, fall, M. Younes; 134, spring, D. Powers. 4 credits each semester.

This course is designed for students who are interested in reading the Qur'an and other texts in Classical Arabic. By the end of the semester, students will have mastered many of the common grammatical structures and will have a good working vocabulary. This course, and its follow-up in the Spring, provide a firm foundation on which to build an advanced study of Classical Arabic. No prior knowledge of Arabic is required.

#### NES 214(2212) Qur'an and Commentary (also RELST 214[2212]) @ (LA)

Spring. 3 credits. Prerequisite: for NES 214, NES 113-210. D. Powers.

Advanced study of classical Arabic through a close reading of selected chapters of the Qur'an, together with the Qur'anic commentary (tafsir) and other relevant literature. Special attention is given to grammar, syntax, and lexicography.

#### NES 311-312(3201-3202) Advanced Intermediate Arabic I and II (also AS&RC 308-312) @

311 fall; 312 spring. 4 credits each semester. *Satisfies Option 1.* Limited to 15 students. Prerequisite: for NES 311, NES 210 or permission of instructor; for NES 312, NES 311 or permission of instructor. Letter grades recommended. M. Younes and staff.

Introduces students to authentic, unedited Arabic language materials ranging from poems, short stories, and plays to newspaper articles dealing with social, political, and cultural issues. Emphasis is on developing fluency in oral expression through discussion of issues presented in the reading selections. There is more focus on the development of native-like pronunciation and accurate use of grammatical structures than on elementary and intermediate Arabic. A primary objective of the course is the development of writing skill through free composition exercises in topics of interest to individual students.

**NES 416(4206) Structure of the Arabic Language (also LING 416[4416]) (KCM)**

Spring. 4 credits. Limited to 15 students.

Prerequisite: one year of Arabic or a linguistic background. M. Younes.

Consists of a brief history of Arabic and its place in the Semitic language family, the sociolinguistic situation in the Arab world (diglossia), Arabic phonology (sounds, emphasis, syllable structure, and related processes), morphology (verb forms and derivational patterns), and syntax (basic sentence structures, cases, and moods).

**Hebrew****NES 101-102(1101-1102) Elementary Modern Hebrew I and II (also JWST 101-102[1101-1102])**

101, fall; 102, spring. 4 credits each semester. Limited to 18 students per section. Prerequisite: for NES 102, NES 101 with grade of C- or better or permission of instructor. Letter grades only. S. Shoer.

Intended for beginners. Provides a thorough grounding in reading, writing, grammar, oral comprehension, and speaking. Students who complete the course are able to function in basic situations in a Hebrew-speaking environment.

**NES 103(1103) Elementary Modern Hebrew III (also JWST 103[1103])**

Fall. 4 credits each semester. Limited to 15 students per section. Prerequisite: NES 102 with grade of C- or better or permission of instructor. Letter grades recommended. N. Scharf.

Sequel to NES 101-102. Continued development of reading, writing, grammar, oral comprehension, and speaking skills.

**NES 200(2100) Intermediate Modern Hebrew (also JWST 200[2100]) @**

Spring. 4 credits. *Satisfies Option 1*. Prerequisite: NES 103 with grade equivalent to C- or above or permission of instructor. Letter grades recommended. N. Scharf.

Introduces Hebrew literature and Israeli culture through the use of texts and audiovisual materials.

**NES 301(3101) Advanced Intermediate Modern Hebrew (also JWST 301[3101]) @**

Fall. 4 credits. *Satisfies Option 1*. Limited to 15 students. Prerequisite: NES 200 with grade of C- or above or permission of instructor. This sequence may be used to fulfill humanities distribution requirement in literature. Letter grades recommended. N. Scharf.

Advanced study of the Hebrew language both orally and through the analysis of mostly unedited texts of social, political, and cultural relevance, with less emphasis on the study of grammar. Students are introduced to articles published in Israeli newspapers and magazines, works by authors, and movies. Students develop composition and advanced writing skills by studying language structure, idioms, and various registers of style.

**NES 305(3105) Conversational Hebrew (also JWST 305[3105])**

Spring. Variable to 3 credits. Limited to 15 students. Prerequisite: NES 301, 400, or permission of instructor; non-native speakers only. Letter grades recommended. N. Scharf.

Intended to continue the development of all aspects of the language. Emphasis, however, is placed on speaking skills and understanding by using text material relevant to Israeli contemporary society. The instructor is sensitive to individual student needs.

**NES 420(4102) Biblical Hebrew Prose—Joshua (also JWST/RELST 420[4102]) @ # (LA)**

Fall. 4 credits. *Satisfies option 1*.

Prerequisite: one year of biblical or modern Hebrew. L. Monroe.

The biblical book of Joshua recounts miraculous stories of the Israelite conquest and settlement of the land of Canaan under the leadership of Joshua ben Nun. The details of these accounts have drawn the attention of biblical scholars and archaeologists alike, who are interested in questions of who the Israelites were, how they came to occupy the land of Canaan, and how they understood themselves in relation to their Canaanite neighbors. In this class we will read the book of Joshua in the original Hebrew, with a particular focus on how the language of the text illuminates the Israelites' own evolving understanding of their origins and collective identity. Close attention will be paid to matters of grammar, syntax, and vocabulary in order to develop students' skills in reading biblical Hebrew prose and to enhance their understanding of the Hebrew language itself as a window on ancient Israelite thought. Students will be expected to utilize commentaries, biblical Hebrew grammars and lexicons in their preparation of assigned texts. Prior training in Hebrew is required.

**Hindi-Urdu****NES 105-106(1310-1311) Elementary Hindi-Urdu (also HINDI 101-102[1101-1102])**

Fall, spring. 6 credits each semester. Staff. For description, see HINDI 101-102.

**NES 107(1312) Introduction to Urdu Script (also HINDI 125[1125])**

Spring. 1 credit. Staff. For description, see ASIAN 125.

**Persian****NES 115-116(1320-1321) Elementary Persian I and II**

115, fall; 116, spring. 4 credits each semester. Limited to 15 students. I. Gocheleishvili.

Designed for students who want an effective and comprehensive approach to learning Persian that will enable them to progress in the language skills of speaking, listening, reading, and writing. At the completion of this course, students are prepared to deepen their comprehension of Persian through literature and the media.

**NES 119-219(1319-2319) Intermediate Persian I and II**

119, fall; 219, spring. 4 credits. *NES 219 @ satisfies Option 1*. Prerequisite: one year (two semesters) elementary Persian or permission of instructor. I. Gocheleishvili. A continuation of NES 115-116. Continued development of speaking, listening, reading, and writing skills.

**Turkish****NES 117-118(1330-1331) Elementary Turkish I and II**

117, fall; 118, spring. 4 credits each semester. Limited to 15 students. D. Ipek. Intended for students with no experience in Turkish. The goal is to provide a thorough grounding in Turkish language with an emphasis on communication. Small class size provides intensive practice in speaking, writing, and listening/comprehension. The course is co-sponsored by the Institute for European Studies.

**Ancient Near Eastern Languages****Akkadian****NES 333-334(3410-3411) Elementary Akkadian I and II (also NES 633-634[6410-6411])**

333, fall; 334, spring. 4 credits each semester. Prerequisite: for NES 334, NES 333 or permission of instructor. Recommended: knowledge of another Semitic language. Staff.

Introduction to the Semitic language of the Akkadians and Babylonians of ancient Mesopotamia. Using the inductive method, students are rapidly introduced to the grammar and the cuneiform writing system of Akkadian through selected readings in the Code of Hammurapi, the Descent of Ishtar, and the Annals of Sennacherib. Secondary readings in comparative Semitic linguistics, the position of Akkadian in the family of Semitic languages and on the history and culture of Mesopotamia provide a background for study of the language.

**Topics Courses****NES 223(2623) Introduction to the Hebrew Bible (also JWST/RELST 223[2623]) @ # (LA)**

Fall. 3 credits. L. Monroe.

The Hebrew Bible (Old Testament) is a repository of ancient Israelite religious, political, social, historical, and literary traditions. For the modern reader these ancient traditions are often obscured by a focus on the text as revelation. The purpose of this course is to introduce students to the biblical world by reading the Hebrew Bible in translation, on its own terms, as a body of literature that evolved in an ancient Near Eastern context. The Bible itself will be the primary text for the course, but students will also be exposed to the rich and diverse textual traditions of the ancient Near East, including Mesopotamia, Egypt, Moab, and Ugarit. In addition, this course will explore the impact of early biblical interpretation on shaping the monotheistic traditions inherited in the West. As participants in a secular course on the Bible, students will be challenged to question certain cultural assumptions about the composition and authorship of the Bible, and will be expected to differentiate between a text's content and its presumed meaning.

**NES 244(2644) Introduction to Judaism (also JWST 244[2644], RELST 244[2644]) @ # (HA)**

Spring. 3 credits. L. Monroe.

This course is designed to acquaint students with the varieties of Judaism from ancient times to the early modern period. A strong emphasis will be placed on ancient Jewish

civilization, and how ancient structures shaped later religious, social, and political trends. Particular attention will be devoted to moments of continuity and change in ideas and practices in each major phase of their historical development. Students will learn to analyze material evidence and primary texts in translation, to engage with the questions brought to bear on this material by contemporary scholars, and to generate their own critical questions. This course will also explore the ways Judaism and the Jewish people have been understood through various interpretive lenses, including, sociology, religious studies, anthropology, musicology, women's studies, and film studies. Students will be encouraged to think creatively, and to engage in experiential and hands-on investigation of particular issues.

**NES 250(2750) Maladies of the Soul: Don Quijote (also SPANL 255[2550]) (LA)**

Fall. 3 credits. M. A. Garcés.  
For description, see SPANL 255.

**NES 251(2651) Holy War, Crusade, and Jihad in Judaism, Christianity, and Islam (also HIST 269[2691], JWST/RELST 251[2651]) @ # (HA)**

Fall. 3 credits. R. Brann.  
Articulating and elaborating religious justifications for war is a cultural practice unique to the three monotheistic traditions and their respective textual communities. This notion and its practice have had profound historical consequences in the past that extend to and inform present-day global socio-political conflicts. The first part of this course will examine the origins of the concept of holy war, crusade and jihad and trace their cultural histories. The second part of the course will be devoted to discussing the ways in which contemporary discourses such as a "clash of civilizations," "the Evil Empire," "The Great Satan," and the "Axis of Evil" draw upon these respective cultural histories and explicitly or implicitly positing political conflict as a "battle for God."

**NES 255(2655) Introduction to Islamic Civilization (also HIST 253[2530], RELST 255[2655]) @ # (HA)**

Fall. 3 credits. D. Powers.  
Considers the major themes of Islamic civilization as they developed from the lifetime of Muhammad until the 20th century. While the readings provide the student with the chronology of Islamic history, lectures are devoted to an analysis of thematic units, such as art and architecture, science, and cities. The class meets three times weekly, and the classroom format is that of a lecture/discussion in which students are encouraged to participate actively. Lectures are accompanied by slide presentations when appropriate.

**NES 261(2661) Ships and Seafaring—Introduction to Nautical Archaeology (also JWST 261[2661]) @ # (HA)**

Spring. 4 credits. C. Monroe.  
A survey of the history and development of ships and seafaring as revealed by shipwrecks, boat burials, texts, art, and other evidence. The role of nautical technology and seafaring among the maritime peoples of the ancient Mediterranean world—Canaanites, Minoans, Mycenaeans, Phoenicians, Hebrews, Greeks, and Romans—as well as the riverine cultures of Mesopotamia and Egypt, is addressed. The survey stretches from the earliest evidence for Mediterranean seafaring around 10,000 BCE

to the first transatlantic voyages in the 15th century, including Arab, Viking, and European explorers, and the birth of modern capitalism in the Italian Maritime Republics. Along the way, economics, war, exploration, cult, life at sea, and colonization are discussed.

**NES 262(2662) Daily Life and the Cultural Landscape of the Biblical World (also ARKEO 260[2662], JWST 262[2662], RELST 261[2662]) @ # (CA)**

Fall. 3 credits. J. Zorn.  
Surveys the common and not-so-common daily activities of the world of ancient Israel and its neighbors in Mesopotamia, Egypt, and Canaan. Many courses cover aspects of ancient political history or ancient literature, but these often focus on the activities of members of social elites, at the expense of the activities of more average citizens. The focus of this course on ancient technologies provides a broader spectrum, spanning all social classes. Material to be covered includes topics such as food production and processing, pottery production, metallurgy, glass making, cloth production and personal adornment, implements of war, medicine, leisure time (games and music), and others.

**NES 265(2565) SSP: Law, Society, and Culture in the Middle East (also RELST 265[2565], HIST 222[2220]) @ # (CA)**

Spring. 3 credits. Limited to 15 students.  
Prerequisite: none. Sophomore seminar.  
D. Powers.

Explores the nature of the Islamic judicial system and notions of justice. Class discussions are based upon the close reading of historical materials, including legal documents, judicial opinions, and court cases (all in English translation), which form the basis of writing assignments. Themes treated include the marital regime, relations between parents and children, gender, slavery, the intergenerational transmission of property, the status of non-Muslims, crime and its punishment, law and the public sphere.

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Sophomore Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores the seminars aim at initiating students into the discipline's outlook, its discourse community, its modes of knowledge, and its ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**NES 266(2666) Jerusalem Through the Ages (also JWST/ARKEO/RELST 266[2666]) @ # (HA)**

Spring. 3 credits. J. Zorn.  
Jerusalem is a holy city to the adherents of the three great monotheistic faiths: Judaism, Christianity, and Islam. For most of its existence it has also been a national capital or major provincial center for the many states and empires that vied for control of the vital land bridge connecting Africa, Europe, and Asia. Thus many of the pivotal events that shaped western civilization were played out in the streets and structures of Jerusalem. This course explores the history, archaeology, and natural topography of Jerusalem throughout its long life, from its earliest remains in the Chalcolithic period (ca. 4000 BCE) to the

19th century, including Jebusite Jerusalem, Jerusalem as the capital of the Davidic dynasty, the Roman era city of Herod and Jesus, the Crusaders and medieval Jerusalem, and Ottoman Jerusalem as the city entered the modern era. Students examine the original historical sources (e.g., the Bible, Josephus, the Madaba map) that pertain to Jerusalem. Slides and videos are used to illustrate the natural features, man-made monuments, and artifacts that flesh out the textual material providing a fuller image of the world's most prominent spiritual and secular capital.

**NES 268(2668) Ancient Egyptian Civilization (also ARKEO/JWST 268[2668]) @ # (HA)**

Fall. 3 credits. C. Monroe.  
The course surveys the history and culture of pharaonic Egypt from its prehistoric origins down to the early first millennium BCE. Within a chronological framework, the following themes or topics will be considered: the development of the Egyptian state (monarchy, administration, ideology); social organization (class, gender and family, slavery); economic factors: empire and international relations;

**NES 293(2793) SSP: Middle Eastern Cinema (also JWST 291[2793], FILM 293[2930], COM L 293[2930], VISST 293[2193]) @ (LA)**

Fall. 4 credits. D. Starr.  
We frequently see representations of "Middle Easterners" in the American media, whether on the news, or in TV dramas and film. But there are far fewer opportunities to see how the media from the Middle East represent their own cultures. Students in this course view films from the Arab world, including North Africa and the Eastern Mediterranean, as well as from Iran and Israel. The films range from musical comedies, to dramas, to experimental genres. Readings provide background on the particular cultural and historical contexts in which the films are produced and familiarize students with techniques for critically interpreting visual media. Films are screened on Mondays at 7:30 p.m. and also are available on reserve.

**NES 332(3832) Martyrdom in Contemporary Societies (JWST 332[3832]) (SBA)**

Spring. 4 credits. Staff.  
Nothing demonstrates better the power of society than the readiness of some individuals to sacrifice their lives for their community, their nation, or their religious group. There is no better way to unify a group than to celebrate the image of individuals who sacrificed themselves, ostensibly, for their community. This course sheds a sociological light on these intimate relations between violent death and solidarities of modern societies. Offers a comparative discussion on the social significance of heroic death and victimhood in various contexts around the globe. Examines various national "cultures of death," analyzing what sociological theories have to say about these phenomena, and discussing the required adaptations in existing theories in light of case studies presented in class.

**NES 343(3430) Tales of Love and Lust (also SPANL 331[3310])**

Fall. 4 credits. M. A. Garcés.  
For description, see SPANL 133.

**NES 364(3664) Ancient Iraq I: Origins of Mesopotamian Civilization (also JWST 364/664[3664-6664], ARKEO 364[3764], NES 664[6664]) @ # (HA)**

Fall. 4 credits. D. I. Owen.

Introduction to the language, literature, history, culture, and archaeology of Syro-Mesopotamia in the fourth and third millennia BCE. Focuses on Sumerian civilization from its emergence in the archaeological record in the fourth millennium until its disappearance around 2000 BCE. In addition, it emphasizes the parallel development of the Semitic peoples in Syria (Eblaites) and upper Mesopotamia (Akkadians). A special feature of the course is a basic introduction to the Sumerian language using original cuneiform tablets in the collection of the Department of Near Eastern Studies.

**NES 384(3784) Israeli Literature: Between Self and Nation (also JWST 384[3784]) (LA)**

Spring. 4 credits. D. Starr.

In this course we will read a selection of works by Israeli authors written after the establishment of the state in 1948. We will focus in particular on the formation of national identity as it has been shaped and reshaped through literary works. Even from the earliest years of the state there were sites of resistance against the pressure to conform. Some of the texts we read explore these tensions between the self and nation, while others explore alternate collective identities within or beyond the confines of the nation and the state. Among the authors we may read are: Orly Castel-Bloom, Sami Mikhail, Amos Oz, Ya'akov Shabtai, Anton Shammas, A. B. Yehoshua. All works will be read in English translation. No knowledge of Hebrew is required.

**NES 389(3889) Sociology of Sport @ (SBA)**

Spring. 4 credits. Staff.

**NES 395(3895) Israeli Society (also JWST 395[3895], SOC 390[3900]) @ (SBA)**

Fall. 4 credits. Staff.

Introduces students to major themes in contemporary Israeli society, focusing on the following: the tension between the definition of Israel as a Jewish state and its aspiration to be democratic, the place of religion in politics, the effects of the long-term occupation of the West Bank and the Gaza Strip, the fragile status of the Arab Palestinian citizens of Israel, civil-military relations, intra-Jewish ethnic divides, and gender relations. The course emphasizes processes of the formation of collective identities in Israel and the interdependency of culture and politics. Requirements: students are expected to come to class fully prepared to participate in a discussion of the readings; three knowledge quizzes; a movie report; active participation in the course web site forum; a midterm paper; final exam.

**NES 400(4100) Seminar in Advanced Hebrew (also JWST 400[4100]) @ (LA)**

Fall. 4 credits; because topics vary by semester, may be repeated for credit by permission of instructor. *Satisfies Option 1.* Limited to 15 students. Prerequisite: NES 301 with grade equivalent to C- or better or permission of instructor. Letter grades recommended. N. Scharf.

Continuation of work done in NES/JWST 301, with less emphasis on the study of grammar. Students read and discuss texts of cultural relevance, using articles published in Israeli newspapers and works by authors in each of the three principal genres: poetry, theater, and novels.

**NES 401(4101) Modern Hebrew Literature (also JWST 401[4101]) @ (LA)**

Spring. 4 credits. *Satisfies Option 1.* Limited to 15 students. Prerequisite: NES/JWST 302, or permission of instructor. D. Starr.

Literature has held a privileged place in the revival of modern Hebrew and the formation of Israeli culture. This course affords students the opportunity to read a sampling of this exciting literature. Each semester feature a different theme, topic, or period in the development of Hebrew literature. Readings may include short stories, novels, poetry, and drama. All readings, writing assignments, and discussions are in Hebrew.

**NES 415(4202) Arabic Short Story @ (LA)**

Fall. 4 credits. Prerequisite: NES 312 or permission of instructor. D. Starr.

Introduces students to modern Arabic literature through the genre of the short story. Class discussions and writing assignments center on interpretation and textual analysis.

**NES 438(4738) Imagining the Mediterranean (also JWST 438[4738], COM L 496[4960])**

Fall. 4 credits. G. Holst-Warhaft.

Through a series of readings in poetry and prose from Greece, Spain, Morocco, Turkey, Israel and Egypt, the course examines how Mediterranean writers interact with the sensuous aesthetics of landscape, music, and ritual in the Mediterranean. We will be concerned with how poetry, music, dance and image interact in the region, and how this relationship is reflected in 20th-century literature from and about the Mediterranean. The readings will focus on particular cases, such as the relationship of Lorca's poetry to the of Andalusia, lowbrow musical form in Greece, and the nostalgia for the mythical city of Alexandria in Cavafy and other Alexandrian authors. We will also consider how the myth of the Mediterranean has affected modern literary imagination within and beyond the region.

**NES 445(4545) Gender, Sexuality, and the Body in Late Antiquity (also RELST 445[4545], FGSS 447[4470])**

Fall. 4 credits. K. Haines-Eitzen.

Beliefs about gender, sexuality, and the human body were remarkably interwoven with political, religious, and cultural disputes of late antiquity. In this course we will explore the construction and representation of gender, sexuality, and the body in various forms of Christianity, in hellenistic and early rabbinic Judaism, and the philosophical writings from the first century through the fourth. Asceticism and celibacy, veiling and unveiling, cross-dressing and Gnostic androgyny, marriage and childbirth, and homosexuality will be among the topics considered. The sources (all in translation) will range from the New Testament, early Christian apocrypha, martyrologies, and patristic writings to Greek and Latin medical and philosophical texts, Jewish midrash, Dead Sea Scrolls, Roman inscriptions, and Egyptian erotic and magical spells. Current interdisciplinary and theoretical studies on

gender, ideology, sexuality, and power will aid us in developing our analytical approaches to the ancient materials.

**NES 447-448(4947-4948) Middle Eastern Music Ensemble (also MUSIC 431-432[3614])**

447, fall; 448, spring. 1 credit each semester. Limited to 40 students.

Prerequisite: permission of instructor.

M. Hatch and staff.

Performance of diverse musical traditions from the Middle East. Instruction in percussion, oud, ney, and kanoun, among others.

**NES 457(4657) Seminar in Islamic History: Formation of Islamic Law (RELST 457[4657], HIST 453[4530]) @ # (HA)**

Fall. 4 credits. Prerequisite: NES 255 or equivalent; or permission of instructor. D. Powers.

Examines what has been called "the mystery of the formation of Islamic law" by attempting to establish a middle ground between the traditional Islamic approach to the subject and that of revisionist western scholars. Themes discussed include: the Near Eastern and Arabian background of the Quranic legislation; the relationship between Quranic legal pronouncements and legal practice during the first century AH; the debate over the authenticity of *hadith* reports, i.e., statements about what Muhammad said, did or condoned by his silence; the role of caliphal law and Umayyad administrative practice; and the formation of the law schools or *madhhabs*. Fulfills research seminar requirement for major.

**NES 460(4560) Theory and Method in Near Eastern Studies (CA)**

Spring. 4 credits. Requirement for NES majors. R. Brann.

Seminar offering advanced Near Eastern Studies students the opportunity to read and discuss the range of theories and methods that have been employed by scholars in the interdisciplinary area of Near Eastern Studies. After giving attention to the historical development of area studies programs—and their current status and relevance—students read a wide range of highly influential works in Near Eastern Studies. Literary theory, historiography, post-colonialism, archaeology, gender theory, and comparative religions are a few of the approaches, methods, and theories explored. Authors include Talal Asad, Homi K. Bhabha, Mircea Eliade, Timothy Mitchell, Mary Douglas, Zachary Lockman, Edward Said, J. Z. Smith.

**NES 466(4666) History of Israelite Religion (also JWST 466[4666], RELST 466)**

Spring. 4 credits. L. Monroe.

This class will focus on the diversity of ancient Israelite practice and belief throughout the biblical period, and its rootedness in the polytheistic religious traditions of ancient Syria-Palestine. It will focus on the worship of Yahweh and other deities in ancient Israel, and will trace the long and complicated process by which Yahweh became the sole deity accepted within the biblical tradition. Using biblical evidence, as well as inscriptional and archaeological discoveries from Syria-Palestine and elsewhere in the ancient Near East, we will address the question of why the Israelites eventually rejected deities such as Baal, Asherah, El, and others, who were originally part of the



Israelite pantheon, and who contributed much of the divine imagery that came to be associated with Yahweh. We will explore the ways in which a small group of Jerusalem elites helped shape the monotheistic tradition that has been inherited in the West, and we will explore the political, social and theological implications of this transformation.

**NES 470 Power and Wealth in Ancient Civilizations (also JWST 470)**

Spring. 4 credits. C. Monroe.

How were wealth and power created and distributed in ancient Mesopotamia, Egypt, and the Aegean? Using archaeological, anthropological, sociological and historical approaches, several case studies will be considered: the emergence of urbanism in the Uruk and Minoan worlds; the construction of bureaucracy in the Ur III state; the organization of empire under Hittite, Egyptian and Assyrian rulers; and the economic strategies of resistance used in smaller kingdoms and city-states like Israel and Phoenicia. The role of the trader in these societies will be examined, as will the role of certain polities within larger economic systems. The case studies are approached after students are introduced to the intellectual foundations of historical materialism in early authors (like Smith, Marx, and Weber) and are versed in current approaches to political economy in early states.

**NES 491-492(4991-4992) Independent Study, Undergraduate Level**

Fall and spring. Variable credit.

Prerequisite: permission of instructor. Staff.

**NES 498-499(4998-4999) Independent Study, Honors**

Fall and spring. 8 credits. Prerequisite:

permission of instructor. Staff.

**NES 619 The Arabic Novel**

Spring. 4 credits. Prerequisites: 400-level Arabic course or equivalent, or permission of instructor. D. Starr.

Advanced topical seminar pertaining to the Arabic novel. As the topics vary from semester to semester, the course may be repeated with permission of the instructor.

**NES 630(6230) Judeo-Arabic Literature (JWST 630)**

Fall. 4 credits. R. Brann. Prerequisites: NES 212 (Arabic), NES 202(Hebrew) or equivalents. Designed for graduate students but open to undergraduates with permission of instructor. May be repeated for credit; readings will vary from year to year.

This course will study some of the most important texts of classical Judeo-Arabic literature produced in Iraq, Egypt, North Africa and Muslim Spain from 900 until 1200. Depending on the textual genre the focus will vary from literary, philosophical, linguistic, and historical analysis.

**NES 691-692(6991-6992) Independent Study: Graduate Level**

Fall and spring. Variable credit.

Prerequisite: permission of instructor. Staff.

**Related Courses in Other Departments**

Africana Studies

Archaeology

Asian Studies

Classics

Comparative Literature

Economics

English

Feminist, Gender, and Sexuality Studies

German Studies

Government

English

History

History of Art

Linguistics

Medieval Studies

Music

Philosophy

Religious Studies

Romance Studies

Russian Literature

Society for the Humanities

Sociology

Theatre, Film, and Dance

Visual Studies

**NEPALI**

See "Department of Asian Studies."

**PALI**

See "Department of Asian Studies."

**PHILOSOPHY**

G. Fine, chair; T. Bloser, R. N. Boyd, A. Chignell (on leave 2006-2007), Y. Cohen, M. Eklund (on leave Spring 2007), H. Hodes (on leave Spring 2007), T. Irwin, M. Kosch, S. MacDonald (on leave Fall 2006), R. W. Miller, M. Moody-Adams, N. Sethi, H. Shue (on leave 2006-2007), N. Silins, N. Sturgeon, B. Weatherston. Emeritus: C. A. Ginet, S. Shoemaker.

The study of philosophy provides students with an opportunity to become familiar with some of the ideas and texts in the history of thought while developing analytical skills that are valuable in practical as well as academic affairs. It affords the excitement and satisfaction that come from understanding and working toward solutions of intellectual problems. The curriculum includes offerings in the history of philosophy, logic, philosophy of science, ethics, social and political philosophy, metaphysics, and theory of knowledge. Any philosophy course numbered in the 100s or 200s is suitable for beginning study in the field. Sections of PHIL 100 are part of the first-year writing seminar program; they are taught by various members of the staff on a variety of philosophical topics, and because of their

small size (17 students at most) they provide ample opportunity for discussion. Students who want a broad introduction to philosophy may take PHIL 101, but many students with special interests may find that the best introduction to philosophy is a 200-level course in some particular area of philosophy; such courses have no prerequisites and are usually open to first-year students.

**The Major**

Students expecting to major in philosophy should begin their study of it in their freshman or sophomore year. Admission to the major is granted by the director of undergraduate studies of the department on the basis of a student's work during the first two years. Normally the student must have completed two philosophy courses with grades of B or better. Eight philosophy courses, taken for a letter grade, are required for the major. They must include at least one course on ancient philosophy (PHIL 211, or a course with a large component on Plato or Aristotle), at least one course on classical modern metaphysics and epistemology from Descartes through Kant (e.g., PHIL 212 or a course on the empiricists, the rationalists, or Kant), and a minimum of three courses numbered above 300. Students admitted to the major (after fall 1996) are required to take a minimum of six philosophy courses numbered above 200, and may not count more than one section of PHIL 100 toward the major. Courses numbered 191-199 do not count toward the major. A course in formal logic (e.g., PHIL 231), while not required, is especially recommended for majors or prospective majors.

Philosophy majors must also complete at least 8 credits of course work in related subjects approved by their major advisors. Occasionally majors may serve as teaching or research aides, working with faculty members familiar with their work.

**Honors.** A candidate for honors in philosophy must be a philosophy major with an average of B- or better for all work in the College of Arts and Sciences and an average of B+ or better for all work in philosophy. In either or both semesters of the senior year a candidate for honors enrolls in PHIL 490 and undertakes research leading to the writing of an honors essay by the end of the final semester. *Honors students normally need to take PHIL 490 both semesters of their senior year to write a satisfactory honors essay.* PHIL 490 does not count toward the eight philosophy courses required for the major. Prospective candidates should apply at the Department of Philosophy office, 218 Goldwin Smith Hall.

**Fees**

In some courses a small fee may be charged for photocopying materials to be handed out to students.

**Introductory Courses**

**First-Year Writing Seminars in Philosophy**

Fall and spring. 3 credits. Consult John S. Knight Institute brochure for times, instructors, and descriptions.

**PHIL 101(1101) Introduction to Philosophy # (KCM)**

Fall and spring. 3 credits. Prerequisite: none. Open to freshmen. B. Weatherston.

An introduction to basic issues and methods in philosophy, focusing on questions about

philosophy of religion and philosophy of mind. The first part of the course will look at whether God's existence is consistent with the amount of suffering we see, and whether the existence of a divine designer is the best explanation of the world we find. The second part will look at questions about minds, especially whether minds are identical to bodies, and whether machines can do what minds do.

**PHIL 131(1310) Logic, Evidence, and Argument**

Spring. 3 credits. Staff.

For description, see department web site.

**PHIL 145(1450) Contemporary Moral Issues (KCM)**

Fall, Y. Cohen; spring, Staff.

Fall 2006: In this course we will examine several contemporary moral problems, including abortion, capital punishment, euthanasia, affirmative action, and world hunger. We will approach these issues from a philosophical perspective by learning how to create and evaluate publicly accessible arguments and apply general moral principles to particular cases.

**PHIL 181(1810) Introduction to the Philosophy of Science (KCM)**

Fall and spring. 3 credits. Staff.

For description, see department web site.

**PHIL 191(1910) Introduction to Cognitive Science (also COGST 101[1101], PSYCH 102[1200], COM S 101[1710], LING 170[1170]) (KCM)**

Fall. 3 or 4 credits. B. Bienvenue.

For description, see PSYCH 102.

**PHIL 211(2110) Ancient Philosophy (also CLASS 231[2661]) # (KCM)**

Fall. 4 credits. Prerequisite: none. Open to freshmen. T. Irwin.

This course examines the origin and development of Western philosophy in Ancient Greece and Rome. We will study some of the central ideas of the Pre-Socratics, Socrates, Plato, Aristotle, and the Hellenistic philosophers (Epicureans, Stoics, and Skeptics). Questions to be considered include: What are the nature and limits of knowledge? Is knowledge even possible? How reliable is perception? What are the basic entities in the universe: atoms, Platonic Forms, or Aristotelian substances? Is moral knowledge possible? What is the nature of happiness and what sort of life will make people happy? Do human beings have free will? Ought we to fear death?

**PHIL 212(2120) Modern Philosophy # (KCM)**

Spring. 4 credits. Prerequisite: none. Open to freshmen. T. Blosier.

For description, see department web site.

**PHIL 213(2130) Existentialism**

Fall. 4 credits. Prerequisite: none. Open to freshmen. M. Kosch.

Examination of main philosophical texts of phenomenology and existentialism (by Husserl, Heidegger, Sartre, Merleau-Ponty), with some 19th century background.

**PHIL 231(2310) Introduction to Deductive Logic (MQR)**

Fall and spring. 4 credits. Prerequisite: none. Open to freshmen. Fall: H. Hodes; spring: Staff.

Fall 2006 topic: The logic of truth-functional connectives, identity, and the universal and existential quantifiers; a formal language;

translation between it and English; constructing worlds and models; and constructing proofs. We'll use a textbook accompanied by a software package, *Language, Proof, and Logic* by J. Barwise and J. Etchemendy

**PHIL 241(2410) Ethics (KCM)**

Fall. 4 credits. Prerequisite: none. Open to freshmen. N. Sturgeon.

An introduction to the philosophical evaluation of moral theories and moral arguments. Ethical relativism, ethical egoism, ethical skepticism, utilitarianism, and duty-based theories; some application to controversial contemporary issues.

**PHIL 242(2420) Social and Political Philosophy (KCM)**

Spring. 4 credits. Prerequisite: none. Open to freshmen. Staff.

For description, see department web site.

**PHIL 245(2450) Ethics and Health Care (KCM)**

Spring. 4 credits. Prerequisites: none. Open to freshmen. N. Sethi.

An introduction to the philosophical study of ethical problems that arise from the practice of medicine as such or that arise in response to developments within medicine and the larger world. Does it require that all have access to approximately the same level of health care? In addition to learning how to arrive at and defend ethical positions, we reflect on the techniques and methods we use.

**PHIL 246(2460) Ethics and the Environment (also S&TS/B&SOC 206[2061]) (KCM)**

Spring. 4 credits. Staff.

For description, see B&SOC 206.

**PHIL 248(2480) Ethics and International Relations (also GOVT 248[2485]) (KCM)**

Spring. 4 credits. Prerequisite: none. Open to freshmen. R. Miller.

An introduction to moral problems posed by international relations. The justification of wars and the assessment of tactics in wars, the right response to global poverty and inequality, the just governance of multinational institutions, the moral importance of sovereignty, self-determination and cultural autonomy, the benefits and burdens of globalization, the moral significance of America's global power, and the tension between patriotic and cosmopolitan duties are some of the issues that may be addressed.

**PHIL 249(2490) Feminism and Philosophy (also FGSS 249[2490]) (KCM)**

Fall. 4 credits. Prerequisite: none. Open to freshmen. N. Sethi.

This class will examine a variety of feminist attempts to understand and explain the various ways in which traditional philosophy reflects bias against women. We will also consider a variety of feminist viewpoints and examine how these are used to address "real life" issues regarding sexuality, violence, family structure, identity, peace, and war.

**PHIL 261(2610) Knowledge and Reality (KCM)**

Fall and spring. 4 credits. Prerequisite: none. Open to freshmen. Fall: T. Blosier; spring: Staff.

For description, see department web site.

**PHIL 262(2620) Philosophy of Mind (KCM)**

Fall. 4 credits. Prerequisite: none. Open to freshmen. N. Silins.

We will evaluate views about the nature of mental states and about their relation to the brain, behavior, and the world. Questions we will consider include: are mental states the same as states of our brains? If not, what is the relation between them and states of our brains? How is it possible for mental states to cause our behavior? We will pay special attention to questions about the nature of consciousness and about whether consciousness can be understood in physical terms.

**PHIL 263(2630) Religion and Reason (also RELST 262[2630]) (KCM)**

Spring. 4 credits. Prerequisite: none. S. MacDonald.

What must (or could) God be like, and what reasons do we have for thinking that a being of that sort actually exists? What difference would (or could) the existence of God make to our lives? This course examines the idea, shared by several major world religions, that God must be an absolutely perfect being. What attributes must a perfect being have? Must it have a mind, be a person, care for human beings? Is the concept of a perfect being coherent? Is the existence of a perfect being compatible with the presence of evil in the world and the existence of human freedom? Does human morality depend in any important way on the nature or will of a perfect being? Is a perfect being among the things that actually inhabit our universe? The course approaches these questions with the tools and methods of philosophical reason and through readings drawn from both classic texts and contemporary philosophical discussion.

**PHIL 286(2860) Science and Human Nature (also S&TS 286[2861]) (KCM)**

Spring. 4 credits. Prerequisite: university level course in biology or equivalent, or permission of instructor. R. Boyd.

Examination of attempts in the biological and social sciences to offer scientific theories of human nature and human potential and to apply such theories to explain important social and psychological phenomena.

**Intermediate or Advanced Courses**

Some of these courses have prerequisites.

**PHIL 309(3090) Plato (also CLASS 339[3669]) # (KCM)**

Fall. 4 credits. Prerequisites: at least one previous course in philosophy at the 200 level or above; or permission of instructor. G. Fine.

We will consider many of Plato's major dialogues, focusing on questions in metaphysics and epistemology, though some attention will also be paid to his ethical and political theories, especially in the *Republic*. Among the topics we will consider are the following: the theory of Forms; Socrates' disavowal of knowledge; dialectic and recollection; the nature of knowledge and how to acquire it; the nature of the soul and moral motivation; justice and happiness.

**PHIL 310(3100) Aristotle (also CLASS 340[3664]) # (KCM)**

Spring. 4 credits. Prerequisite: one philosophy course. T. Irwin.

An examination of the philosophical significance of Aristotle's major works,

especially in natural philosophy, philosophy of mind, and metaphysics.

**PHIL 311(3110) Modern Rationalism #**

Spring. 4 credits. Prerequisite: one philosophy course. Staff.

For description, see department web site.

**PHIL 312(3120) Modern Empiricism # (KCM)**

Fall. 4 credits. Prerequisite: one philosophy course. Staff.

For description, see department web site.

**PHIL 316(3160) Kant # (KCM)**

Spring. 4 credits. Prerequisite: one philosophy course. Staff.

For description, see department web site.

**PHIL 320(3200) 19th and 20th Century Continental Philosophy**

Fall. 4 credits. Prerequisite: one philosophy course. M. Kosch.

Survey of European social theory from Hegel to Foucault (via Marx, Nietzsche, Freud, Weber, and the Frankfurt School).

**PHIL 331(3310) Deductive Logic (also MATH 281[2810]) (MQR)**

Fall. 4 credits. H. Hodes.

The syntax and model-theory of classical propositional logic and classical predicate logic, including proofs of the soundness and completeness of Natural Deduction formalizations of these logics, with some attention to related material.

**PHIL 332(3320) Philosophy of Language (also LING 332[3332])**

Fall. 4 credits. Prerequisite: one philosophy course or permission of instructor. Staff.

The course is an introduction to, and an overview of, philosophy of language. We will cover a variety of issues, including singular reference, meaning, truth, analyticity, indeterminacy, and nativism. We will pay special attention to the development of philosophy of language from Frege's late nineteenth century writings through today, and to the interplay between philosophy of language and other areas of philosophy.

**PHIL 333(3330) Problems in Semantics (also LING 333[3333], COGST 333[3330]) (KCM)**

Spring. 4 credits. S. McConnell-Ginet

For description, see LING 333.

**PHIL 341(3410) Ethical Theory (KCM)**

Spring. 4 credits. Prerequisite: one philosophy course or permission of instructor. N. Sturgeon

Topic: Consequentialism and its critics. This course will examine one of the deepest divides in modern philosophical debates about ethics, between those who think the moral evaluation of acts, character traits and social institutions ultimately depends solely on their good or bad consequences, and critics who find this approach fundamentally misguided.

**PHIL 346(3460) Modern Political Philosophy (also GOVT 362[3625]) (KCM)**

Fall. 4 credits. R. Miller.

A study of the leading contemporary theories of justice, including the work of Rawls, Nozick, Gauthier, and Scanlon. In discussing these theories and their critics, we will encounter radically different accounts of the moral significance of economic inequality, the kinds of freedom that governments ought to protect, the kinds of values and convictions

that are a proper basis for laws (as opposed to being private matters); the tension between unequal political influence and democratic rights; and the roles of community, virtue, and group-loyalty in political justification. While mainly exploring these rival conceptions of freedom, equality, community, and obligation, we will also examine the implications of these theories for specific political controversies (e.g., abortion, welfare programs, and pornography).

**PHIL 364(3640) Metaphysics (KCM)**

Spring. 4 credits. B. Weatherston.

We will look at a number of contemporary debates in metaphysics, including debates between reductionists and anti-reductionists about nomological concepts, competing theories of persistence and issues about material constitution. We will pay some attention to higher level debates about whether we should expect there to be objective answers to the questions we are investigating.

**PHIL 381(3810) Philosophy of Science: Knowledge and Objectivity (also S&TS 381[3811]) (KCM)**

Fall. 4 credits. R. Boyd.

Topics in the philosophy of science.

**PHIL 390(3900) Independent Study**

Fall or spring. Credit TBA.

To be taken only in exceptional circumstances. Must be arranged by the student with his or her advisor and the faculty member who has agreed to direct the study.

**Advanced Courses and Seminars**

These courses are offered primarily for majors and graduate students.

**PHIL 409(4090) German Philosophical Texts (KCM)**

Fall and spring. Variable credit.

Prerequisites: knowledge of German and permission of instructor. Staff.

Reading and translation of philosophical texts in German.

**PHIL 410(4100) Latin Philosophical Texts (also RELST 410[4100]) # (KCM)**

Spring. Variable credit. Prerequisites: knowledge of Latin and permission of instructor. Staff.

Reading and translation of philosophical texts in Latin.

**PHIL 411 (4110) Greek Philosophical Texts (also CLASS 611[7111]) # (KCM)**

Fall and spring. Variable credit.

Prerequisites: knowledge of Greek and permission of instructor. Staff.

Reading and translation of philosophical texts in Greek.

**PHIL 415(4150) Medieval Philosophy # (KCM)**

Spring. 4 credits. Prerequisite: at least two courses in philosophy numbered 200 or above, or permission of instructor.

S. MacDonald.

Topic for 2007: Aquinas's philosophical theology

**PHIL 416(4160) Modern Philosophy # (KCM)**

Fall. 4 credits. Staff.

For description, see department web site.

**PHIL 431(4310) Mathematical Logic (also MATH 481[4810]) (MQR)**

Spring. 4 credits. Staff.

For description, see MATH 481.

**PHIL 435(4350) Pragmatics (also LING 425[4425]) (KCM)**

Fall. 4 credits. D. Abusch.

For description, see LING 425.

**PHIL 460(4600) Epistemology**

Fall. 4 credits. N. Silins.

Self-Knowledge. Topics we will cover include: the extent and character of our first-person access to our mental states, the explanation of the extent and character of our first-person access to our mental states (with special attention to inner observation views), whether styles of skeptical argument against our knowing the external world can be run against our knowing our own minds, the compatibility of content externalism and first-person authority. We will work through material by Paul Boghossian, Jessica Brown, Tyler Burge, Alex Byrne, Richard Moran, Sydney Shoemaker, Timothy Williamson, and others.

**PHIL 462(4620) Philosophy of Mind (KCM)**

Spring. 4 credits. Staff.

For description, see department web site.

**PHIL 464(4640) Metaphysics (KCM)**

Fall. 4 credits. Staff.

For description, see department web site.

**PHIL 481(4810) Problems in Philosophy of Science (also S&TS 481/681[4811/6811]) (KCM)**

Spring. 4 credits. R. Boyd.

Topics in the philosophy of science.

**PHIL 490(4900) Informal Study for Honors**

Fall and spring. 4 credits. Prerequisite: senior honors students.

See "Honors" at the beginning of the Philosophy section.

**PHIL 611(6110) Ancient Philosophy**

Fall. 4 credits. T. Irwin.

Mind, action, and ethics in Aristotle and Stoicism.

**PHIL 613(6130) Modern Philosophy**

Spring. 4 credits. M. Kosch.

For description, see department web site.

**PHIL 641(6410) Ethics and Value Theory**

Fall. 4 credits. Prerequisite: this course is a seminar for Philosophy graduate students; others may enroll only with permission of instructor. N. Sturgeon.

Topic: Relativism, Realism, Subjectivism and Noncognitivism in Ethics and Value Theory.

**PHIL 643(6430) Social and Political Philosophy**

Spring. 4 credits. R. Miller.

Topic for 2007: International justice. We will discuss leading current controversies over international economic justice; morality and war; cultural diversity and human rights; global governance, social movements and democratic values; the moral significance of global power structures; and the moral status of sovereignty, patriotism and nationalism.

**PHIL 661(6610) Epistemology**

Spring. 4 credits. C. Ginet.

Topic: Timothy Williamson's book, *Knowledge and Its Limits*.

**PHIL 665(6650) Metaphysics**

Fall. 4 credits. M. Eklund.

Our main topic will be different ways to conceive of realism/antirealism disputes both the global dispute and how to understand this type of dispute as it arises with respect to particular discourses such as mathematics, ethics, modality, the past, etc. We will discuss error theories (about ethics and mathematics), non-factualism, anti-realism as it is found in the writings of Dummett and Putnam, response-dependence, and, lastly, fictionalism. We will relatedly discuss different conceptions of truth correspondence, coherence, deflationism, epistemic conceptions of truth and semantic conceptions of truth. As should be clear from this rather varied list of issues, the course will be an overview of the problems in the area rather than something focused on a narrowly conceived problem.

**PHIL 700(7000) Informal Study**

Fall or spring. Credit TBA.

To be taken by graduate students only in exceptional circumstances and by arrangement made by the student with his or her Special Committee and the faculty member who has agreed to direct the study.

**PHYSICS**

S. A. Teukolsky, chair (109 Clark Hall, 255-6016); C. P. Franck, director of undergraduate studies (101 Clark Hall, 255-8158, physicsdus@mailbox@cornell.edu); J. P. Alexander, V. Ambegaokar, T. A. Arias, E. Bodenschatz, P. Brouwer, D. G. Cassel, E. Cassel, I. Cohen, C. Csaki, J. C. Davis, G. F. Dugan, V. Elser, D. B. Fitchen, E. E. Flanagan, R. Fulbright, R. S. Galik, A. Giambattista, L. K. Gibbons, P. Ginsparg, B. Greene, S. M. Gruner, L. N. Hand, D. L. Hartill, C. L. Henley, G. Hoffstaetter, P. Krasicky, A. LeClair, D. M. Lee, G. P. Lepage, P. L. McEuen, E. Mueller, M. Neubert, H. Padamsee, J. M. Parpia, J. R. Patterson, M. Perelstein, D. C. Ralph, B. Richardson, R. C. Richardson, D. L. Rubin, A. Ryd, K. Schwab, K. Selby, J. P. Sethna, A. J. Sievers, E. Siggia, P. C. Stein, R. M. Talman, J. Thom, R. Thorne, H. Tye, C. Umrigar, M. D. Wang, I. Wasserman, P. Wittich, T.-M. Yan, J. York

The Department of Physics offers a full range of university-level work in physics, from general education courses for nonscientists to doctoral-level independent research. Major research facilities are operated by two component organizations, the Laboratory of Atomic and Solid State Physics (LASSP) and the Laboratory for Elementary Particle Physics (LEPP). LASSP carries out extensive research efforts in condensed-matter physics and biophysics. LEPP operates a major high-energy particle physics research facility at Wilson Laboratory, the Cornell electron-positron storage ring (CESR). Theoretical work is carried out in many fields of physics, including astrophysics. There is a full schedule of weekly research-oriented seminars and colloquia. Students find many opportunities for research participation and summer employment.

Introductory physics sequences are: 101-102, 207-208, and 112-213-214, or its more analytic version 116-217-218. In addition, there is a group of general-education courses, PHYS 200-206, 209, 210. PHYS 101-102, a

self-paced autotutorial course, is designed for students who do not intend to take further physics courses and who do not have preparation in calculus. PHYS 112 and 207 both require calculus (MATH 190 or 191 or 111), and additional mathematics is required for subsequent courses in the sequence. PHYS 101-102 or 207-208 may be taken as terminal physics sequences. The three-semester sequences 112-213-214 or 116-217-218, are recommended for engineers and physics majors.

Courses beyond the introductory level that might be of interest to nonmajors include PHYS 316 Modern Physics I; PHYS 330 Modern Experimental Optics; and PHYS 360 Electronic Circuits.

Advanced placement and credit are offered as outlined in "Advanced Placement of Freshmen," or students may consult the director of undergraduate studies, as should students requesting transfer credit for physics courses taken at another college.

**The Major**

The major program is constructed to accommodate students who wish to prepare for professional or graduate work in physics as well as those who wish to complete their major program in the field of physics but have other post-graduation goals. The physics major provides flexibility to pursue diverse interests through concentrations either within physics or outside physics.

Students who wish to major in physics are advised to start the physics sequence in the first semester of their freshman year. The major program still can be completed with a second-semester start, but flexibility in future course scheduling is reduced.

Prospective majors are urged to make an early appointment at the physics office for advice in program planning. Acceptance into the major program is normally granted upon completion of a year of physics and mathematics courses at Cornell with all course grades at the B-level or higher. Students wishing to declare the major should meet with the director of undergraduate studies, who will match the student with a major advisor following discussion of the student's interests. Details of the major course program are worked out in consultation between the student and major advisor. For students graduating after 2008, grades of at least C- or S for S-U only courses are required in all courses for the physics major.

**Physics Core**

Common to all major programs is a requirement to complete a core of physics courses. In addition to the three-semester introductory sequence (PHYS 112-213-214 and 216 before 316 or 116-217-218), the core includes five upper-level courses—(1) the two-course sequence in modern physics (PHYS 316-317), (2) at least three semester hours of laboratory work selected from PHYS 310, 330, 360, 410, ASTRO 410, (3) an intermediate course in classical mechanics, and (4) an intermediate course in electromagnetism.

Accompanying these physics courses should be work in mathematics through at least MATH 222 or 294. Students following the professional/graduate school channel are expected to complete at least one additional year of applicable mathematics (A&EP

321-322 or appropriate selections from mathematics).

In addition to the core, each physics major must complete 15 semester hours of credit in an area of concentration that has been agreed on by the student and major faculty advisor.

**Concentration within Physics**

A student who wishes to pursue professional or graduate work in physics or a closely related field should follow a concentration within the field of physics. For those students with a strong secondary school preparation, the sequence PHYS 116-217-218 is encouraged. Students are strongly encouraged to start the sequence with PHYS 116, even if they qualify for advanced placement credit for PHYS 112 and/or 213. Core courses in mechanics and electromagnetism will normally be PHYS 318 and 327, respectively. The minimum 15 hours beyond the core must be composed of physics courses with numbers greater than 300 and must include the senior laboratory course PHYS 410. This means a physics concentration needs a minimum of 7 credit hours of laboratory work to complete the requirements. The accompanying table shows several typical course sequences by means of which the major requirements may be completed. The primary distinction among students who may follow the different sequences is the amount and level of pre-college work in calculus and in physics. Changes in these typical patterns are common, as agreed on between student and major faculty advisor. Research work is encouraged of all majors. If this work is done as an independent project, PHYS 490, up to 8 credits can be applied to the concentration.

**Concentration outside Physics**

Such a concentration will reflect the student's interest in some area related to physics. The array of courses that comprise the concentration must have internal coherence. The array will normally be worked out in conference with the major faculty advisor and must be approved by the advisor. Of the required 15 hours credit beyond the core, at least 8 credits must be in courses numbered above 300. Students in the past have chosen to concentrate in a wide variety of fields, including (but not limited to) astronomy, business, chemical physics, computer science, econometrics, education, geophysics, history, and philosophy of science, law, meteorology, or public policy. A combined biology-chemistry concentration is common for pre-medical students or those who wish to prepare for work in biophysics.

The department particularly wishes to encourage students with an interest in science education. Physics majors can obtain teaching certification by concentrating in education and then completing a one-year master of arts in teaching (MAT) degree. Information about the education concentration and MAT can be obtained from the Department of Education's Cornell Teacher Education Program or from the director of undergraduate studies in physics. For students with concentrations outside physics, the core requirements in mechanics and electromagnetism can be appropriately met with PHYS 314 and 323, respectively.

Students with an astronomy concentration who might continue in that field in graduate school should use ASTRO 410, 431, 432 as

part of the concentration; they are encouraged to use PHYS 318 and 327 to satisfy the core requirements in mechanics and electromagnetism.

### Honors

A student may be granted honors in physics upon the recommendation of the Physics Advisors Committee of the physics faculty. There is no particular course structure or thesis requirement for honors.

### Double Majors

Double majors including physics are possible and not at all uncommon. It should be noted, however, that any course used to satisfy a requirement of another major may be used in satisfaction of physics major requirements only if the student's concentration is *within* physics.

### Courses with Overlapping Content

Because the department offers several courses with overlapping content, students should select courses carefully to meet the needs of their academic programs and to ensure credit for each course they take. Listed below are groups of courses with largely similar content. In general, students may receive credit for only one of the courses in each group.

PHYS 101, 112, 116, 207  
PHYS 102, 208, 213, 217  
PHYS 214, 218  
PHYS 314, 318  
PHYS 323, 327  
PHYS 116, 216

In addition, students with credit for PHYS 101, 112, 116, or 207, or an advanced placement equivalent who wish to enroll in PHYS 200-206, 209, or 210 should obtain written

permission from the instructor and the director of undergraduate studies in physics.

### Course Prerequisites

Prerequisites are specified in physics course descriptions to illustrate the materials that students should have mastered. Students who wish to plan programs different from those suggested by the prerequisite ordering are urged to discuss their preparation and background with a physics advisor or with the instructor in the course. In many cases an appropriate individual program can be worked out without exact adherence to the stated prerequisites.

### Courses

#### PHYS 012(1012) PHYS 112(1112) Supplement

Spring. 1 credit. S-U grades only.  
R. Lieberman.

Provides backup instruction for PHYS 112. Recommended for students who either feel insecure about taking PHYS 112 or simply want to develop their problem-solving skills. Emphasis is on getting the student to develop a deep understanding of basic concepts in mechanics. Much class time is spent solving problems and applications.

#### PHYS 013(1013) PHYS 213(2213) Supplement

Fall. 1 credit. S-U grades only.  
R. Lieberman.

Provides backup instruction for PHYS 213. Description is the same as for PHYS 012, except the material covered is electricity and magnetism.

### PHYS 101(1101) General Physics I (PBS)

Fall, summer (eight-, six-, or a four-week session within the first weeks of the eight-week session). 4 credits. Enrollment may be limited and freshmen are excluded. General introductory physics for nonphysics majors. Prerequisites: three years high school mathematics, including some trigonometry. Students without high school physics should allow extra time for PHYS 101. Includes less mathematical analysis than PHYS 207 but more than PHYS 200-206, 209, 210. B. Richardson.

Emphasizes quantitative and conceptual understanding of the topics of introductory physics developed without use of calculus. The course is mostly self-paced in a mastery-oriented format including eight subject units and a final retention (review) unit. Most instruction occurs in the learning center with personal tutoring by staff, assigned readings, problems, laboratory exercises, videotaped lectures, and solutions of sample test questions at our web site. Unit testing is designed to measure mastery with a limit of three test tries. Major topics for 101: kinematics, forces and dynamics, momentum, energy, fluid mechanics, waves and sound, thermal physics, kinetic theory, and thermodynamics. At the level of *College Physics*, second edition, by Giambattista, Richardson, and Richardson.

### PHYS 102(1102) General Physics II (PBS)

Spring, summer (eight-week, six-week, or second four weeks only for those doing PHYS 101 in first four weeks). 4 credits. Enrollment may be limited. Prerequisite: for PHYS 102, PHYS 101 or 112 or 207. Includes less mathematical analysis than PHYS 208 but more than PHYS 200-206, 209, 210. B. Richardson.

Emphasizes quantitative and conceptual understanding of the topics of introductory physics developed without use of calculus. The course is mostly self-paced in a mastery-oriented format including eight subject units and a final retention (review) unit each semester. Most instruction occurs in the learning center with personal tutoring by staff, assigned readings, problems, laboratory exercises, videotaped lectures, and solutions of sample test questions at the course web site. Unit testing is designed to measure mastery with a limit of three test tries taken at the time of the student's choice. Major topics for 102: electricity and magnetism, optics, relativity, quantum, nuclear, and particle physics. At the level of *College Physics*, second ed., by Giambattista, Richardson, and Richardson.

### PHYS 103(1103) General Physics (PBS)

Summer. 4 credits. Prerequisite: three years high school mathematics, including trigonometry. Students without high school physics should allow extra time for PHYS 103. Introductory physics taught through interactive lectures; not recommended for students majoring in physics or engineering; fulfills same requirements as PHYS 101.

Basic principles treated quantitatively but without calculus. Topics include kinematics; forces and Newton's Laws; momentum, angular momentum, and energy; thermal physics and fluid mechanics; sound and waves, thermodynamics. Text is *College Physics*, by Giambattista, Richardson, and Richardson.

### Typical Physics Course Sequences (other sequences are also possible)

Semester	No AP math or physics	1 year AP calculus and good HS physics	Outside concentrators	Outside concentrators (alternate)
1st - Fall	112	116	112	
2nd - Spring	213	217	213	112
3rd - Fall	214, 216	218	214, 216	213
4th - Spring	316, 3x0	316, 3x0	3x0	214, 216
5th - Fall	317, 327, 3x0	317, 327, 3x0	316	3x0, 316
6th - Spring	314/318, 443	318, 443	314	314, 3x0
7th - Fall	341, 410	341, 410	317, 323	317, 323
8th - Spring	Elective(s)	Elective(s)		

- For majors with concentrations outside physics, there is wide variation in individual programs, arranged to best match the field of concentration.
- Crossovers between the two sequences 112-113-214 and 116-217-218 are possible, although the combination 112-213-218 is difficult. PHYS 207 may be substituted for PHYS 112. Students taking 217 after 112 must co-register for 216.
- Students taking the honors sequence 116-217-218 are strongly encouraged to start with PHYS 116. Exceptionally well-prepared students may be able to begin work at Cornell with PHYS 217. Such students should visit the department office for advice in planning a course program.
- Physics electives for the major include 360, 444, 454, 455, 480, 490, 525, 553, 561, 572, the senior seminars 481-489, ASTRO 332 or 431-432, and A&EP 434.
- One semester of intermediate laboratory, listed here as 3x0, is required.
- Well-prepared sophomores wishing to take PHYS 318 should consult the instructor before registering.



**PHYS 112(1112) Physics I: Mechanics (PBS)**

Fall, spring, summer (six-week session). 4 credits. Primarily for engineering students and prospective physics majors. Prerequisite: MATH 191. Recommended: co-registration in MATH 192. Students co-registered in MATH 191, 112, or equivalent may enroll, but PHYS 112 employs some math concepts before their completion in these calculus courses. Fall, J. Thom; spring, Staff.

Covers the mechanics of particles with focus on kinematics, dynamics, conservation laws, central force fields, periodic motion. Mechanics of many-particle systems: center of mass, rotational mechanics of a rigid body, and static equilibrium. At the level of *University Physics*, Vol. 1, by Young and Freedman.

**PHYS 116(1116) Physics I: Mechanics and Special Relativity (PBS)**

Fall, spring, 4 credits. More analytic than PHYS 112; intended for students who are comfortable with deeper, somewhat more abstract approach; intended mainly but not exclusively for prospective majors in physics, astronomy majors, or applied and engineering physics majors. Prerequisites: good secondary school physics course, familiarity with basic calculus, and enjoyment of puzzle-solving. Corrective transfers between PHYS 116 and PHYS 112 (in either direction) are encouraged during first three weeks of instruction. Fall, H. Tye; spring, staff.

At the level of *An Introduction to Mechanics* by Kleppner and Kolenkow.

**PHYS 117(1117) Concepts of Modern Physics**

Fall, 1 credit. Enrollment may be limited. Corequisite: PHYS 112 or 116 or 213 or 217. For freshmen who plan to major in physics, applied and engineering physics, or astronomy. S-U grades only. A. Sadoff. Intended for freshmen who plan to major in physics or a closely related field (i.e., applied and engineering physics or astronomy) and would like to learn about the concepts of modern physics early in their physics education. Possible topics of discussion are methodology, symmetry and conservation laws, quantum theory, the unification of forces and matter, and big-bang cosmology.

**PHYS 190(1190) Supplemental Introductory Laboratory**

Fall, spring, 1 credit. Times TBA with instructor. Limited enrollment. S-U grades only. Prerequisites: 3 transfer credits for introductory physics lecture material; a degree requirement for laboratory component of that introductory course; approval of director of undergraduate studies; and permission of lecturer of that course at Cornell. Students must file PHYS 190 permission form 121 Clark Hall with physics department course coordinator. Students perform the laboratory component of one of the introductory courses (PHYS 112, 207, 208, 213, 214) to complement the lecture-related course credit acquired elsewhere. Those wishing to take equivalent of one of these introductory courses at another institution should receive prior approval from the physics director of undergraduate studies.

**PHYS 201(1201) Why the Sky Is Blue: Aspects of the Physical World (PBS)**

Fall, 3 credits. A. Sadoff.

Descriptive physics course aimed specifically at the nonscience student. There is an emphasis on the ideas of modern physics where the approach is both historical and thematic. The methodology of science and the nature of evidence is emphasized. An overriding theme is the unification and character of physical laws as shown, for example, through the great principles of symmetry and conservation. While a few computational problems are assigned, the purpose is to help students to understand the concepts rather than to master problem-solving techniques.

**PHYS 202(1202) How Physics Works (PBS)**

Spring, 3 credits. Intended for nonphysics majors. No background in either science or mathematics beyond high school algebra assumed. P. Stein.

Introduces students who are not majoring in scientific or quantitative disciplines to the techniques and ways of reasoning employed in physics. By gaining an understanding of two milestones in the history of physics (the discoveries of Newton and the application of the laws of laws of probability to physical problems), students learn about the interaction of experiment, mathematics, and conjecture that has fueled the advance of physics.

**PHYS 203(1203) Physics of the Heavens and the Earth—A Synthesis (PBS)**

Spring, 3 credits. Prerequisite: none; uses high school algebra and geometry. For nonscience majors. H. Padamsee.

Shows how the unification of apparently distinct areas of physics leads to an explosion in the growth of our knowledge and understanding. The material is divided into three parts: the physics of motion on earth; motion in the heavens; and synthesis. Trace how ideas about celestial and terrestrial motion evolved separately at first, from the ancient ideas of Greek philosophers to the dynamics and telescopic discoveries of Galileo during the Renaissance. The two arenas finally melded under Newton's Universal Gravitation. Einstein's special and general theories of relativity eventually supplanted Newton's ideas. There is an emphasis throughout on "how do we know the laws?" These are the stories of breakthrough discoveries and brilliant insights made by fascinating people, offering a humanistic perspective.

**PHYS 204(1204) Physics of Musical Sound (also MUSIC 204[2111]) (PBS)**

Spring, 3 credits. Intended for nonscientists; does not serve as prerequisite for further science courses. Assumes no scientific background but uses high school algebra. K. Selby.

Explores musical sound from a physics point of view. Topics include: how various musical instruments work; pitch, scales, intervals and tunings; hearing; room acoustics; reproduction of sound. Science writing and physics problem-solving skills are developed through weekly assignments. Student activities include hands-on investigations of musical instruments, and field trips. Students write a term paper investigating a topic of their choice. At the level of *The Science of Sound* by Rossing, Moore, and Wheeler.

**PHYS 205(1205) Reasoning about Luck (PBS)**

Fall, 3 credits. Intended for nonscientists. Does not serve as prerequisite for further science courses. Assumes no scientific background but uses high school algebra. V. Ambegaokar.

When and how natural scientists can cope rationally with chance is the theme of this course. Starting from simple questions—such as how one decides if an event is "likely," "unlikely," or just incomprehensible—an understanding is reached of more subtle points: why it is, for example, that in large systems likely events can become overwhelmingly likely. From these last considerations, the interested student is introduced to the second law of thermodynamics, that putative bridge between C. P. Snow's two cultures. The way in which chance occurs, albeit somewhat mysteriously, in quantum mechanics is also explained. There are several problem sets, but the main assignment is a 15- to 20-page paper on one or more of the topics covered.

**PHYS 207(2207) Fundamentals of Physics I (PBS)**

Fall, 4 credits. Prerequisites: high school physics plus MATH 111, 190, or 191, or solid grasp of basic notions of introductory calculus. Corequisite: math course approved by instructor. R. Thorne.

A two-semester introduction to physics, intended for students majoring in an analytically oriented biological science, a physical science, or mathematics. The combination of lectures illustrated with applications from the sciences, medicine, and everyday life, weekly labs tightly coupled to lectures that introduce computer-aided data acquisition and analysis, and recitations that emphasize cooperative problem-solving, provide a rich exposure to the methods of physics and the basic analytical and scientific communication skills required by all scientists. Course covers mechanics, conservation laws, waves, and topics from thermal physics, fluids, acoustics, and materials physics. At the level of *Fundamentals of Physics*, Vol. I, seventh ed., by Halliday, Resnick, and Walker.

**PHYS 208(2208) Fundamentals of Physics II (PBS)**

Spring, 4 credits. Prerequisites: PHYS 207 or 112 or 101; substantial contact with introductory calculus (e.g., MATH 111, 190, or 191). 207–208 is a two-semester introduction to physics with emphasis on tools generally applicable in sciences, intended for students majoring in physical science, mathematics, or analytically oriented biological science.

Covers electricity and magnetism, and topics from geometrical and physical optics, quantum and nuclear physics. At the level of *Fundamentals of Physics*, Vol. II, seventh ed., by Halliday, Resnick, and Walker.

**PHYS 213(2213) Physics II: Heat/Electromagnetism (PBS)**

Fall, spring, summer (six-week session). 4 credits. Primarily for students of engineering and prospective physics majors. Prerequisite: PHYS 112 and MATH 192. Students co-registered in MATH 192, 221, or equivalent may enroll, but PHYS 213 employs some math concepts before their completion in these calculus courses. Fall, L. Gibbons; spring, Staff.

Topics include temperature, heat, the laws of thermodynamics, electrostatics, behavior of matter in electric fields, DC circuits, magnetic fields, Faraday's law, AC circuits, and electromagnetic waves. At the level of *University Physics*, Vols. 1 and 2, by Young and Freedman, 11th ed.

**PHYS 214(2214) Physics III: Optics, Waves, and Particles (PBS)**

Fall, spring, summer (six-week session). 4 credits. Primarily for engineering students and prospective physics majors. Prerequisites: PHYS 213 and MATH 293. Students co-registered in MATH 293, 222, or equivalent may enroll, but PHYS 214 employs some math concepts before their completion in these calculus courses. Fall, T. Arias; spring, staff.

Physics of oscillations and wave phenomena, mechanical waves, sound waves, electromagnetic waves, reflection and transmission of waves, interference and diffraction effects, transport of momentum and energy, wave properties of particles, and introduction to quantum physics. Course includes computer use in solving problems and labs. At the level of *University Physics*, Vols. 1-3, by Young and Freedman.

**PHYS 216(2216) Introduction to Special Relativity**

Fall, spring, weeks 5-7. 1 credit. Enrollment may be limited. Co-registration in this course is requirement for registration in PHYS 217, unless the student has taken a relativity course at level of PHYS 116 or ASTRO 106. Students cannot get credit for PHYS 216 if they have taken PHYS 116. Prerequisites: PHYS 112 or 207 or permission of instructor. S-U grades only. Fall, Staff; spring, Staff.

Introduction to Einstein's Theory of Special Relativity, including Galilean and Lorentz transformations, the concept of simultaneity, time dilation and Lorentz contraction, the relativistic transformations of velocity, momentum and energy, and relativistic invariance in the laws of physics. At the level of *An Introduction to Mechanics* by Kleppner and Kolenkow.

**PHYS 217(2217) Physics II: Electricity and Magnetism (also A&EP 217[2170]) (PBS)**

Fall, spring. 4 credits. Enrollment may be limited. Intended for students who have done very well in PHYS 112 or 116 and in mathematics and who desire more analytic treatment than that of PHYS 213. Prospective physics majors encouraged to register. Prerequisites: approval of student's advisor and permission of instructor. Corequisite: MATH 293 or equivalent. Placement quiz may be given early in semester, permitting students who find PHYS 217 too abstract or analytical to transfer into PHYS 213. Vector calculus is taught in this course, but previous contact, especially with the operations *grad*, *div*, and *curl*, is helpful. It is assumed the student has seen special relativity at level of PHYS 116 or is currently enrolled in PHYS 216 and that student has covered material of MATH 192. Fall, A. LeClair; spring, staff.

At the level of *Electricity and Magnetism*, Vol. 2, by Purcell (Berkeley Physics Series).

**PHYS 218(2218) Physics III: Waves and Thermal Physics (PBS)**

Fall, spring. 4 credits. Enrollment may be limited. Intended for students who have done very well in PHYS 116 and 217 and in mathematics and who desire more analytic treatment than that of PHYS 214. Prospective physics majors are encouraged to register. Prerequisites: PHYS 217 (with grade of B or higher) and course in differential equations or permission of instructor. Fall, D. Cassel; spring, M. Wang.

The first part of the course gives a thorough discussion of wave equations, including traveling waves, standing waves, energy, momentum, power, reflection and transmission, interference and diffraction. Derives wave equations on strings, sound, elastic media, and light. Covers solutions of these wave equations and Fourier series and transforms. The second part introduces thermodynamics and statistical mechanics, including heat engines, the Carnot cycle, and the concepts of temperature and entropy. Evening exams may be scheduled. At the level of *Physics of Waves* by Elmore and Heald.

**PHYS 310(3310) Intermediate Experimental Physics (PBS)**

Spring. 3 credits. Enrollment may be limited. Prerequisite: PHYS 208 or 213.

Students select from a variety of experiments. An individual, independent approach is encouraged. Facilities of the PHYS 410 lab are available for some experiments.

**PHYS 314(3314) Intermediate Mechanics (PBS)**

Spring. 4 credits. Prerequisites: PHYS 208 or 214 (or equivalent) and MATH 294 (or equivalent). Assumes prior introduction to linear algebra and Fourier analysis. Intended for physics majors with concentration outside of physics or astronomy; PHYS 318 covers similar material at more analytical level. J. C. Davis.

Likely topics include Lagrangian mechanics; Newtonian mechanics based on a variational principle; conservation laws from symmetries; two-body orbits due to a central force; analysis of scattering experiments; small amplitude oscillating systems including normal mode analysis; parametrically driven systems; rigid body motion; motion in non-inertial reference frames; and nonlinear behavior including bistability and chaos. Students not only become more familiar with analytic methods for solving problems in mechanics but also gain experience with computer tools. At the level of *Classical Dynamics* by Marion and Thornton.

**PHYS 316(3316) Basics of Quantum Mechanics (PBS)**

Fall, spring. 3 credits. Prerequisites: PHYS 214 or 218; PHYS 116 or 216; and co-registration in at least MATH 294 or equivalent. Assumes that majors registering in PHYS 316 will continue with PHYS 317. Fall, J. C. Davis; spring, G. Hoffstaetter.

Topics include breakdown of classical concepts in microphysics; light quanta and matter waves; Schrodinger equation and solutions for square well, harmonic oscillator, and the hydrogen atom; angular momentum, spin, and magnetic moments. At the level of *An Introduction to Quantum Physics* by French and Taylor.

**PHYS 317(3317) Applications of Quantum Mechanics (PBS)**

Fall. 3 credits. Prerequisite: PHYS 316. K. Schwab.

Covers a number of applications of quantum mechanics to topics in modern physics. Topics include: the physics of single and multi-electron atoms, quantum statistical mechanics, molecular structure, quantum theory of metals, band theory of solids, superconductivity, nuclear structure, radioactivity, nuclear reactions, and elementary particle physics.

**PHYS 318(3318) Analytical Mechanics (PBS)**

Spring. 4 credits. Prerequisites: PHYS 116 or permission of instructor; A&EP 321 or appropriate course(s) in mathematics. Intended for junior physics majors concentrating in physics or astronomy. PHYS 314 covers similar material at less demanding level. Assumes prior exposure to Fourier analysis, linear differential equations, linear algebra, and vector analysis. E. Flanagan.

Newtonian mechanics of particles and systems of particles, including rigid bodies; oscillating systems; gravitation and planetary motion; moving coordinate systems; Euler's equations; Lagrange and Hamilton formulations; normal modes and small vibrations; introduction to chaos. At the level of *Classical Mechanics* by Goldstein. *Classical Dynamics* by Marion and Thornton, and *Analytical Mechanics* by Hand and Finch. Supplementary reading is assigned.

**PHYS 323(3323) Intermediate Electricity and Magnetism (PBS)**

Fall. 4 credits. Prerequisites: PHYS 208 or 213/214 (or equivalent) and MATH 293/294 (or equivalent). Recommended: co-registration in A&EP 321 or appropriate mathematics course. Intended for physics majors with concentration outside of physics or astronomy; PHYS 327 covers similar material at more analytical level. C. Franck.

Topics include electro/magnetostatics, boundary value problems, dielectric and magnetic media, Maxwell's Equations, electromagnetic waves, including guided waves, and sources of electromagnetic radiation. At the level of *Introduction to Electrodynamics* by Griffiths.

**PHYS 327(3327) Advanced Electricity and Magnetism (PBS)**

Fall. 4 credits. Prerequisites: PHYS 217/218 or permission of instructor. Corequisite: A&EP 321 or appropriate mathematics course(s). Intended for physics majors concentrating in physics or astronomy. PHYS 323 covers similar material at less demanding level. Assumes knowledge of material at level of PHYS 217 and makes extensive use of vector calculus, and some use of Fourier transforms and complex variables. F. L. Hand.

Covers electro/magnetostatics, vector and scalar potentials, multipole expansion of the potential solutions to Laplace's Equation and boundary value problems; time-dependent electrodynamics; Maxwell's Equations, electromagnetic waves, reflection and refraction, wave guides, retarded potential, antennas; relativistic electrodynamics, four vectors, Lorentz, transformation of fields. At the level of *Classical Electromagnetic Radiation* by Heald and Marion.

**PHYS 330(3330) Modern Experimental Optics (also A&EP 330(3300)) (PBS)**

Fall. 4 credits. Limited enrollment.

Prerequisite: PHYS 214 or equivalent.

G. Hoffstaetter.

Practical laboratory course in basic and modern optics. The six projects cover a wide range of topics from geometrical optics to classical wave properties such as interference, diffraction, and polarization. Each experimental setup is equipped with standard, off-the-shelf optics and opto-mechanical components to provide the students with hands-on experience in practical laboratory techniques currently employed in physics, chemistry, biology, and engineering. Students are also introduced to digital imaging and image processing techniques. At the level of *Optics* by Hecht.

**PHYS 341(3341) Thermodynamics and Statistical Physics (PBS)**

Fall. 4 credits. Prerequisites: PHYS 214, 316, and MATH 294. I. Cohen.

Covers statistical physics, developing both thermodynamics and statistical mechanics simultaneously. Also covers concepts of temperature, laws of thermodynamics, entropy, thermodynamic relations, and free energy. Applications to phase equilibrium, multicomponent systems, chemical reactions, and thermodynamic cycles. Application of statistical mechanics to physical systems, and introduction to treatment of Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics with applications. Elementary transport theory. At the level of *Fundamentals of Statistical and Thermal Physics* by Reif.

**PHYS 360(3360) Electronic Circuits (also A&EP 363(3630)) (PBS)**

Fall, spring. 4 credits. Prerequisites: undergraduate course in electricity and magnetism (e.g., PHYS 208, 213, or 217) or permission of instructor. No previous electronics experience assumed, although course moves quickly through introductory topics such as basic dc circuits. Fall semester usually has smaller enrollment. S-U grade option available by permission of instructor for students who do not require course for major. Fall, E. Kirkland; spring, R. Thorne.

Practical electronics as encountered in a scientific or engineering research/development environment. Analyze, design, build, and test circuits using discrete components and integrated circuits. Analog circuits: resistors, capacitors, filters, operational amplifiers, feedback amplifiers, oscillators, comparators, passive and active filters, diodes and transistor switches and amplifiers. Digital circuits: combinational and sequential logic (gates, flip-flops, registers, counters, timers), analog to digital (ADC) and digital to analog (DAC) conversion, signal averaging, computer architecture and interfacing. Additional topics may include analog and digital signal processing, light wave communications, transducers, and noise reduction techniques. At the level of *Art of Electronics* by Horowitz and Hill.

**PHYS 400(4400) Informal Advanced Laboratory**

Fall, spring. 1-3 credits, variable.

Prerequisites: two years physics or permission of instructor. Fall, P. McEuen; spring, staff.

Experiments of widely varying difficulty in one or more areas, as listed under PHYS

410, may be done to fill the student's special requirements.

**PHYS 410(4410) Advanced Experimental Physics (PBS)**

Fall, spring. 4 credits. Prerequisite: senior standing or permission of instructor; PHYS 214 (or 310 or 360) plus 318 and 327, or permission of instructor. Fall, P. McEuen; spring, staff.

Selected topics in experimental concepts and techniques. About 60 different experiments are available in acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, magnetic resonance, X-rays, low temperature, solid state, cosmic rays, and nuclear physics. The student performs three to four different experiments, depending on difficulty, selected to meet individual needs and interests. Independent work is stressed. Lectures are on experimental techniques used in experiments in the laboratory and on current research topics.

**PHYS 443(4443) Intermediate Quantum Mechanics (PBS)**

Spring. 4 credits. Prerequisites: PHYS 327 or 323; and PHYS 316 and A&EP 321 or appropriate mathematics course(s); co-registration in PHYS 314 or 318; or permission of instructor. Assumes prior experience in linear algebra, differential equations, and Fourier transforms. M. Neubert.

Provides an introduction to concepts and techniques of quantum mechanics, at the level of *An Introduction to Quantum Mechanics* by Griffiths.

**PHYS 444(4444) Introduction to Particle Physics (PBS)**

Spring. 4 credits. Prerequisite: PHYS 443 or permission of instructor. A. Ryd.

The standard model of particle physics; behavior of high-energy particles and radiation; elementary particles; basic properties of accelerators and detectors; general symmetries and conservation laws. At the level of *Introduction to Elementary Particles* by Griffiths or *Modern Elementary Particle Physics* by Kane.

**PHYS 445(4445) Introduction to General Relativity (also ASTRO 445(4445)) (PBS)**

Fall. 4 credits. Offered as alternative to more comprehensive, two-semester graduate sequence PHYS 553 and 554. E. Flanagan.

One-semester introduction to general relativity, which teaches physics concepts and phenomenology while keeping mathematical formalism to a minimum. General relativity is a fundamental cornerstone of physics that underlies several of the most exciting areas of current research. These areas include theoretical high-energy physics and the search for a quantum theory of gravity, relativistic astrophysics, and in particular, cosmology, where there have been several groundbreaking observations over the last few years. It uses the new textbook *Gravity: An Introduction to Einstein's General Relativity* by Hartle.

**PHYS 454(4454) Introductory Solid-State Physics (also A&EP 450(4500)) (PBS)**

Fall. 4 credits. Prerequisite: PHYS 443, A&EP 361, or CHEM 793 highly desirable but not required. F. Wise.

Introduction to modern solid-state physics, including crystal structure, lattice vibrations,

electron theory of metals and semiconductors, and selected topics from magnetic properties, optical properties, superconductivity, and defects. At the level of *Introduction to Solid State Physics* by Kittel and *Solid State Physics* by Ashcroft and Mermin.

**PHYS 455(4455) Geometrical Concepts in Physics (PBS)**

Spring. 4 credits. Prerequisite: PHYS 323 or equivalent and at least co-registration in PHYS 318 or permission of instructor.

Usually offered every other spring.

Most non-quantum physical theories are based on one or another form of geometry: Newtonian mechanics on Euclid, electromagnetism on Minkowski, general relativity on Riemann, string theory on higher dimensionality. This course surveys the unification of classical physics that accompanies the application of Hamilton's principle of least action to these various geometries. At the level of *A First Course in String Theory, Part I* by Zwiebach or *Geometric Mechanics* by Talman.

**[PHYS 456(4456) Introduction to Accelerator Physics and Technology (also PHYS 656(7656)) (PBS)]**

Fall. 3 credits. Prerequisites: PHYS 323 or 327 and PHYS 314 or 318. Next offered 2007-2008. G. Hoffstaetter.

Fundamental physical principles of particle accelerators and enabling technologies, with a focus on basic effects in linear and circular accelerators as high-energy physics colliders and x-ray sources.]

**PHYS 480(4480) Computational Physics (also PHYS 680(7680), ASTRO 690(7690)) (PBS)**

Spring. 3 credits. Assumes familiarity with standard mathematical methods for physical sciences and engineering, differential equations and linear algebra in particular and with computer programming in general (e.g., Fortran or C). S-U grades only. T. Arias.

Covers numerical methods for ordinary and partial differential equations, linear algebra and eigenvalue problems, nonlinear equations, and fast Fourier transforms and nonlinear optimization problems from the hands-on perspective of how they are used in modern computational research in the era of open software and the web. Depending on the instructor, the course emphasizes different areas of computational science. Emphasis ranges from general methods for tackling PDEs, including finite-difference and spectral methods, to developing students' own working ab initio computer program for calculating the properties of molecules and materials with the methods that won Walter Kohn and John Pople the Nobel Prize in Chemistry in 1998.

**[PHYS 481(4481) Quantum Information Processing (also PHYS 681(7681), COM S 483(4812))]**

Spring. 2 credits. S-U grades only.

Prerequisite: familiarity with theory of finite-dimensional vector spaces over complex numbers. Next offered 2007-2008.

A technology that successfully exploits fundamental principles of quantum physics can spectacularly alter both the nature of computation and the means available for the transmission of information.]

**[PHYS 487(4487) Selected Topics in Accelerator Technology (also PHYS 687(7687))]**

Fall. 2 credits. Prerequisite: PHYS 323 or 327. S-U grades only. Next offered 2008-2009.

Fundamentals of accelerator technology. Consists of a series of topical seminars covering the principal elements of accelerator technology.]

**PHYS 488(4488) Advanced Topics in Accelerator Physics (also PHYS 688(7688))**

Spring. 3 credits. S-U grades only. G. Hoffstaetter.

After an introduction to the history of particle accelerators and to their fundamental physical principles, special topics in accelerator physics will be covered. Such topics are: microwave structures and particle acceleration, linear and nonlinear beam dynamics, collective effects and beam instabilities, characteristics of synchrotron radiation and x-ray experiments, a project in storage ring design, and experiments with the beam in Cornell's storage ring CESR.

**PHYS 490(4490) Independent Study in Physics**

Fall or spring. Variable to 4 credits; max. of 8 credits may be applied to physics major. Prerequisite: permission of professor who will direct proposed work. Copy of Request for Independent Study form must be filed with physics department course coordinator, 121 Clark Hall. Individual project work (reading or laboratory) in any branch of physics.

**PHYS 500(6500) Informal Graduate Laboratory**

Fall, spring. Variable to 2 credits. Prerequisite: permission of instructor. Fall, P. McEuen; spring, staff.

Experiments of widely varying difficulty in one or more areas, as listed under PHYS 510, may be done to fill special requirements.

**PHYS 510(6510) Advanced Experimental Physics**

Fall, spring. 3 credits. Optional lec associated with PHYS 410 available M. Fall, P. McEuen; spring, staff.

About 60 different experiments are available in acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, magnetic resonance, X-rays, low temperature, solid state, cosmic rays, and nuclear physics. Students perform three to four experiments selected to meet individual needs. Independent work is stressed. Lectures include techniques used in experiments in the advanced laboratory and on current research topics.

**PHYS 520(6520) Projects in Experimental Physics**

Fall, spring. Variable to 3 credits. Prerequisite: PHYS 510. To be supervised by faculty member. Students must advise department course coordinator of faculty member responsible for project.

Projects of modern topical interest that involve some independent development work by student. Opportunity for more initiative in experimental work than is possible in PHYS 510.

**PHYS 525(6525) Physics of Black Holes, White Dwarfs, and Neutron Stars (also ASTRO 511(6511))**

Spring. 4 credits. Prerequisite: none. D. Lai. For description, see ASTRO 511.

**PHYS 553-554(6553-6554) General Relativity (also ASTRO 509-510(6509-6510))**

553, fall; 554, spring. 4 credits. Prerequisite: knowledge of special relativity and methods of dynamics at level of *Classical Mechanics* by Goldstein. J. York.

Introductory study of Einstein's theory using methods of vector analysis, differential geometry, and tensor calculus. Topics include moving frames, connections and curvature, equivalence principle, variational principle, electrodynamics, hydrodynamics, thermodynamics, statistical mechanics in the presence of gravitational fields, special relativity from the viewpoint of GR, GR as a dynamical theory, and experimental tests of GR. At the level of *Gravitation* by Misner, Thorne, and Wheeler and *General Relativity* by Wald. Hartle's book *Gravity: An Introduction to Einstein's General Relativity* may also be useful. PHYS 554 is a continuation of 553, which emphasizes applications to astrophysics and cosmology. Topics include gravitational collapse and black holes, gravitational waves, elementary cosmology, and the use of active gravitational dynamics as a fundamental element of astrophysical and cosmological research.

**PHYS 561(6561) Classical Electrodynamics**

Fall. 3 credits. C. Csaki.

Covers Maxwell's equations, electromagnetic potentials, electrodynamics of continuous media (selected topics), special relativity, and radiation theory. The practical application of appropriate mathematical methods is emphasized. At the level of *Classical Electrodynamics* by Jackson.

**PHYS 562(6562) Statistical Mechanics**

Spring. 4 credits. Primarily for graduate students. Prerequisites: good knowledge of quantum mechanics, classical mechanics, and undergraduate-level thermodynamics or statistical mechanics class. J. Sethna.

Starts with the fundamental concepts of temperature, entropy, and free energy, defining the microcanonical, canonical, and grand canonical ensembles. Touches upon Markov chains, random walks, diffusion equations, and the fluctuation-dissipation theorem. Covers Bose-Einstein and Fermi statistics, black-body radiation, Bose condensation, superfluidity, metals, and white dwarves. Discusses fundamental descriptions of phases, and introduce Landau theory, topological order parameters, and the homotopy classification of defects. Briefly studies first-order phase transitions and critical droplet theory and concludes with a discussion of critical phenomena, scaling, universality, and the renormalization group.

**PHYS 572(6572) Quantum Mechanics I**

Fall. 4 credits. V. Elser.

Covers the general principles of quantum mechanics, formulated in the language of Dirac. Covers systems with few degrees of freedom such as hydrogen atom, including fine and hyperfine structure. Theory of angular momentum, symmetries, perturbations and collisions are developed to analyze phenomena displayed by these systems. At the level of *Quantum Mechanics: Fundamentals* by Gottfried and Yan. A knowledge of the subject at the level of PHYS 443 is assumed, but the course is self-contained.

**PHYS 574(6574) Applications of Quantum Mechanics II**

Spring. 4 credits. Knowledge of concepts and techniques covered in PHYS 561 and 572 and of statistical mechanics at undergraduate level assumed.

Possible topics include identical particles, many electron atoms, second quantization, quantization of the electromagnetic field, scattering of complex systems, radiative transitions, and introduction to the Dirac equation.

**[PHYS 599(6599) Cosmology (also ASTRO 599(6599))]**

Next offered 2007-2008.

For description, see ASTRO 599.]

**PHYS 635(7635) Solid-State Physics I**

Fall. 3 credits. Prerequisites: good undergraduate solid-state physics course (e.g., PHYS 454), as well as familiarity with graduate-level quantum mechanics. D. Ralph.

Survey of the physics of solids: crystal structures, x-ray diffraction, phonons, and electrons. Selected topics from semiconductors, magnetism, superconductivity, disordered materials, dielectric properties, and mesoscopic physics. The focus is to enable graduate research at the current frontiers of condensed matter physics.

**PHYS 636(7636) Solid-State Physics II**

Spring. 3 credits. Prerequisite: PHYS 635. P. Brouwer.

Continuation of PHYS 635. Topics from quantum condensed matter physics not included in that course, which may include Fermi Liquid Theory, magnetism, superconductivity, broken symmetries, elementary excitations, topological defects, superfluids, the quantum Hall effect, mesoscopic quantum transport theory, Anderson localization, and other metal insulator transitions.

**[PHYS 645(7645) Topics in High-Energy Particle Physics]**

Fall. 3 credits. Next offered 2007-2008.

Serves as an introduction to physics of baryons, mesons, and leptons.]

**PHYS 646(7646) Topics in High-Energy Particle Physics**

Spring. 3 credits. M. Neubert.

Covers topics of current interest, such as high-energy electron and neutrino interactions, electron positron annihilation, and high-energy hadronic reactions.

**PHYS 651(7651) Relativistic Quantum Field Theory I**

Fall. 3 credits. S-U grades only. M. Perelstein.

Topics include consequences of causality and Lorentz invariance, quantization of Klein-Gordon and Dirac fields, perturbation theory, Feynman diagrams, calculation of cross sections and decay rates, and an introduction to radiative corrections and renormalization with applications to electromagnetic and weak interactions.

**PHYS 652(7652) Relativistic Quantum Field Theory II**

Spring. 3 credits. S-U grades only. H. Tye.

A continuation of PHYS 651. Introduces more advanced methods and concepts in quantum field theory. Topics include renormalization, non-abelian gauge theories, functional integral methods, and quantization of non-abelian gauge theories, spontaneous symmetry

breaking, and anomalies. At the level of *An Introduction to Quantum Field Theory* by Peskin and Schroeder.

**PHYS 653(7653) Statistical Physics**

Fall. 3 credits. Prerequisites: quantum mechanics at level of PHYS 572, statistical physics at level of PHYS 562. S-U grades only. E. Mueller.

Survey of topics in modern statistical physics selected from phase transitions and the renormalization groups, linear response and fluctuations-dissipation theories; quantum statistical mechanics; and nonequilibrium statistical mechanics.

**PHYS 654(7654) Theory of Many-Particle Systems**

Spring. 3 credits. Prerequisites: PHYS 562, 574, 635, 636, and 653 or permission of instructor. S-U grades only. Staff.

Advanced topics in condensed-matter physics are taught by several members of the faculty. Past modules include random matrix theory, the quantum Hall effect, disordered systems and computational complexity, and asymptotic analysis. Future topics may include dilute cold gases and exotic quantum phenomena, thermodynamic Green's functions,  $1/N$  expansions, density functional theory, instantons, dynamical mean-field theory, conformal field theory, Fermi liquid theory and superconductivity, localization and disordered metals, renormalization groups, duality transformations, Luttinger liquids, frustrated and quantum magnetism, and Chern-Simons gauge theory. Detailed course content will be announced at the end of the fall semester.

**[PHYS 656(7656) Introduction to Accelerator Physics and Technology (also PHYS 456(4456))]**

Next offered 2007–2008.  
For description, see PHYS 456.]

**[PHYS 661(7661) Advanced Topics in High-Energy Particle Theory]**

Fall. 3 credits. Prerequisite: PHYS 652. S-U grades only. Next offered 2007–2008. H. Tye.

Presents advanced topics of current research interest. Subject matter varies from year to year. Some likely topics are two-dimensional conformal field theory with applications to string theory.]

**PHYS 665(7665) Seminar: Astrophysics Gas Dynamics (also ASTRO 699(7699))**

Fall. 2 credits. D. Lai.  
For description, see ASTRO 699.

**PHYS 667(7667) Theory of Stellar Structure and Evolution (also ASTRO 560(6560))**

For description, see ASTRO 560.

**PHYS 680(7680) Computational Physics (also PHYS 480(4480), ASTRO 690(7690))**

For description, see PHYS 480.

**PHYS 681–689(7681–7689) Special Topics**

Offerings are announced each semester. Typical topics are group theory, analyticity in particle physics, weak interactions, superfluids, stellar evolution, surface physics, Monte Carlo methods, low-temperature physics, magnetic resonance, phase transitions, and the renormalization group.

**[PHYS 681(7681) Quantum Information Processing (also PHYS 481(4481), COM S 483(4812))]**

Next offered 2007–2008.  
For description, see PHYS 481.]

**PHYS 682(7682) Computational Methods for Nonlinear Systems (also CIS 629(6229))**

Fall. 4 credits. Enrollment may be limited. J. Sethna and C. Myers.

Graduate computer laboratory, focusing on the next generation of tools for computation, simulation, and research in a broad range of fields of interest to the IGERT program and the Life Sciences Initiative. The course is pitched at a high level of computational sophistication, but is designed to fit into the busy schedules of first-year graduate students.

**[PHYS 687(7687) Selected Topics in Accelerator Technology (also PHYS 487(4487))]**

Next offered 2008–2009.  
For description, see PHYS 487.]

**PHYS 688(7688) Advanced Topics in Accelerator Physics (also PHYS 488(4488))**

For description, see PHYS 488.

**PHYS 690(7690) Independent Study in Physics**

Fall or spring. Variable to 4 credits. Students must advise department course coordinator, 121 Clark Hall, of faculty member responsible for grading their project. S-U grades only.

Special graduate study in some branch of physics, either theoretical or experimental, under the direction of any professorial member of the staff.

## POLISH

See "Department of Russian."

## PORTUGUESE

See "Department of Romance Studies."

## PSYCHOLOGY

D. J. Bem, S. L. Bem, M. Christiansen, J. E. Cutting, T. J. DeVoogd, D. A. Dunning, S. Edelman, M. Ferguson, D. J. Field, B. L. Finlay, T. D. Gilovich, M. Goldstein, B. P. Halpern, A. M. Isen, R. E. Johnston, C. L. Krumhansl, D. A. Levitsky, J. B. Maas, D. A. Pizarro, H. S. Porte, D. T. Regan, E. A. Regan, H. Segal, D. Smith, M. Spivey, B. J. Strupp, V. Zayas

The major areas of psychology represented in the department are perceptual and cognitive psychology, biopsychology, and personality and social psychology. These areas are very broadly defined, and the courses are quite diverse. Biopsychology includes animal learning, neuropsychology, interactions between hormones, other biochemical processes, and behavior. Perceptual and cognitive psychology includes such courses as cognition, perception, memory, and psycholinguistics. Personality and social psychology is represented by courses in social psychology and personality (e.g., Psychology and Law, Judgment and Decision

Making), as well as courses in fieldwork and psychopathology. In addition to the three major areas mentioned above, the department emphasizes the statistical and logical analysis of psychological data and problems.

## The Major

Admission to the major is usually granted to any student in good standing in the college who has passed three or more psychology courses with grades of C+ or better. Provisional admission requires two such courses. To apply to the major and receive an advisor, a major application form may be obtained from the department office (211 Uris Hall) and should be completed and taken to one of the faculty members whose name is listed on the form.

Requirements for the major are:

1. a total of 40 credits in psychology (including prerequisites), from which students majoring in psychology are expected to choose, in consultation with their advisors, a range of courses that covers the basic processes in psychology (laboratory and/or field experience is recommended); and
2. demonstration of proficiency in statistics before the beginning of the senior year. (See the section below on the statistics requirement.)

Normally it is expected that all undergraduate psychology majors will take at least one course in each of the following three areas of psychology:

1. **Perceptual cognition and development**
2. **Behavioral and evolutionary neuro science (BEN)**
3. **Social, personality, and abnormal psychology**

The following classification of Department of Psychology offerings is intended to help students and their advisors choose courses that will ensure that such breadth is achieved.

1. **Perceptual cognition and development:** PSYCH 205, 209, 214, 215, 292, 305, 311, 316, 342, 412, 413, 414, 415, 416, 417, 418, 419, 436, 492.
2. **Behavioral and evolutionary neuro science:** PSYCH 223, 322, 324, 326, 332, 361, 396, 420, 422, 424, 425, 429, 431, 440, 492.
3. **Social, personality, and abnormal psychology:** PSYCH 265, 275, 280, 281, 325, 327, 328, 380, 385, 402, 404, 450, 481, 489, 491.
4. **Other courses:** PSYCH 101, 199, 347, 350, 410, 440, 441, 470, 471, 472, 473, 475, 478, 479. The major advisor determines to which group, if any, these courses may be applied.

With the permission of the advisor, courses in other departments may be accepted toward the major requirements.

### Fieldwork, independent study, and teaching.

The department requires students to observe the following limits on fieldwork, independent study, and teaching.

1. Undergraduates may not serve as teaching assistants for psychology courses if they are serving as teaching assistants for any other course during the same semester.
2. An undergraduate psychology major cannot apply more than 12 of the credits



earned in independent study (including honors work) and fieldwork toward the 40 credits required by the major.

**Statistics requirement.** Proficiency in statistics can be demonstrated in any one of the several ways listed below.

1. Passing PSYCH 350.
2. Passing an approved course or course sequence in statistics in some other department at Cornell.
3. Passing a course or course sequence in statistics at some other college, university, or college-level summer school. The course or sequence must be equivalent to at least 6 semester credits. The description of the course from the college catalog and the title and author of the textbook used must be submitted to Professor Gilovich for approval.
4. Passing an exemption examination. This examination can be given at virtually any time during the academic year if the student gives notice at least one week before. Students who have completed a theoretical statistics course in a department of mathematics or engineering and who wish to demonstrate competence in applied statistics usually find this option the easiest. Students planning this option should discuss it in advance with Professor Gilovich.

**Concentration in biopsychology.** Psychology majors interested in psychology as a biological science can elect to specialize in biopsychology. Students in this concentration must meet all of the general requirements for the major in psychology and must also demonstrate a solid background in biology; the physical sciences, including at least introductory chemistry; and mathematics. Students will design with their advisors an integrated program in biopsychology built around courses on physiological, chemical, anatomical, and ecological determinants of human and nonhuman behavior offered by the Department of Psychology. Additional courses in physiology, anatomy, biochemistry, neurochemistry, neurobiology, and behavioral biology may be designated as part of the psychology major after consultation between the student and his or her biopsychology advisor.

**Concentration in personality and social psychology.** Psychology majors who wish to specialize in social psychology are expected to meet the general requirements set by their department, including statistics. To ensure a solid interdisciplinary grounding, students in the concentration are permitted to include some major courses in sociology and related fields. Advisors will assist students in the selection of a coherent set of courses from social organization, cultural anthropology, experimental psychology, social methodology, and several aspects of personality and social psychology. Seniors in the concentration may elect advanced and graduate seminars, with the permission of the instructor.

**Undergraduate honors program.** The honors program is designed for exceptional students who wish to pursue an intensive and independent program of research in psychology. Successful participation serves as evidence of the student's facility in the two most important skills required of an academic psychologist: namely, the capacity to acquire and integrate a substantial body of theoretical

and factual material and the ability to devise and execute a creative empirical research project.

The honors program offers students the closest contact and consultation with faculty they will likely experience while at Cornell, and all qualified majors who are planning graduate work in any academic field should consider applying. However, it should also be noted that conducting honors research and completing a thesis is an extremely demanding undertaking, both in time and effort. Due to the demands of both research and writing, it is expected that after the Christmas break, honors students will return to campus as early as possible to continue their work, as well as remain on campus through all of spring break.

The focus of the honors program is conducting an experiment, analyzing the data that result, and describing the project in a thesis that closely approximates a professional-level research report both in form and quality. The research project is to be conducted under the close sponsorship of a faculty member. Subject to approval, the sponsor need not be in the psychology department per se. Students that successfully complete the honors program graduate with one of levels of honors, which is noted on their diplomas. The customary level is cum laude, awarded to approximately two-thirds of psychology honors graduates. Approximately one-third receive the next higher level of honors, which is magna cum laude. A student who has both an unusually strong academic record in psychology and completes a thesis of exceptionally high quality will be considered for summa cum laude, the highest level of honors. However, those are unusual cases. The T. A. Ryan Award, accompanied by a cash prize, is awarded to the student who conducts the best honors project in a given year. Students in the program register for 3 or 4 credits of PSYCH 471 Independent Study in both fall and spring semesters. Format and binding of the thesis follows guidelines for the doctoral dissertation and master's thesis, outlined by the Cornell University Graduate School. Stylistic format is APA style. Alternative style formats are possible, if approved in advance.

### Computing in the Arts Undergraduate Concentration

A concentration in Computing in the Arts with an emphasis on psychology is available both to psychology majors and to students majoring in other subjects. For more information, see pages \*\*\*

### Courses

#### PSYCH 101(1101) Introduction to Psychology: The Frontiers of Psychological Inquiry (SBA)

Fall, summer (six-week). 3 credits.

Attendance at lec mandatory. Students who wish to take disc seminar should also enroll in PSYCH 103. M W F. J. B. Maas.

The study of human behavior. Topics include brain functioning and mind control, psychophysiology of sleep and dreaming, psychological testing, perception, learning, cognition, memory, language, motivation, personality, abnormal behavior, psychotherapy, social psychology, and other aspects of applied psychology. Emphasis is on developing skills to critically evaluate claims made about human behavior.

#### PSYCH 102(1200) Introduction to Cognitive Science (also COGST 101[1101], COM S 101[1710], LING 170[1170], PHIL 191[1910]) (KCM)

Fall, summer (six-week). 3 or 4 credits

(4-credit option involves writing sec instead of exams). T R. M. Spivey.

For description, see COGST 101.

#### PSYCH 103(1103) Introductory Psychology Seminars

Fall. 1 credit. Limited to 300 students.

Corequisite: PSYCH 101. 12 different time options. J. B. Maas and staff.

Weekly seminar that may be taken in addition to PSYCH 101 to provide an in-depth exploration of selected areas in the field of psychology. Involves extensive discussion and a semester paper related to the seminar topic. Choice of seminar topics and meeting times are available at the second lecture of PSYCH 101.

#### PSYCH 111(1110) Brain, Mind, and Behavior (also BIONB/COGST 111[1110]) (PBS)

Spring. 3 credits. Letter grades only.

Prerequisite: freshmen and sophomores in humanities and social sciences; juniors and seniors not allowed. Not recommended for psychology majors; biology majors may not use for credit toward major. M W F. E. Adkins Regan and R. Hoy.

For description, see COGST 111.

#### PSYCH 165(1650) Computing in the Arts (also COM S/CIS/ENGRI 165[1650], MUSIC 165[1465])

Fall. 3 credits. G. Bailey.

For description, see COM S 165.

#### PSYCH 201(2010) Cognitive Science in Context Laboratory (also COGST 201[2010], COM S 201[2710]) (KCM)

Spring. 4 credits. Limited to 24 students.

Prerequisite: PSYCH 102, COGST/COM S 101, LING 170, or PHIL 191. Knowledge of programming languages not assumed. Disc and demos, M W; lab, M W, plus additional hours TBA. 259 Uris Hall. D. Field and staff.

For description, see COGST 201.

#### PSYCH 205(2050) Perception (also PSYCH 605[6050])

Spring. 3 credits. Open to all students.

Graduate students, see PSYCH 605. T R.

J. E. Cutting.

One of four introductory courses in cognitive psychology. Basic perceptual concepts and phenomena are discussed with emphasis on stimulus variables and sensory mechanisms. All sensory modalities are considered. Visual and auditory perception are discussed in detail.

#### PSYCH 209(2090) Developmental Psychology (also PSYCH 709[7090]) (KCM)

Spring. 4 credits. Graduate students, see PSYCH 709. M W. M. Goldstein.

One of four introductory courses in cognition and perception. A comprehensive introduction to current thinking and research in developmental psychology that approaches problems from both psychobiological and cognitive perspectives. We will use a comparative approach to assess principles of development change. The course focuses on the development of perception, action, cognition, language and social understanding in infancy and early childhood.

**PSYCH 214(2140) Cognitive Psychology**  
(also PSYCH 614[6140], COGST  
214[2140], COGST 614[6140]) (KCM)

Fall. 3 credits. Limited to 175 students.

Prerequisite: sophomore standing.

Graduate students, see PSYCH 614. M W F.  
S. Edelman.

Introduces the idea of cognition as information processing or computation, using examples from perception, attention and consciousness, memory, language, and thinking. Participants acquire conceptual tools that are essential for following the current thought on the nature of mind and its relationship to the brain.

**[PSYCH 215(2150) Psychology of Language (also COGST 215[2150], LING 215[2215]) (KCM)]**

Spring. 3 credits. Prerequisites: sophomore, junior, or senior standing; any one course in psychology or human development.

Next offered 2007–2008. T R.

M. Christiansen.

Provides an introduction to the psychology of language. The purpose of the course is to introduce students to the scientific study of psycholinguistic phenomena. Covers a broad range of topics from psycholinguistics, including the origin of language, the different components of language (phonology, morphology, syntax, and semantics), processes involved in reading, computational modeling of language processes, the acquisition of language (both under normal and special circumstances), and the brain bases of language.]

**PSYCH 223(2230) Introduction to Biopsychology (PBS: supplementary list)**

Fall. 3 credits. Prerequisites: none. May be used to satisfy psychology major breadth requirement and as alternative prerequisite for upper-level biopsychology courses.

D. Smith.

Introduction to psychology from a biological perspective, including both evolutionary and physiological approaches to behavior. Topics include the structure and function of the nervous system, genetic and biochemical models of behavior, hormones and behavior, biological bases of learning, cognition, communication, and language, and the evolution of social organization.

**Introductory courses in social and personality psychology.** Each of the following three courses (265, 275, 280) provides an introduction to a major area of study within social and personality psychology. These courses are independent of one another, and none have any prerequisites. Students may take any one of the courses or any combination of them (including all three). Courses may be taken in any order or simultaneously.

**PSYCH 231(2310) SSP: Borges and I: a Quest for Self-Knowledge (KCM)**

Spring. 4 credits. Limited to 15 students.

S. Edelman.

This seminar will survey the state of the art in theoretical neuroscience, a discipline whose ultimate goal is finding the mind in the brain. Our journey through the scientific literature on minds and brains, covering topics such as memory and identity, love, solitude and society, language, creativity, religion, and morality, will be accompanied by a choice of short stories by Jorge Luis Borges.

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars

Program. Seminars offer discipline-specific study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**[PSYCH 265(2650) Psychology and Law (SBA)]**

Fall. 3 credits. M W F. Next offered 2007–2008. D. A. Dunning.

Examines the implications of psychological theory and methods for law and the criminal justice system. Concentrates on psychological research on legal topics (e.g., confession, eyewitness testimony, jury decision making, homicide, aggression, the prison system), social issues (e.g., death penalty, affirmative action), and on psychologists as participants in the legal system (e.g., assessing insanity and dangerousness and for expert testimony).]

**[PSYCH 275(2750) Introduction to Personality Psychology (also HD 260[2600]) (SBA)]**

Spring. 3 credits. Recommended: introductory psychology or human development. T R. Staff.

Designed as an introduction to theory and research in the area of personality psychology, including personality development. Covers the major influences on personality, including genetic, environmental, and gene-environment interactions. The assumptions and models of human behavior that form the basis of each theoretical orientation are examined and compared, and the relevant empirical evidence reviewed and evaluated. In addition, basic psychometric concepts and the methods for measuring and assessing personality are covered, as are the major related debates and controversies.]

**PSYCH 280(2800) Introduction to Social Psychology (SBA)**

Spring, summer (three-week). 3 credits. T R. T. D. Gilovich and D. T. Regan.

Introduction to research and theory in social psychology. Topics include social influence, persuasion, and attitude change; social interaction and group phenomena; altruism and aggression; stereotyping and prejudice; and everyday reasoning and judgment.

**PSYCH 282(2820) Community Outreach (also HD 282[2820])**

Fall. 2 credits. Prerequisites: PSYCH 101 or HD 115. T. H. Segal.

Provides students with information and perspectives essential to volunteer fieldwork with human and social service programs in the community. Readings are drawn from the field of community psychology and include analyses of successful programs, such as Head Start, as well as a review of the methods by which those programs are developed and assessed. Although students are not required to volunteer, the instructor provides students with a list of local agencies open to student placements.

**PSYCH 305(3050) Visual Perception (also VISST 305[3305])**

Fall. 4 credits. Limited to 25 students.

Prerequisite: PSYCH 205 or permission of instructor. M W F. J. E. Cutting.

Detailed examination of pictures and their comparison to the real world. Linear

perspective in Renaissance art, photography, cinema, and video is discussed in light of contemporary research in perception and cognition.

**PSYCH 313(3130) Problematic Behavior in Adolescence (also HD 313[3130])**

Fall. 3 credits. Prerequisite: HD 115 or PSYCH 101. Recommended: HD 216. M W. J. Haugaard.

For description, see HD 313.

**[PSYCH 316(3160) Auditory Perception (also PSYCH 716[7160]) (KCM)]**

Fall. 3 or 4 credits; 4-credit option involves lab project or paper. Limited to 30 students. Prerequisite: PSYCH 102, 205, 209, or 214 (or other psychology, linguistics, or biology courses by permission of instructor). Graduate students, see PSYCH 716. M W. Next offered 2007–2008. C. L. Krumhansl.

Covers the major topics in auditory perception including: physics of sound; structure and function of the auditory system; perception of loudness, pitch, and spatial location, with applications to speech production and perception; and music and environmental sounds.]

**PSYCH 322(3220) Hormones and Behavior (also BIONB 322[3220], PSYCH 722[7220]) (PBS)**

Fall. 3 credits. Two lec plus sec in which students read and discuss original papers in the field, give an oral presentation, and write a term paper. Prerequisites: junior or senior standing; any one of the following: PSYCH 223, BIONB 221 or 222, or one year introductory biology plus psychology course. Graduate students, see PSYCH 722. M W F. E. Adkins Regan.

Comparative and evolutionary approaches to the study of the relationship between reproductive hormones and sexual behavior in vertebrates, including humans. Also hormonal contributions to parental behavior, aggression, stress, learning and memory, and biological rhythms.

**PSYCH 324(3240) Biopsychology Laboratory (also BIONB 324[3240]) (PBS)**

Fall. 4 credits. Limited to 20 students. Prerequisites: junior or senior standing; PSYCH 223 or BIONB 221 or 222, and permission of instructor. T R.

T. J. DeVoogd.

Experiments designed to provide experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, animal species, and behavior patterns are included.

**PSYCH 325(3250) Adult Psychopathology (also HD 370[3700]) (SBA)**

Spring. 3 credits. Prerequisite: sophomore, junior, or senior standing; any one course in psychology or human development. T R. No S-U option. M W. H. Segal.

A theoretical and empirical approach to the biological, psychological, and social (including cultural and historical) aspects of adult psychopathology. Readings range from Freud to topics in psychopharmacology. The major mental illnesses are covered, including schizophrenia as well as mood, anxiety, and personality disorders. Childhood disorders are not covered.

**PSYCH 326(3260) Evolution of Human Behavior (also PSYCH 626[6260]) (PBS: Supplementary List)**

Spring. 4 credits. Prerequisite: PSYCH 223, or introductory biology, or introductory anthropology. Graduate students, see PSYCH 626. T. R. E. Johnston.

Broad comparative approach to the behavior of animals and humans with special emphasis on the evolution of human behavior. Topics vary but include some of the following: human evolution, evolutionary and sociobiological theory, animal communication, nonverbal communication, language, cognitive capacities, social behavior and organization, cooperation and altruism, sexual behavior, mating and marriage systems, aggression, and warfare.

**PSYCH 327(3270) Field Practicum I (also HD 327[3270]) (SBA)**

Fall only. 3 credits. Limited enrollment. Prerequisites: PSYCH 325 or HD 370 (or taken concurrently), and permission of instructor. Students must commit to taking PSYCH 328 in spring semester. Letter grades only. M. W. H. Segal.

Composed of three components that form an intensive undergraduate field practicum. First, students spend three to six hours a week at local mental health agencies, schools, or nursing facilities working directly with children, adolescents, or adults; supervision is provided by host agency staff. Second, the instructor provides additional weekly individual, clinical supervision for each student. Third, seminar meetings cover issues of adult and developmental psychopathology, clinical technique, case studies, and current research issues. Students write one short paper, two final take-home exams, and present an account of their field experience in class.

**PSYCH 328(3280) Field Practicum II (also HD 328[3280]) (SBA)**

Spring. 3 credits. Limited enrollment. Prerequisites: PSYCH 327 taken previous semester, PSYCH 325 or HD 370 (or taken concurrently), permission of instructor. Letter grades only. M. W. H. Segal.

Continues the field practicum experience from PSYCH 327.

**PSYCH 330(3300) Introduction to Computational Neuroscience (also BIONB/COGST 330[3300]) (PBS)**

Fall. 3 credits. Limited to 25 students. Prerequisite: BIONB 222 or permission of instructor. S-U grades optional. Offered alternate years. C. Linster.

For description, see BIONB 330.

**PSYCH 332(3320) Biopsychology of Learning and Memory (also BIONB 328[3280], PSYCH 632[6320]) (PBS)**

Spring. 3 credits. Limited to 60 students. Prerequisites: one year of biology and either a biopsychology course or BIONB 222. Graduate students, see PSYCH 632. M. W. F. T. J. DeVoogd.

Surveys the approaches that have been or are currently being used to understand the biological bases for learning and memory. Topics include invertebrate, "simple system" approaches, imprinting, avian song learning, hippocampal and cerebellar function, or research using fMRI pathology in humans. Many of the readings are from primary literature.

**PSYCH 340(3400) Autobiographical Memory**

Spring. 3 credits. Limited to 20 students. Prerequisites: any one course in psychology or human development. Staff.

Much recent research has focused on people's ability to remember—and often to misremember—their own life experiences. This course reviews that research, including such topics as "flashbulb" memories, "childhood amnesia," the development of memory in children, cultural differences, the "false memory syndrome," eyewitness testimony, prospective memory, sex differences, recall of school learning, the amnesic syndrome, and the relation between memory and self.

**PSYCH 342(3420) Human Perception: Applications to Computer Graphics, Art, and Visual Display (also PSYCH 642[6420], COGST 342[3420], VISST 342[3422])**

Fall. 3 or 4 credits; 4-credit option involves term paper. Highly recommended: PSYCH 205. Graduate students, see PSYCH 642. T. R. D. J. Field.

Our present technology allows us to transmit and display information through a variety of media. To make the most of these media channels, it is important to consider the limitations and abilities of the human observer. The course considers a number of applied aspects of human perception with an emphasis on the display of visual information. Topics include "three-dimensional" display systems, color theory, spatial and temporal limitations of the visual systems, attempts at subliminal communication, and "visual" effects in film and television.

**PSYCH 347(3470) Psychology of Visual Communications (SBA)**

Spring. 3 credits. Limited to 15 students. Prerequisites: PSYCH 101 and permission of instructor. R. J. B. Maas.

Exploration of theories of education, communication, perception, attitude, and behavior change as they relate to the effectiveness of visually based communication systems. Emphasis is on the use of photography and computer graphics to deliver educational messages. A digital camera with manual control of f-stops and shutter speed is mandatory.

**PSYCH 350(3500) Statistics and Research Design (MQR)**

Fall, summer (three-week). 4 credits.

Limited to 120 students. M. W. F. Staff. Acquaints the student with the elements of statistical description (e.g., measures of average, variation, correlation) and, more important, develops an understanding of statistical inference. Emphasis is placed on those statistical methods of principal relevance to psychology and related behavioral sciences.

**[PSYCH 361(3610) Biopsychology of Normal and Abnormal Behavior (also NS 361[3610]) (PBS: Supplementary List)]**

Spring. 3 credits. Limited to 50 students in psychology and 50 students in nutritional sciences. Prerequisites: junior or senior standing; introductory biology and introductory psychology or permission of instructor. S-U grades optional. M. W. F. Next offered 2007-2008. B. J. Strupp.

Critical evaluation of factors thought to underlie normal and abnormal behavior and/or cognitive functioning. Psychological, biological, and societal influences are integrated. Topics include the psychobiology of learning and memory; nutritional influences on behavior/cognition (e.g., sugar, food additives, choline); cognitive dysfunction (e.g., amnesia, Alzheimer's disease); developmental exposure to environmental toxins and

drugs of abuse; and psychiatric disorders (depression, eating disorders).]

**PSYCH 380(3800) Social Cognition (SBA)**

Fall. 3 credits. Prerequisites: junior or senior standing; PSYCH 280. T. R. M. Ferguson.

What are the causes and consequences of our own and other's judgments, feelings, attitudes, and behaviors? This course introduces students to social cognition, which is a research perspective that uses both cognitive and social psychological theories and methodologies to explain such social phenomena.

**PSYCH 385(3850) The Psychology of Emotion (SBA)**

Fall. 3 credits. D. Pizarro.

We've all been mad, sad, happy, and disgusted. Some of us get nostalgic at times, and some of us are easily embarrassed. We've been feeling these emotions nearly our whole lives, and this makes us all emotion experts of a sort. Nonetheless, these feelings can be mysterious. Where do they come from? Do people across all cultures experience similar emotions? How can we regulate our emotions? Do emotions make us less rational? Do they make us smarter? What triggers certain emotions? Are there gender differences in emotions? The science of emotion is fairly young, but there has been an enormous amount of progress in understanding emotional phenomena in the last few decades. In this course, we will tackle the aforementioned questions and more. By the end of the course you should be familiar with the most influential theories of emotion—from the evolutionary explanations of emotion to the developmental and social factors involved in making us emotional creatures. So while we are all intuitive experts on emotion, by the end of the course you will have a different kind of expertise—one grounded in the most recent scientific discoveries in this exciting field.

**[PSYCH 396(3960) Introduction to Sensory Systems (also BIONB 396[3960]) (PBS)]**

Spring. 4 credits. Limited to 35 students.

Next offered 2009-2010. B. P. Halpern. Somesthetic, auditory, and visual system neuroscience principles and methods of study are taught using the Socratic method. Original literature read and discussed.]

**PSYCH 405(4050) Intuitive Judgment (SBA)**

Fall. 4 credits. Limited to 18 students by application. Priority given to senior psychology majors. Prerequisites: at least one course in each of social and cognitive psychology. T. Gilovich.

Judgment pervades everyday experience. Can this person be trusted? Does this relationship have promise? Is the economy likely to flourish? This course examines how people answer such questions by examining—in depth—classic and contemporary scholarship on the subject. Readings are mostly primary sources.

**PSYCH 410(4101) Undergraduate Seminar in Psychology**

Fall or spring. 2 credits. Priority given to psychology majors. Staff.

Information on specific sections for each semester, including instructor, prerequisites, and time and place, may be obtained from the Department of Psychology office, 211 Uris Hall.

**PSYCH 412(4120) Laboratory in Cognition and Perception (also PSYCH 612[6120]) (KCM)**

Spring. 4 credits. Limited to 15 students. Prerequisite: statistics and one course in cognition or perception recommended. Graduate students, see PSYCH 612. M W. D. J. Field.

Laboratory course designed to introduce students to experimental methods in perception and cognitive psychology. Students take part in a number of classic experiments and develop at least one independent project. Computers are available and used in many of the experiments although computer literacy is not required. Projects are selected from the areas of visual perception, pattern recognition, memory, and concept learning.

**[PSYCH 414(4140) Comparative Cognition (also PSYCH 714[7140], COGST 414[4140]) (KCM)]**

Spring. 3 or 4 credits; 4-credit option involves annotated bibliography or creation of relevant web site. Prerequisites: PSYCH 205, 209, 214, 223, 292 or permission of instructor. Graduate students, see PSYCH 714. T R. Next offered 2007–2008. Staff.

Examines some of the conceptual and empirical work resulting from and fueling the recent surge of interest in animals' thinking. Specific topics may include whether nonhumans behave intentionally; whether they show concept and category learning, memory, and abstract thinking similar to that of humans; the role of social cognition in the evolution of intelligence; and whether animals are conscious or self-aware. Evidence from communication studies in which animal signals provide a "window on the mind" plays a strong role in the deliberations, including studies of naturally occurring signaling in various species and experiments in which nonhumans are trained in human-like language behavior. Cognition in nonhuman primates is a specific focus throughout. The course is a mix of lecture and discussion, emphasizing the latter as much as possible.]

**PSYCH 416(4160) Modeling Perception and Cognition (also PSYCH 616[6160], COGST 416[4160])**

Spring. 4 credits. Prerequisites: PSYCH 205, 209, 214, or 215, or permission of instructor. Graduate students, see PSYCH 616. M W F. M. Spivey.

Offers a survey of several computational approaches to understanding perception and cognition. Explores linear systems analysis, connectionist models, dynamical systems, and production systems, to name a few. Emphasis is placed on how complex sensory information gets represented in these models, as well as how it gets processed. Covers computational accounts of language processing, language acquisition, visual perception, and visual development, among other topics. Students complete a final project that applies a computational model to some perceptual/cognitive phenomena.

**PSYCH 418(4180) Psychology of Music (also MUSIC 418[4181], PSYCH 618[6180]) (KCM)**

Spring. 3 or 4 credits, depending on whether student elects to do independent project. Intended for upper-level students in music, psychology, engineering, computer science, linguistics, physics, anthropology, biology, and related disciplines. Some music background desirable but no specific musical skills

required. Graduate students, see PSYCH 618. M W. C. L. Krumhansl.

Covers the major topics in the psychology of music treated from a scientific perspective. Reviews recent developments in the cognitive science of music, beginning with music acoustics and synthesis, and extending to music and its emotional and social effects.

**[PSYCH 424(4240) Neuroethology (also BIONB 424[4240]) (PBS)]**

Spring. 4 credits. Prerequisites: BIONB 221 or 222 or BIO G 101–102 and permission of instructor. S-U grades optional. M W F; disc, one hour each week. Next offered 2007–2008. C. D. Hopkins.

For description, see BIONB 424.]

**PSYCH 425(4250) Cognitive Neuroscience (also BIONB 423[4230], PSYCH 625[6250]) (KCM)**

Fall. 4 credits. Prerequisites: introductory biology; biopsychology or neurobiology (e.g., PSYCH 223 or BIONB 221); and introductory course in perception, cognition, or language (e.g., PSYCH 102, 209, 214, or 215). Graduate students, see PSYCH 625. S-U grades optional. M W F. Offered alternate years. B. L. Finlay.

Studies the relationship between structure and function in the central nervous system. Stresses the importance of evolutionary and mechanistic approaches for understanding the human behavior and cognition. Focuses on issues in cognitive neuroscience, including mechanisms of perception, particularly vision, and the neuropsychology of everyday acts involving complex cognitive skills such as recognition of individuals, navigation in the world, language, memory, social interaction, and consciousness.

**PSYCH 426(4260) Learning Language (also PSYCH 726, COGST 426)**

Spring. 4 credits. Prerequisite: PSYCH 214 or permission of instructor. Letter grades only. S. Edelman.

A survey of a promising new synthesis in the understanding of the cognitive function that is at the core of the human nature: language. The material focuses on two aspects of the study of language: (1) psycholinguistic data and their interpretation, and (2) algorithmic studies and computational modeling. In psycholinguistics, students will read key papers that shed light on the nature of linguistic knowledge ("grammar") possessed by normal adult speakers, and on the learning of this knowledge by children. In computation, the focus is on learning grammar from raw data. The common thread to this course is realism: in psycholinguistics, we shall consider only those results obtained empirically by established psychological procedures (as opposed to intuition, either of experts or of lay speakers); in computation, the only approaches of interest to us are those that are algorithmically tractable, and that are effective when applied to realistic data

**[PSYCH 427(4270) Evolution of Language (also COGST 427[4270], PSYCH 627[6270])]**

Fall. 3 credits. Prerequisite: junior or senior standing; any one course in psychology or human development. Graduate students, see PSYCH 627. S-U grades optional. Offered alternate years; next offered 2007–2008. M. Christiansen.

Seminar surveying a cross-section of modern theories, methods, and research pertaining to the origin and evolution of language. Considers evidence from psychology,

the cognitive neurosciences, comparative psychology, and computational modeling of evolutionary processes. Topics for discussion may include: What does the fossil record tell us about language evolution? What can we learn from comparative perspectives on neurobiology and behavior? Can apes really learn language? Did language come about through natural selection? What were the potential preadaptations for language? What is the relationship between phylogeny and ontogeny?]

**[PSYCH 428(4280) Connectionist Psycholinguistics (also COGST 428[4280], PSYCH 628[6280])]**

Fall. 3 credits. Prerequisite: senior standing or permission of instructor. Graduate students, see PSYCH 628. Offered alternate years; next offered 2008–2009. T. M. Christiansen.

Connectionist psycholinguistics involves using (artificial) "neural" networks, which are inspired by brain architecture, to model empirical data on the acquisition and processing of language. As such, connectionist psycholinguistics has had a far-reaching impact on language research. This course surveys the state of the art of connectionist psycholinguistics, ranging from speech processing and word recognition, to inflectional morphology, sentence processing, language production and reading. An important focus of discussion is the methodological and theoretical issues related to computational modeling of psychological data. Furthermore, the course discusses the broader implications of connectionist models of language, not only for psycholinguistics, but also for computational and linguistic perspectives on language.]

**[PSYCH 429(4290) Olfaction and Taste: Structure and Function (also BIONB 429[4290], PSYCH 629[6290]) (PBS)]**

Spring. 4 credits. Next offered 2007–2008. B. Halpern.

Explores structural and functional characteristics of smelling and tasting by reading and discussing current literature in these areas, using the Socratic method.]

**PSYCH 430(4300) Moral Reasoning (also PSYCH 630[6300])**

Spring. 4 credits. Prerequisites: open to junior and senior psychology majors and to graduate students; open to others by permission of instructor. D. Pizarro.

In recent years there has been a resurgence of interest in the science of morality. Recently, scientists across a wide range of disciplines have made discoveries that bear on the question of how and why humans have a sense of morality. The goals of this course are to offer an introduction to the science behind our moral sense. In order to achieve this goal, we will read articles on almost every area of scientific psychology. By the end of the course you should be well versed in the primary issues and debates involved in the scientific study of morality.

**PSYCH 431(4310) Effects of Aging on Sensory and Perceptual Systems (also PSYCH 631[6310], BIONB 421[4210]) (PBS)]**

Fall. 3 or 4 credits; 4-credit option involves term paper or creation of relevant web site. Limited to 35 students. Prerequisites: introductory biology or psychology, plus second course in perception, neuroscience, cognitive science. Graduate students, see PSYCH 631. T R. B. P. Halpern.



Literature-based examination of post-maturation changes in the perceptual, structural, and physiological characteristics of somesthetic, visual, auditory, and chemosensory systems. Emphasis is on human data, with nonhuman information included when especially relevant. Quality of life issues are included. Current developments in human sensory prosthetic devices, and in regeneration or replacement of receptor structures or organs are examined. Brief written statements by e-mail of questions and problems related to each set of assigned readings are required in advance of each class meeting and are automatically distributed to all members of the class. This course is taught using the Socratic method, in which the instructor asks questions of the students. Students read, analyze, and discuss in class difficult original literature dealing with the subject matter of the course. Readings are from Internet sites, a course packet, materials on reserve, and from the course Blackboard site. Students are expected to come to each class having already done and thought about the assigned readings, and to take an active part in every class. All examinations are take-home.

**PSYCH 435(4350) Olfaction, Pheromones, and Behavior**

Fall. 4 credits. Prerequisites: introductory biology and course in neurobiology and behavior or biopsychology or 300-level course in biopsychology or permission of instructor. R. Johnston.

Covers chemical signals, olfaction, and behavior in vertebrates (including humans), as well as the neurobiology of olfaction and odor-mediated behaviors. Behavioral topics may vary from year to year but include evaluation of and advertisement for mates, aggression and territorial behavior, parental-young interactions, social recognition (species, sex, individual, kin reproductive state, status), memory for odors, odor and endocrine interactions, imprinting, and homing and navigation. Basic aspects of the structure and function of the olfactory system are also covered, including the molecular biology of chemo-reception, olfactory coding, and higher-order processing in the central nervous system. The format includes lectures, discussions, and student presentations.

**PSYCH 436(4360) Language Development (also COGST 436[4360], HD 337[3370], LING 436[4436]) (KCM)**

Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll under HD 633/LING 700/PSYCH 600, supplemental graduate seminar. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. T. R. B. Lust.

For description, see COGST 436.

**PSYCH 437(4370) Lab Course: Language Development (also COGST 450[4500], LING 450[4500], HD 437[4370]) (in conjunction with COGST 436[4360], HD 339[4360], LING 436[4436], Language Development)**

Spring. 2 credits. R. B. Lust.

Optional supplement to the survey course Language Development (HD 337/COGST/PSYCH/LING 436). Provides students with a hands-on introduction to scientific research,

including design and methods, in the area of first-language acquisition.

**PSYCH 440(4400) The Brain and Sleep (also PSYCH 640[6400])**

Fall. 4 credits. Prerequisites: at least PSYCH 223 or BIONB 221. Recommended: additional course in biology, biopsychology, or neurobiology. S-U grades optional. Graduate students, see PSYCH 640. M. W. H. S. Porte.

Taking a comparative evolutionary perspective, this course examines the neural events that instigate, maintain, and disturb the states and rhythms of sleep in various species. Emphasizing human data where possible, special topics include sleep deprivation and the biological functions of sleep; biologically interesting deviations from normal sleep; and the cognitive neuroscience of sleep, including sleep's possible role in learning and memory.

**PSYCH 441(4410) Laboratory in Sleep Research (also PSYCH 642[6420])**

Spring. 4 credits. Lab fee: \$50. Graduate students, see PSYCH 641. W. H. S. Porte.

Emphasizing the neurobiology of sleep state, this course introduces students to the laboratory study of human sleep and its psychological correlates. Serving as both experimenter and subject, each student learns the physical rationale and techniques of electroencephalography and other bioelectric measures of behavioral state. Using computerized data analysis, students complete weekly laboratory reports and a collaborative term project. Sleep recordings are done during the day or evening when possible. In addition, overnight recording sessions are required.

**PSYCH 452(4520) Trauma and Treatment (also PSYCH 652[6520]) (SBA)**

Fall. 4 credits. Limited to 12 students; priority given to senior psychology and human development majors. Prerequisite: course work in both psychopathology and social development; permission of instructor by e-mail application during preregistration. Letter grades only. S. Bem.

An in-depth examination of psychological trauma and its treatment in psychotherapy. Special attention is given to the neuroscience of danger, defense, and emotional dysregulation, the effects of early traumatic attachment on development, the key role of dissociation, and an array of treatments including dialectical behavior therapy, play therapy, sensorimotor therapy, gestalt therapy, and psychoanalytic therapy.

**[PSYCH 465(4650) Topics in High-Level Vision (also COGST 465[4650], PSYCH 665[6650]) (KCM)]**

Spring. 4 credits. Graduate students, see PSYCH 665. Offered alternate years; next offered 2007-2008. S. Edelman.

High-level vision is a field of study concerned with functions such as visual object recognition and categorization, scene understanding, and reasoning about visual structure. It is an essentially cross-disciplinary endeavor, drawing on concepts and methods from neuroanatomy and neurophysiology, cognitive psychology, applied mathematics, computer science, and philosophy. This course concentrates on a critical examination of a collection of research publications, linked by a common thread, from the diverse perspectives offered by the different disciplines. Students write biweekly commentaries on the assigned papers and a term paper integrating the material covered in class.

**PSYCH 470(4700) Undergraduate Research in Psychology**

Fall or spring. 1-4 credits. Prerequisite: written permission from staff member who will supervise the work and assign grade must be included with course enrollment material. Students should enroll in section listed for that staff member; section list available from Department of Psychology. S-U grades optional. Staff.

Practice in planning, conducting, and reporting independent laboratory, field, and/or library research.

**PSYCH 471(4710) Advanced Undergraduate Research in Psychology**

Fall or spring. 1-4 credits. Prerequisite: written permission of staff member who will supervise work and assign grade must be included with course enrollment material. Students should enroll in section listed for that staff member; sec list available from Department of Psychology. S-U grades optional. Staff.

Advanced experience in planning, conducting, and reporting independent laboratory, field, and/or library research. One, and preferably two, semesters of PSYCH 470 is required. The research should be more independent and/or involve more demanding technical skills than that carried out in PSYCH 470.

**PSYCH 472(4720) Multiple Regression**

Spring, weeks 1-7. 2 credits. Prerequisite: one solid semester of introductory statistics. Recommended: analysis of variance. M. W. F. Staff.

Covers uses and pitfalls of multiple regression in causal analysis, path analysis, and prediction. Emphasis is on analyzing data collected under uncontrolled conditions. Includes collinearity, indicator variables, sets, adjusted and shrunken  $R^2$ , suppressors, hierarchical analysis, overcontrol, and experimental design. Students may use the Minitab, SPSS, Stata, SAS, or Systat statistics packages.

**PSYCH 473(4730) General Linear Model**

Spring, weeks 8-14. 2 credits. Prerequisite: PSYCH 472 or equivalent. M. W. F. Staff.

Topics include multicategorical variables, corrections for multiple tests, diagnostic methods, nonlinear relationships, interaction, main and simple effects, and basic power analysis. Student may use Minitab, SPSS, Stata, SAS, or Systat.

**PSYCH 478(4780) Parenting and Child Development (also PSYCH 678[6780], HD 444[4440]) (KCM)**

Fall. 4 credits. Limited to 25 students.

Intended for seniors and graduate students. Graduate students, see PSYCH 678. M. W. M. Goldstein.

Explores the influence of parenting skills and styles on the development of infants and children. By studying parents and their infants together, the family can be viewed as a system in which the members engage in reciprocal stimulation and regulation of learning and behavior. Patterns of interaction within a family serve as a source of developmental change in infants. Such a system is influenced by internal and external forces. This course examines internal factors such as the biology of parenting and mechanisms of social learning in infants. Also studies the influence of external factors on family life, such as socioeconomic status and changes in family structure (e.g. single vs. dual parenting). Finally, it examines and evaluates the role of



public policies and intervention strategies that impact parents and children.

**PSYCH 481(4810) Advanced Social Psychology (also PSYCH 681[6810])**

Fall. 4 credits. Limited to 15 students, by application. Priority given to senior psychology majors. Graduate students, see PSYCH 681. T R. D. T. Regan.

Selected topics in social psychology are examined in depth with an emphasis on the relationship between experimental research and the development of theory. Readings are mostly primary sources. Among the theoretical approaches to social behavior we may discuss are social comparison theory, cognitive dissonance, attribution processes and social judgment, dramaturgy and impression management, and evolutionary perspectives.

**PSYCH 482(4820) Automaticity (also PSYCH 682[6820]) (SBA)**

Spring. 4 credits. Prerequisites: PSYCH 280; at least one course in cognitive psychology or permission of instructor. R. M. Ferguson.

What is automaticity? This is a topic that has gained considerable momentum in social psychology over the past 10 to 15 years and has been broadly applied to classic social psychological phenomena, including judgments, attitudes, emotion, motivation, and behavior. The crux of this momentum has been the controversial argument that such phenomena can occur without a person's awareness, intention, effort, or control. Although there is an abundance of empirical work on this topic, there still remain a number of unanswered and interesting questions. The objective of the course is twofold. The first is for students to learn the automaticity literature in social psychology; the second is to identify such critical questions, and speculate on possible answers. The course reviews the wide range of theoretical and empirical work on automaticity and examines contemporary definitions of automaticity within social and other areas of psychology. The analysis of automaticity is necessarily closely linked with issues such as unconscious vs. conscious processing, attention, control, intentionality, and free will.

**PSYCH 489(4890) Seminar: Beliefs, Attitudes, and Ideologies (also PSYCH 689[6890], FGSS 488[4880]) (CA)**

Fall. 4 credits. Prerequisites: admission by application during spring pre-registration period for fall semester. Priority given to juniors, seniors, and graduate students. M. D. J. Bem.

Course in cultural analysis examining the properties of beliefs and attitudes, how they are formed and changed, the psychological functions they serve, and how they get organized into ideologies. Several specific issues involved in America's "culture wars" are examined, such as abortion, gender, sexual orientation, and affirmative action. Other topics include deaf culture, utilitarian ethics, and the ideology of science. Participants write weekly commentaries on the readings and a term paper examining a particular ideology.

**PSYCH 491(4910) Research Methods in Psychology (also COGST 491[4910], PSYCH/COGST 691[6910])**

Spring. 4 credits. Limited to 20 students. Recommended: permission of instructor, PSYCH 350, upper-division psychology courses, or graduate standing. Graduate students, see PSYCH 691. T R. D. A. Dunning.

An intensive examination of the basic research methods used in social, personality, cognitive, and developmental psychology. The course focuses on designing and conducting experiments, i.e., how to turn vague theories into concrete and testable notions, evaluate studies, avoid common pitfalls, and, finally, remain ethical. Beyond learning methods of "correct" and rigorous experimentation, students also discuss what makes a research study interesting. The course in addition, covers test construction, survey methods, and "quasi experiments." Students concentrate on completing a small research project in which they conduct an experiment, interpret its data, and write up the results.

**PSYCH 492(4920) Sensory Function (also BIONB 492[4920], PSYCH 692[6920]) (PBS)**

Spring. 4 credits. Limited to 25 students. Prerequisite: 300-level neuroscience course, or BIONB 222 or BIOAP 311, or equivalent; knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Graduate students, see PSYCH 692. M W F. Offered alternate years. B. P. Halpern and H. C. Howland.

In general, this course has covered classical topics in sensory function such as vision, hearing, touch, and balance, as well as some more modern topics like sensory processing, location of stimulus sources in space, the development of sensory system, and nonclassical topics such as electroreception and internal chemoreceptors.

**Advanced Courses and Seminars**

Advanced seminars are primarily for graduate students, but with the permission of the instructor they may be taken by qualified undergraduates. The selection of seminars to be offered each semester is determined by the needs of the students.

A supplement describing these advanced seminars is available at the beginning of each semester and can be obtained from the department office (211 Uris Hall). The following courses may be offered either semester and carry 4 credits unless otherwise indicated.

**PSYCH 510-511(6100-6110) Perception**

**PSYCH 512-514(6120) Visual Perception**

**PSYCH 518(6181) Topics in Psycholinguistics**

**PSYCH 519-520(6830) Affects and Cognition (also NRE 507)**

Fall. 4 credits. A. M. Isen.

**PSYCH 521(6210) Behavioral and Brain Sciences**

Fall and spring. 4 credits each semester.

**PSYCH 522(6220) Topics in Perception and Cognition**

**PSYCH 523(6230) Hormones and Behavior**

**PSYCH 527(6270) Topics in Biopsychology**

**[PSYCH 530(6300) Structure in Vision and Language (also COGST 530[6300], LING 530[5530], COM S 393)**

Spring. 4 credits. Graduate seminar. Limited to 20 graduate students. Prerequisites: graduate standing; course each in cognitive psychology, linguistics,

computer science, or permission of instructor. Offered alternate years; next offered 2007-2008. S. Edelman.

One of the central puzzles of cognition is the manner in which brains deal with structured information such as scenes composed of a variety of objects, or sentences composed of words and phrases. The processing of structure by the brain is constrained by the neuronal architecture, as well as by general principles of information processing that are studied in computer science. This course focuses on insights from these different disciplines, striving for understanding couched in abstract computational terms, yet compatible with the basic neurobiological constraints, with behavioral data, and with philosophical intuition.]

**PSYCH 535(6350) Evolutionary Perspectives on Behavior**

**PSYCH 541(6410) Statistics in Current Psychological Research**

**[PSYCH 550(6500) Special Topics in Cognitive Science (also COGST 550)]**

Spring. 4 credits. Next offered 2007-2008. M. Spivey.]

**PSYCH 580(6800) Experimental Social Psychology**

**PSYCH 600(6000) General Research Seminar**

Fall or spring. 0 credits.

**PSYCH 605(6050) Perception (also PSYCH 205[2050])**

Spring. 4 credits. Non-arts graduate students only. T R. J. E. Cutting.

**PSYCH 612(6120) Laboratory in Cognition and Perception (also PSYCH 412[4120])**

Spring. 4 credits. M W. D. J. Field.

**PSYCH 613(3150) Obesity and the Regulation of Body Weight (also NS 315[3150])**

Spring. 3 credits. Limited to 30 students. Prerequisites: one course each in psychology and nutrition; undergraduates by permission of instructor. S-U grades optional. Offered alternate years. T R. D. A. Levitsky.

Multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, the genetics of obesity, the role of activity and energy metabolism, psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.

**PSYCH 614(6140) Cognitive Psychology (also PSYCH 214[2140], COGST 214[2140], COGST 614[6140])**

Fall. 3 credits. M W. F. S. Edelman.

**PSYCH 616(6160) Modeling Perception and Cognition (also PSYCH 416[4160], COGST 416[4160])**

Spring. 4 credits. M. Spivey.

**PSYCH 618(6180) Psychology of Music (also PSYCH 418[4180], MUSIC 418[4181])**

Spring. 4 credits. M W. C. Krumhansl.

**PSYCH 625(6250) Cognitive Neuroscience (also PSYCH 425[4250])**

Fall. 4 credits. M W. F. B. L. Finlay.

**PSYCH 626(6260) Evolution of Human Behavior (also PSYCH 326[3260])**  
Spring. 4 credits. T R. R. E. Johnston.

**[PSYCH 627(6270) Evolution of Language (also COGST/PSYCH 427[4270])]**  
Fall. 3 credits. Next offered 2007-2008.  
M. Christiansen.]

**[PSYCH 628(6280) Connectionist Psycholinguistics (also PSYCH 428[4280], COGST 428[4280])]**  
Fall. 3 credits. Next offered 2008-2009.  
W. M. Christiansen.]

**[PSYCH 629(6290) Olfaction and Taste: Structure and Function (also PSYCH/BIONB 429[4290])]**  
Spring. 4 credits. T R. Next offered 2007-2008. B. P. Halpern.]

**PSYCH 630(6300) Moral Reasoning**  
Spring. 4 credits. T R. D. Pizarro.

**PSYCH 631(6310) Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431[4310], BIONB 421[4210])**  
Fall. 4 credits. T R. B. P. Halpern.

**PSYCH 632(6320) Biopsychology of Learning and Memory (also PSYCH 332[3320], BIONB 328[3280])**  
Spring. 4 credits. M W F. T. J. DeVogd.

**PSYCH 640(6400) The Brain and Sleep (also PSYCH 440[4400])**  
Fall. 4 credits. M W. H. S. Porte.

**PSYCH 641(6410) Laboratory in Sleep Research (also PSYCH 441[4410])**  
Spring. 4 credits. W. H. S. Porte.

**PSYCH 642(6420) Human Perception: Applications to Computer Graphics, Art, and Visual Display (also PSYCH/COGST 342[3420], VISST 342[3342])**  
Fall. 4 credits. T R. D. J. Field.

**PSYCH 652(6520) Trauma and Treatment (also PSYCH 452[4520])**  
Fall. 4 credits. S. Bem.

**[PSYCH 665(6650) Topics in High-Level Vision (also PSYCH 465[4650], COGST 465[4650], COM S 392[4110])]**  
Spring. 4 credits. Next offered 2007-2008.  
S. Edelman.]

**PSYCH 678(6780) Parenting and Child Development (also PSYCH 478[4780], HD 444[4440])**  
Fall. 4 credits. M. Goldstein.

**PSYCH 681(6810) Advanced Social Psychology (also PSYCH 481[4810])**  
Fall. 4 credits. T R. D. T. Regan.

**PSYCH 682(6820) Automaticity (also PSYCH 482[4820])**  
Spring. 4 credits. R. M. Ferguson.

**PSYCH 689(6890) Seminar: Beliefs, Attitudes, and Ideologies (also PSYCH 489[4890])**  
Fall. 4 credits. M. D. J. Bem.

**PSYCH 691(6910) Research Methods in Psychology (also PSYCH 491[4910], COGST 491[4910])**  
Spring. 4 credits. T R. D. A. Dunning.

**PSYCH 692(6920) Sensory Function (also PSYCH/BIONB 492[4920])**  
Spring. 4 credits. M W F. B. P. Halpern and H. C. Howland.

**[PSYCH 696(6960) Introduction to Sensory Systems (also PSYCH/BIONB 396[3960])]**  
Spring. 4 credits. M W F. Next offered 2009-2010. B. P. Halpern.]

**PSYCH 700(7000) Research in Biopsychology**

**PSYCH 709(7090) Developmental Psychology (also PSYCH 209[2090])**  
Spring. 4 credits. M W. M. Goldstein.

**PSYCH 710(7100) Research in Human Experimental Psychology**

**PSYCH 713(7130) Information Processing: Conscious and Nonconscious**  
Spring. 4 credits. R. Staff.

**[PSYCH 714(7140) Comparative Cognition (also PSYCH/COGST 414[4140])]**  
Spring. 4 credits. T R. Next offered 2007-2008. Staff.]

**[PSYCH 716(7160) Auditory Perception (also PSYCH 316[3160])]**  
Fall. 4 credits. M W. Next offered 2007-2008. C. L. Krumhansl.]

**PSYCH 720(7200) Research in Social Psychology and Personality**

**PSYCH 722(7220) Hormones and Behavior (also PSYCH/BIONB 322[3220])**  
Fall. 4 credits. M W F. E. A. Regan.

**PSYCH 726(7260) Learning Language (also PSYCH/COGST 426)**  
Spring. 4 credits. S. Edelman.

**PSYCH 775(7750) Proseminar in Social Psychology I**

Fall. 2 credits. Limited to 10 students.  
Prerequisite: graduate students in social psychology; permission of instructors.  
D. Dunning, M. Ferguson, T. Gilovich, D. Pizarro, and D. Regan.  
First semester of a yearlong discussion-seminar course intended to give graduate students an in-depth understanding of current research and theory in social psychology. Emphasizes social cognition, but other topics, such as group dynamics, social influence, the social psychology of language, and emotional experience, are covered.

**PSYCH 776(7760) Proseminar in Social Psychology II**

Spring. 2 credits. Limited to 10 students.  
Prerequisite: graduate students in social psychology; permission of instructors.  
D. A. Dunning, M. Ferguson, T. D. Gilovich, D. Pizarro, and D. T. Regan.  
Second semester of a yearlong discussion-seminar course intended to give graduate students an in-depth understanding of current research and theory in social psychology. Emphasizes social cognition, but other topics, such as group dynamics, social influence, the social psychology of language, and emotional experience are covered.

**PSYCH 900(9000) Doctoral Thesis Research in Biopsychology**

**PSYCH 910(9100) Doctoral Thesis Research in Human Experimental Psychology**

**PSYCH 920(9200) Doctoral Thesis Research in Social Psychology and Personality**

## Summer Session Courses

The following courses are also frequently offered in the summer session, though not necessarily by the same instructor as during the academic year. Not all of these courses are offered in a particular summer. Information regarding these courses and additional summer session offerings in psychology is available from the department before the end of the fall semester.

PSYCH 101 Introduction to Psychology: The Frontiers of Psychological Inquiry

PSYCH 102 Introduction to Cognitive Science

PSYCH 128 Introduction to Psychology: Personality and Social Behavior

PSYCH 199 Sports Psychology

PSYCH 223 Introduction to Biopsychology

PSYCH 280 Introduction to Social Psychology

PSYCH 350 Statistics and Research Design

## QUECHUA

See "Romance Studies."

## RELIGIOUS STUDIES MAJOR

D. Boucher, director; A. Blackburn, R. Brann, C. M. Carmichael, K. Clinton, J. Fajans, D. Fredericksen, D. Gold, S. Greene, K. Haines-Eitzen, J. S. Henderson, T. D. Hill, D. Holmberg, P. R. Hyams, C. V. Kaske, W. J. Kennedy, J. M. Law, S. MacDonald, K. S. March, L. Monroe, R. L. Moore, D. I. Owen, D. S. Powers, C. Robinson, P. S. Sangren, S. Toorawa, M. Washington, A. Willford

The Religious Studies Program, an academic unit providing a major in the scholarly study of religion, offers a wide variety of courses addressing various approaches to, and topics in, the study of religion.

The Religious Studies Program is designed to meet the needs of three classes of students: (1) students planning to pursue advanced degrees in the academic study of religion or allied disciplines or subdisciplines (e.g., history of religions, religion and literature, religion and psychology, ethics, theology, area studies); (2) students seeking courses on topics relating to religion to fulfill distribution requirements; and (3) students desiring a more systematic exposure to the academic study of religion as a significant component of a liberal arts education. To all students, our program offers an excellent opportunity to develop a deeper understanding and appreciation of the complex ways in which religious traditions inform human thought and behavior. The courses offered through our program are built on the established scholarly tradition of the study of religion as an academic, as opposed to confessional, pursuit. Religious traditions are explored in all of their complexity through comparative, contextual (in specific historical or cultural contexts), and thematic studies.

The program also hosts lecture series, conferences, symposia, and periodic social gatherings for faculty members and students throughout the academic year to foster a sense of intellectual community.

## The Major in Religious Studies

**Signing into the major:** To sign into the major in Religious Studies, a student must have completed at least one course in Religious Studies before scheduling an appointment with the program director. Here is the process:

1. Schedule an appointment with the director of the Religious Studies Program, whose name and e-mail address can be found on the Religious Studies web site.
2. In addition to a copy of the current Cornell transcript (the informal one students regularly receive is acceptable), students should bring to their meeting with the director all of these forms, available in the Religious Studies office, 409 White Hall:
  - a. a completed Religious Studies major application form
  - b. a proposed "course of study," which will be used as a guide in the student's conversation with the director and revised for formal submission to the program upon your entrance as a major
  - c. a College of Arts and Sciences advisor/major form, which will be signed by the director and advisor. The advisor will be assigned in the student's meeting with the director based on interest.

### Advising in the Religious Studies Program:

Upon entering the major in Religious Studies, a student is assigned a faculty advisor whose area of expertise most closely matches the proposed interest of the student. An up-to-date approved advisor list is available in the Religious Studies office. Note that not all faculty members who cross-list courses with RELST can serve as RELST advisors. Working closely with one's RELST advisor when selecting courses is an important component of this program, enabling students to fulfill the requirements for the major while creating an integrated and coherent course of study out of our large number of multidisciplinary course offerings.

To graduate as a major in Religious Studies, a student must (1) complete with letter grades the program's three core courses, RELST 250 Introduction to Asian Religions, RELST 251 Introduction to Judaism, Christianity, and Islam, and RELST 449 History and Methods of the Academic Study of Religion; and (2) complete with letter grades seven additional courses approved for the major.

Students must complete 10 courses cross-listed with Religious Studies:

### Three Core Courses:

RELST 250 Introduction to Asian Religions

RELST 251 Introduction to Judaism, Christianity, and Islam

RELST 449 History, Theory, and Methods in the Academic Study of Religion

The requirement for either or both RELST 250/251 may be satisfied by taking two or more courses in the relevant traditions with some attention to breadth:

The requirement for RELST 250 may be satisfied by taking at least one course on South Asian traditions AND one course on East Asian traditions.

The requirement for RELST 251 may be satisfied by taking at least one course in each of two or more of the traditions of Near Eastern origin (Judaism, Christianity, and Islam).

Absolutely no student will be exempted from RELST 449.

### Seven Additional Courses

In selecting their additional courses for the major, students are expected to consult closely with their advisors to ensure that their programs have adequate breadth in Religious Studies generally and depth in a particular tradition, cultural area, or approach to the field.

Most courses approved for the major are offered by cooperating departments within the College of Arts and Sciences. A comprehensive up-to-date list of these courses is maintained at the office of the Religious Studies Program, 409 White Hall.

## Graduating with Honors in Religious Studies:

### GENERAL INFORMATION

1. **Eligibility.** 3.0 cumulative average and 3.5 average inside the major with no grade in the major below B-. Program director notifies eligible candidates during the spring semester of the junior year or before commencement of final year.
2. **Honors Courses.** Candidates must sign into RELST 495 Senior Honors Essay for 8 credits (two courses) for two semesters. After the first semester, an R in the transcript indicates that this course (usually for 8 credits) is a yearlong course. When the project is completed at the end of the second semester, the grade recorded counts for all 8 credits. (The 8-credit limit is the result of the conviction/belief that earning more than 8 credits for a single "piece" of one's undergraduate education is unwise.)

The student submits the honors proposal (with and according to the program's instruction/cover sheet) to the Religious Studies administrator before the end of the spring semester of the junior year, or not later than Sept. 15 of the final year. The administrator then approves the student's signing into the honors courses.

3. **Honors Committee—three faculty members.** While students are required to have three faculty members on their committee at the time of the submission of the final draft, only two of them must be identified when the proposal is submitted. In the event the advisor is on leave, the program will assign a committee member from the list of approved RELST advisors. The three members should be:
  - a. The professor who has agreed to work closely with the student over the year and to be the supervisor/grader of the project is chair of the committee.
  - b. The student's Religious Studies major advisor (required)
  - c. Another knowledgeable faculty member
 Sometimes the advisor is the supervisor/chair. If that is the case, the student needs two additional knowledgeable professors for the committee of three.

## Courses Approved for the Major Sponsored by Religious Studies

**RELST 133-134(1211-1212) Introduction to Qur'anic and Classical Arabic (also NES 133-134[1211-1212])**

133, fall; 134, spring. 4 credits. M. Younes. For description, see NES 133-134.

**[RELST 202(2105) The Greek New Testament (also CLASS 202[2105])**

Spring. 3 credits. Prerequisites: at least one year of Ancient Greek (CLASS 101-103 or 104, or permission of instructor). Next offered 2008-2009. E. Rebillard. For description, see CLASS 202.]

**[RELST 211(2110) SSP: Black Religious Traditions: Sacred and Secular (also AM ST 251[2110], HIST 211[2110])**

Fall. 4 credits. Next offered 2007-2008. M. Washington. For description, see HIST 211.]

**RELST 214(2212) Qur'an and Commentary (also NES 214[2212])**

Spring. 3 credits. D. Powers. For description, see NES 214.

**RELST 215(2150) SSP: Crusade, Heresy, and Inquisition in the Medieval Mediterranean (also HIST 214[2141]) (CA)**

Spring. 4 credits. Limited to 15 students. P. Hyams. For description, see HIST 214.

**RELST 223(2623) Introduction to the Hebrew Bible (also NES/JWST 223[2623])**

Fall. 3 credits. L. Monroe. For description, see NES 223.

**RELST 226(2646) Atheism Then and Now (also CLASS 226[2646])**

Spring. 3 credits. J. Coleman. For description, see CLASS 226.

**[RELST 237(2607) Greek Religion and Mystery Cults (also CLASS 237[2607])**

Spring. 3 credits. Next offered 2007-2008. K. Clinton. For description, see CLASS 237.]

**RELST 242(2420) Religion and Politics in American History (also HIST/AM ST 242[2420])**

Spring. 4 credits. Sophomore seminar. Limited to 15 students. Prerequisite: permission of instructor. R. L. Moore. For description, see HIST 242.

**RELST 244(2644) Introduction to Ancient Judaism (also NES/JWST 244[2644])**

Spring. 3 credits. L. Monroe. For description, see NES 244.

**RELST 250(2250) Introduction to Asian Religions (also ASIAN 250[2250])**

Spring. 3 credits. J. M. Law. For description, see ASIAN 250.

**RELST 251(2651) Holy War, Crusade, and Jihad (also HIST 269[2691], NES 251[2651], JWST 251[2651])**

Fall. 3 credits. R. Brann. For description, see NES 251.

**RELST 255(2655) Introduction to Islamic Civilization (also NES 255[2655], HIST 253[2530])**

Fall. 3 credits. D. Powers. For description, see NES 255.

**RELST 261(2662) Daily Life in the Biblical World (also ARKEO 260[2662], JWST/NES 262[2662])**

Fall. 3 credits. J. Zorn.  
For description, see NES 262.

**RELST 262(2630) Religion and Reason (also PHIL 263[2630])**

Spring. 4 credits. S. MacDonald.  
For description, see PHIL 263.

**RELST 265(2565) SSP: Law, Society, and Culture in the Middle East (also NES 265[2565], HIST 222[2220])**

Spring. 3 credits. D. Powers.  
For description, see NES 265.

**RELST 266(2666) Jerusalem Through the Ages (also NES/JWST/ARKEO 266[2666])**

Spring. 3 credits. J. Zorn.  
For description, see NES 266.

**RELST 277(2277) Meditation in Indian Culture (also ASIAN 277[2277])**

Spring. 3 credits. D. Gold.  
For description, see ASIAN 277.

**RELST 326(3260) Christianity and Judaism (also COM L 326[3260])**

Spring. 4 credits. C. Carmichael.  
For description, see COM L 326.

**RELST 328(3280) Literature of Old Testament (also COM L 328[3280])**

Fall. 4 credits. C. Carmichael.  
For description, see COM L 328.

**[RELST 332(3644) Sages and Saints/Ancient World (also HIST 338[3644], CLASS 332[3644]) (HA)]**

Spring. 4 credits. Next offered 2008-2009.  
E. Rebillard.  
For description, see CLASS 332.]

**[RELST 333(3643) Greek and Roman Mystery Cults and Early Christianity (also CLASS 333[3643])]**

Fall. 4 credits. Next offered 2007-2008.  
K. Clinton.  
For description, see CLASS 333.]

**[RELST 347(3347) Tantric Traditions (also ASIAN 347[3347])]**

Fall. 4 credits. Next offered 2007-2008.  
D. Gold.]

**[RELST 348(3348) Indian Devotional Poetry (also ASIAN 348[3348])]**

Spring. 4 credits. Next offered 2007-2008.  
D. Gold.]

**RELST 351(3351) Indian Religious Worlds (also ASIAN 351[3351])**

Fall. 4 credits. D. Gold.  
For description, see ASIAN 351.

**[RELST 354(3354) Indian Buddhism (also RELST 654[6654], ASIAN 354/654[3354/6654])]**

Fall. 4 credits. Next offered 2007-2008.  
D. Boucher.]

**RELST 355(3355) Japanese Religions: A Study of Practice (also ASIAN 355[3355])**

Fall. 4 credits. J. M. Law.  
For description, see ASIAN 355.

**[RELST 359(3359) Japanese Buddhism (also ASIAN 359[3359])]**

Spring. 4 credits. Next offered 2007-2008.  
J. M. Law.  
For description, see ASIAN 359.]

**RELST 368(3680) Marriage and Sexuality in Medieval Europe (also HIST/FGSS 368[3680])**

Fall. 4 credits. P. Hyams.  
For description, see HIST 368.

**[RELST 405(4665) Augustine's Confessions (also CLASS 405[4665])]**

Spring. 4 credits. Next offered 2008-2009.  
C. Brittain.  
For description, see CLASS 405.]

**RELST 410(4100) Latin Philosophical Texts (also PHIL 410[4100])**

Spring. Variable credit. Prerequisite: knowledge of Latin and permission of instructor. Staff.  
For description, see PHIL 410.

**RELST 420(4720) Biblical Hebrew Prose—Joshua (also NES/JWST 420[4720])**

Fall. 4 credits. L. Monroe.  
For description, see NES 420.

**[RELST 421(4421) Religious Reflections on the Human Body (also ASIAN 421[4421])]**

Spring. 4 credits. Next offered 2008-2009.  
J. M. Law.  
For description, see ASIAN 421.]

**RELST 424(4240) The Sexual Politics of Religion (also FGSS 429/629) (CA)**

Spring. 4 credits. L. Ramberg.  
For description, see FGSS 429.

**RELST 426(4260) New Testament Seminar (also COM L 426[4260])**

Spring. 4 credits. C. Carmichael.  
For description, see COM L 426.

**RELST 427(4280) Biblical Seminar (also COM L 428[4280])**

Fall. 4 credits. C. Carmichael.  
For description, see COM L 428.

**[RELST 429(4290) Adam's Rib and Other Divine Signs: Reading Biblical Narrative (also ENGL 429[4290])]**

Spring. 4 credits. Next offered 2007-2008.  
L. Donaldson.]

**[RELST 441(4441) Mahayana Buddhism (also ASIAN 441[4441])]**

Spring. 4 credits. Next offered 2007-2008.  
D. Boucher.]

**RELST 445(4545) Gender, Sex, and Body—Late Antiquity (also NES 445[4545], FGSS 447[4470]) (CA)**

Fall. 4 credits. K. Haines-Eitzen.  
For description, see NES 445.

**RELST 449(4449) History and Methods of the Academic Study of Religion (also ASIAN 449[4449])**

Spring. 4 credits. Requirement for Religious Studies majors. D. Boucher.  
For description, see ASIAN 449.

**[RELST 450(4500) Rescreening the Holocaust (also GERST 449[4490], COM L 453[4530])]**

Fall. 4 credits. Next offered 2008-2009.  
D. Bathrick.  
For description, see THETR 450.]

**RELST 457(4657) Formation of Islamic Law (also NES 457[4657], HIST 453[4530])**

Fall. 4 credits. D. Powers.  
For description, see NES 457.

**RELST 460(4460) Indian Meditation Texts (also ASIAN 460[4460])**

Fall. 4 credits. D. Gold.  
For description, see ASIAN 460.

**[RELST 475(4625) Christianization/Roman World (also CLASS 475[4625], HIST 483[4831])]**

Fall. 3 credits. Next offered 2008-2009.  
E. Rebillard.  
For description, see CLASS 475.]

**RELST 489(4489) Religion and Sustainability (also ASIAN 489) (CA)**

Fall. 4 credits. J. M. Law.  
For description, see ASIAN 489.

**RELST 490-491(4990-4991) Directed Study**

490, fall; 491, spring. 2-4 credits each semester. For majors in Religious Studies; permission of director required. Staff.

**RELST 495(4995) Senior Honors Essay**

Fall and spring (two semesters). 8 credits. Requirement for honors in Religious Studies. Staff.

**[RELST 650(6650) Seminar on Asian Religions (also ASIAN 650[6650])]**

Fall. 4 credits. Limited to 10 students. Prerequisite: graduate standing. Reading knowledge of modern Japanese desirable. Next offered 2007-2008. J. M. Law.  
For description, see ASIAN 650.]

**[RELST 654(6654) Indian Buddhism (also RELST 354[3354], ASIAN 354/654[3354/6654])]**

Fall. 4 credits. Next offered 2007-2008.  
D. Boucher.  
For description, see ASIAN 354/654.]

Additional courses offered by cooperating departments may also be approved through petition for the major in Religious Studies. For details see the program director, whose name and e-mail address can be found on the Religious Studies web site.

## ROMANCE STUDIES

T. Alkire, S. Amigo-Silvestre, M. Arellano, I. Auffret, M. Baraldi, K. Bättig von Wittelsbach, A. Berger, B. Bosteels, T. Campbell, F. Cervesi, D. Castillo (chair), E. Dozier (associate chair for language instruction), C. Dye, M. A. Garcés, M. Greenberg, L. Horne, C. Howie, Z. Iguina, R. Klein, C. Lawless, P. Lewis, S. LoBello, K. Long, J. Luks, N. Maldonado-Méndez, T. McNulty, L. Meza-Riedewald, M. Migiel, L. Morató-Peña, J. Oliveira, J. E. Paz-Soldán (director of graduate study), S. Pinet, K. Proux-García, M. K. Redmond, J. R. Resina, J. M. Rodríguez-García, J. Routier-Pucci, E. Sánchez-Blake, C. Sparfel, S. Stewart-Steinberg, A. Stratakis-Tiód, M. Stycos, B. Teutli, S. Tun, M. C. Vallois, C. Waldron. Emeriti: C. Morón Arroyo, J. Béraud, A. Colby-Hall, N. Furman, A. Grossvogel, D. I. Grossvogel, A. Seznec. Adjunct Associate Professor: S. Tarrow. Visiting: L. Dubreuil, J. A. Hernandez, L. Ferri

The Department of Romance Studies offers courses in the following areas: Catalan, French, Hispanic, Italian, and Luso-Brazilian literatures; Catalan, French, Italian, Portuguese, Quechua, and Spanish language; Francophone, Italian, Luso-Brazilian, and Hispanic cultures; and linguistics and semiotics. Through its course

offerings and opportunities for independent study, the department seeks to encourage study of the interactions of the Romance literatures among themselves, with other literatures, and with other fields of inquiry.

## Catalan

### CATAL 121-122(1210-1220) Elementary Catalan

121, fall; 122, spring. 4 credits each semester. 121 must be taken before 122. Recommended: knowledge of another Romance language. Fall: A. Puig-Herz; spring: W. Viestenz.

Catalan is a Romance language spoken by some 10 million people in four European states (Andorra, France, Italy, and Spain). This course provides a thorough grounding in all language skills: speaking, listening, reading, and writing, and is designed to provide students with the basis for establishing linguistic contact with Catalan culture.

## French

T. Alkire, A. Berger, C. Dye, M. Greenberg, C. Howie, R. Klein, P. Lewis, S. LoBello, K. Long, J. Luks, T. McNulty, K. Proux-Garcia, C. Sparfel, S. Tun, M. C. Vallois, C. Waldron. Emeriti: J. Béreaud, A. Colby-Hall, N. Furman, D. I. Grossvogel, A. Seznec. Adjunct Associate Professor: S. Tarrow. Visiting: L. Dubreuil, L. Ferri

## The Major

The major in French is divided into two options: French cultural studies and French literature. While prospective majors should try to plan their programs as far ahead as possible, especially if they intend to study abroad, no student will be refused admission to the major merely because of a late start. See the director of undergraduate studies, Professor Kathleen Long (kp12@cornell.edu), 320 Morrill Hall. This consultation is especially important for finding out what sequence of courses will follow the current choice of courses.

We are currently not admitting new students to the French linguistics major. Students having such interests should apply for admission through the field of linguistics. Courses in general Romance linguistics are offered.

## French Literature

This option is designed to give students mastery of the oral and written language, as well as knowledge and understanding of French and Francophone literatures and cultures, and to develop their skills in literary analysis.

To be admitted to the major, a student should have completed FRLIT 221 and FRROM 219 or equivalent.

To complete the major, a student must:

1. Acquire advanced knowledge of and competence in French language. This competence is demonstrated by the successful completion of FRROM 301 Advanced French I or FRROM 305 French through Film (\*\*only one may be taken for credit) or a properly accredited study abroad or the passing of a special language test (the CASE examination) or the permission of the major advisor or of the director of undergraduate studies.

2. Take the two core courses for the major: FRLIT 321 Readings in Modern French Literature and Culture; FRLIT 322 Readings in Early Modern French Literature and Culture.
3. Take five or more additional courses at the 300-level or above, including
  - One course on Francophone Literature or culture
  - One course on French Literature or culture pre-1789
  - One course at the 400-level
  - Three courses conducted in French (i.e., no more than two courses conducted in English may be counted toward the major), and
  - Up to two courses offered by a department other than Romance Studies (for example Comparative Literature, History, Linguistics, Philosophy, Art History, or Visual Studies), provided the course includes a significant (at least 50 percent) French component.

## French Cultural Studies

This option is designed to give students mastery of the oral and written language, as well as a broader knowledge of French and Francophone culture in an interdisciplinary context.

To be admitted to the major, a student should have completed FRLIT 221 and FRROM 219 or equivalent.

To complete the major, a student must

- Acquire advanced knowledge of and competence in French language. This competence is demonstrated by the successful completion of FRROM 301 Advanced French I or FRROM 305 French through Film (\*\*only one may be taken for credit), or a properly accredited study abroad or the passing of a special language test (the CASE examination) or the permission of the major advisor or of the director of undergraduate studies.
- Take one of the core courses for the major: FRLIT 320 Introduction to the 21st Century; FRLIT 321 Readings in Modern French Literature and Culture, or FRLIT 325 Being French (all may be taken for credit, but only one is required)
- Take six or more additional courses at the 300-level or above, including
  1. One course on French literature or culture pre-1789
  2. One course at the 400-level
  3. Three courses offered by the Department of Romance Studies
  4. Three courses conducted in French (i.e., no more than three courses conducted in English may be counted toward the major) and
  5. Up to three courses offered by a department other than Romance Studies (for example History, Government, Philosophy, Art History, Comparative Literature, or Visual Studies), provided the courses includes a significant (at least 50%) French component.

## Administration of the French Major

Students are admitted to the major by the director of undergraduate studies in the French section of the Department of Romance Studies but are guided by their individual advisors. A copy of each student's program is given to the director of undergraduate studies for approval and safe-keeping.

## Concentration in French Studies

At Cornell, a concentration is the functional equivalent of a minor. Its purpose is to supplement a student's major with a complementary focus or concentration that is indicated on the graduate's transcript. The concentration in French Studies, organized by the interdisciplinary Program in French Studies, is designed to be compatible with all kinds of majors and is open to students in all the undergraduate colleges. The concentration promotes broad understanding of French culture, as well as Francophone literatures, societies, and their political/economic systems; it also encourages students to refine and practice their language skills. Students pursuing the concentration must attain proficiency (by taking a placement exam or completing a 200-level course in French) and must take the core course The French Experience (FRLIT 224 or HIST 270) or an approved equivalent of the core course (approved alternatives will be listed on the program web site). Students may also petition the program director to use an advanced course conducted in French as their core course. Completion of the concentration requires, in addition to the core, three non-language courses on French and Francophone topics. Only one of the four courses required for the concentration can be taken S-U.

Applications for the concentration are accessible at the French Studies web site, [www.einaudi.cornell.edu/french\\_studies/about/index.asp](http://www.einaudi.cornell.edu/french_studies/about/index.asp) and should be submitted to the Institute for European Studies (120 Uris Hall) or to Bonnie Bailey at [bab3@cornell.edu](mailto:bab3@cornell.edu).

## Study Abroad in France

French majors or other interested students may study in France for one or two semesters during their junior year. Opting for one of several study-abroad plans recognized by the Departments of Romance Studies and Linguistics facilitates the transfer of credit. Information about these plans is available from the director of undergraduate studies.

Students must be Cornell undergraduates with a strong academic record. The minimum French preparation is the completion of FRROM 219 or its equivalent in advanced credit or placement by the Cornell CASE examination. Taking FRROM 301 and/or 312 is, however, strongly recommended.

Students interested in studying in France are encouraged to consider the special benefits offered by EDUCO, the program in Paris cosponsored by Cornell, by Emory, and by Duke University. EDUCO offers advanced students a challenging course of study and the experience of total immersion in French life and culture in Paris. Participants in this program spend the year or semester as fully matriculated students at the University of Paris VII and other institutions of higher learning in Paris, including the Institut d'Etudes Politiques (Sciences Po), selecting courses in many fields from the regular university course offerings.



Students begin the academic year with an intensive three-week orientation in French history, society and daily life. While it is possible to enroll in the EDUCO Program for one semester, admission will be given first to students planning to study abroad for the full academic year.

EDUCO maintains a center in Paris with appropriate support staff. The resident director, chosen annually from the Cornell, Emory, and Duke faculties, teaches a special seminar each semester, provides academic advice, and helps ensure the quality of the courses. The center, which includes a small library and word-processing facilities, is regularly used by students for special tutorials, seminars, and lectures, as well as informal gatherings.

**Honors.** The honors program encourages well-qualified students majoring in French literature and culture to do independent work in French outside the structure of courses. The preparation of the senior honors essay, generally spread over two semesters, provides a unique learning opportunity, since it allows for wide reading and extensive rewriting to a degree not possible in the case of course papers.

To be eligible for honors, students must have a general grade point average of at least 3.00 and a grade point average of at least 3.5 in the French major.

No special seminars or courses are required of honors students, but they will have regular meetings with the faculty advisors who have agreed to supervise their work. They may receive course credit by enrolling in FRLIT 429-430, but these independent study courses must be taken in addition to the courses that meet the minimum requirements for the major. At the end of the senior year, each honors student is examined orally on the honors essay by a jury consisting of his or her faculty advisor and two other faculty members. The senior essay is to be made available for reading by the jury on or before April 15. The awarding of honors is determined by the student's grades in the major and the quality of the honors essay.

## Language

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance at the first scheduled class session. Because of the high demand for language courses, a student who fails to attend the first class meeting will be dropped so others may register.

*Note: Students placed in the 200-level courses have the option of taking language and/or literature courses; see listings under "Literature" for descriptions of the literature courses, some of which may be taken concurrently with FRROM 206, 209, or 219.*

### FRROM 121-122(1210-1220) Elementary French

121, fall; 122, spring. 4 credits each semester. Prerequisites: for 121, no experience in French or LPF lower than 37 or SAT II lower than 410; for 122, LPF 37-44 or SAT II 410-480. FRROM 121. Fall: J. Luks (course coordinator) and staff; spring: J. Luks (course coordinator), S. Tun, and staff.

Provides a thorough grounding in the language and insights into French language and francophone cultures so that students

can function in basic situations in a French-speaking culture. Small classes provide intensive, context-specific practice in speaking, reading, writing, and listening comprehension.

### FRROM 123(1230) Continuing French

Fall or spring. 4 credits. Prerequisite: FRROM 122 or LPF 45-55 or SAT II 490-590. Recommended courses after FRROM 123: FRROM 206 or 209. Fall: K. Proux-García (course coordinator) and staff; spring: K. Proux-García.

All-skills course designed to improve pronunciation, oral communication, and reading ability; to establish a groundwork for correct writing; and to provide a substantial grammar review. The approach encourages the student to see the language within the context of its culture.

### FRROM 206(2060) French Intermediate Reading and Writing

Fall. 4 credits. *Satisfies Option 1.* Prerequisite: FRROM 123, LPF 56-64, or SAT II 600-680. Conducted in French. Recommended courses after FRROM 206: FRROM 219 or FRLIT 221. Students who have taken FRROM 209 are not eligible to take FRROM 206 for credit. S. Tun.

Designed for students who want to focus on their reading and writing skills. Emphasizes grammar review and expansion, vocabulary development, and appreciation of different styles of language. Diverse text types are used, including a contemporary novel and student-selected material.

### FRROM 209(2090) French Intermediate Composition and Conversation I

Fall, spring, or summer. 4 credits. *Satisfies Option 1.* Prerequisite: FRROM 123, LPF 56-64, or SAT II 600-680. Recommended courses after FRROM 209: FRROM 219 or FRLIT 221. Students who have taken FRROM 206 are not eligible to take FRROM 209 for credit. Fall: C. Sparfel (course coordinator), C. Dye, C. Waldron, and staff; spring: C. Sparfel (course coordinator), C. Dye, and staff; summer: C. Waldron.

Designed to strengthen grammar skills; improve reading, speaking, and writing ability; and help students become independent learners.

### FRROM 210(2100) Pronunciation of Standard French

Spring. 3 credits. Prerequisites: FRROM 206 or 209 or higher, CASE Q+, or permission of instructor. This course cannot be used to fulfill the language requirement. T. Alkire.

Intermediate-level course focusing on accent reduction. Students learn how to transcribe French sounds while simultaneously engaging in systematic listening and pronunciation exercises. The exercises target vowels, consonants, and basic intonational patterns. Expressive intonation may be addressed near the end of the semester if time permits. Class work includes memorization of short dialogues and scenes from films. Students achieve better pronunciation, greater fluency, and increased self-assurance in spoken French by the end of the course.

### FRROM 219(2190) French Intermediate Composition and Conversation II

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: FRROM 206 or 209, or permission of instructor, or Q+ on Cornell

Advanced Standing Examination (CASE). Conducted in French. Recommended courses after FRROM 219: FRLIT 221. FRROM 301 or 305. FRROM 219 may be taken concurrently with FRLIT 221. Fall: S. LoBello and staff; spring: S. LoBello (course coordinator), K. Proux-García, and staff.

Emphasizes improving grammatical accuracy and enriching vocabulary in oral and written expression of French. Varied types of reading including newspaper articles. Short videos, films, and presentations by students, provide the basis for writing assignments and class discussions. Themes and emphases may vary from section to section.

### FRROM 300(3000) Directed Studies

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

### FRROM 301(3010) Advanced French (I)

Fall or spring. 4 credits. *Satisfies Option 1.* Requirement for French majors.

Prerequisite: FRROM 219 or Q++ on Cornell Advanced Standing Examination (CASE). Recommended courses after FRROM 301: FRROM 312. FRLIT 221 may be taken concurrently with 301. S. LoBello.

Class discussions based on reading contemporary texts: half short stories, half articles on current events taken from French magazines or newspapers. All texts are chosen for thematic or cultural interest and linguistic quality. Special attention is given to accuracy in French through grammar review and weekly papers (essays or translations). Each student gives one or more oral presentations in class.

### FRROM 305(3050) French through Film

Fall or spring. 4 credits. *Satisfies Option 1.*

Prerequisite: FRROM 219 or Q++ on Cornell Advanced Standing Examination (CASE) or permission of instructor. Recommended courses after FRROM 305: FRROM 301, 312 or FRLIT 221. FRROM 305 may be taken concurrently with FRLIT 221. C. Waldron.

Analysis of French contemporary films and related readings, used as a means of studying the language. Particular emphasis is on the culture and historical context as it relates to French contemporary society. Additionally, guest speakers provide enrichment on selected topics.

### FRROM 312(3120) Advanced French (II)

Fall or spring. 4 credits. *Satisfies Option 1.*

Prerequisite: FRROM 301 or 305, or Q++ on Cornell Advanced Standing Examination (CASE). T. Alkire.

Course on stylistics and translation aiming to help students develop a richer, more nuanced and idiomatic command of both the spoken and written language. Systematic study of grammar is discontinued as more attention is devoted to topics such as descriptive and prescriptive stylistics, authorial style, varieties of spoken and written French and their literary representations, rhetorical figures, poetics, as well as translation theory and textual analysis. Writing exercises include pastiche, précis, explication de texte, exercice de style, and thème. Additional exercises target vocabulary development. Seminar-style participation in class discussions is expected, as are two oral presentations.

**FRROM 313(3130) French in the News**Spring. 4 credits. *Satisfies Option 1.*

Prerequisite: FRROM 301 or 305, or placement by Cornell Advanced Standing Examination (CASE). C. Waldron.

Studying French televised news broadcasts and other media places students at the heart of today's France. Flexible approach allows students to perfect their language skills.

**FRROM 630(6300) French for Reading—Graduate Students**

Spring only. 3 credits. Prerequisite: graduate standing. T. Alkire and staff.

Designed for those with little or no background in French. Aims primarily to develop skill in reading French. Covers grammar basics, extensive vocabulary, and strategies for reading in a foreign language. Some flexibility in selecting texts according to fields of interest is offered.

**Literature****FRLIT 221(2210) Introduction to Textual Analysis # (LA)**Fall or spring. 3 credits. *Satisfies Option 1.*

Prerequisite: FRROM 206 or 209 or CASE Q+. Conducted in French. Fall: L. Ferri, T. McNulty, and staff; spring: A. Berger, C. Howie, and staff.

Designed to introduce students to methods of textual analysis, through the reading and discussion of works in various genres (narrative prose, drama, poetry) from the French and Francophone world. Emphasizes the development of analytical skills, in particular close readings of works by a variety of authors from different periods. Offerings change from semester to semester; for detailed descriptions of individual sections, consult the course roster or department web site.

**FRLIT 224(2240) The French Experience (also HIST 270(2700)) (CA)**

Fall. 3 credits. Readings available both in French and in English translation. Conducted in English. P. Lewis and S. Kaplan.

Examination of French society, culture, and institutions through key moments in French history in an attempt to understand what made French culture so distinctive. Looking attentively at texts, images and contexts, students attempt to unravel some of the defining enigmas of the French experience. Two lectures a week in English. Readings available in French and in English translation. Discussion sections available in French when possible.

**Note:** Prerequisite for all 300-level courses in French literature: FRLIT 221 or equivalent.**FRLIT 313(3130) French through Creative Writing (LA)**Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FRROM 301 or 305, or CASE placement. Conducted in French. A. Berger.

The aim of this course is threefold: to further students' understanding of the peculiarities of the French language, to further their understanding of literary writing (hence their reading ability) and to allow them to put these skills to the test by writing creatively themselves. We will read short pieces of literature, looking at the grammar, the rhetoric, the figures and the rhythm; at any thing that produces a literary effect and a richness of meaning. Then students will write short pieces themselves, based on their linguistic discoveries and understanding of the literary

process. Both the texts read and the texts produced weekly by the students will be subjected to commentary and careful scrutiny.

**FRLIT 320(3200) Introduction to Twenty-First Century France (LA)**Spring. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FROM 301, or CASE placement. Conducted in French. P. Lewis.

The broad focus of this course will be the art, literature, culture, and society of contemporary France. These interlocking dimensions of what the French take to be their national identity will be examined through a wide variety of representations: descriptions published in newspapers, magazines, and scholarly journals of the social, political, and religious controversies that have been prominent since the spring 2003 elections; a sampling of narratives, theatre, poetry, and opera produced since 2000; documentary films and standard movies produced for mass consumption; publicity for museums, exhibitions, monuments, and urban organizations; essays by politicians, journalists, and scholars about so-called "decline of France"; and conflicting accounts of France's place in the European Union and its tense relations with the United States.

**FRLIT 321(3210) Readings in Modern French Literature and Culture (LA)**Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221 or 224, and FRROM 301 or 305 or CASE placement. Conducted in French. L. Dubreuil.

Designed to teach ways of reading and understanding works created from the Romantic period to the present day, in their cultural context. A range of texts from various genres is presented, and students refine their analytical skills and their understanding of various methodologies of reading. Texts by authors such as Balzac, Baudelaire, Cixous, Colette, Duras, Genet, Mallarmé, Michaux, Proust, Rimbaud, Sarraute, Sartre.

**FRLIT 322(3220) Readings in Early Modern Literature and Culture # (LA)**Spring. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221 or 224, and FRROM 301 or 305 or CASE placement. Conducted in French. P. Lewis.

Designed to familiarize students with works from the Renaissance, the Classical period, and the Enlightenment, as well as the cultural and historical context in which these texts were created, reflected a dynamic period of significant change for France. Texts by such authors as Ronsard, du Bellay, Montaigne, Molière, Marguerite de Navarre, Corneille, Diderot, de Lafayette, Racine, Perrault, Rousseau. Students may read texts in the original languages or in translation.

**FRLIT 324(3240) Imagining America (also AM ST 326, COM L 341, GOVT 303)**

Fall. 4 credits. Conducted in English. D. Rubenstein.

For description, see AM ST 303.

**FRLIT 339(3390) The Haitian Experience (CA)**Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FRROM 301 or 305, or CASE placement. Conducted in French. L. Dubreuil.

This course will present some of the major features of Haitian society, culture, religion, politics, and literature, from the end of the

18th century to the present. Topics will include: Toussaint Louverture and the Black Revolution of the 1790s, voodoo, theories of race, and Creole as a language. Works studied will include books from and about Haiti, and perhaps some films as well. An important part of the course will be devoted to the rich (but less well-known) body of 19th century Haitian literature (such as Delorme, Durand, Firmin).

**FRLIT 353(3530) Monsters A-X (Aristotle-X-files) (also FGSS/COM L 353(3530)) # (CA)**

Fall. 4 credits. Conducted in English.

K. Long.

This course will explore the classical, medieval, and early modern sources for our notions of monsters, including strange beasts, wild men, demons, witches, and cyborgs. What do these figures tell us about our own attitudes towards racial and gender differences, towards other species and towards nature more generally? Finally, what do these figures tell us about our idea of what constitutes life? Texts to be considered will include Aristotle's *On the Generation of Animals*, Pliny's *Natural History*, Chrétien de Troyes' *Yvain*, Ambroise Paré's *On Monsters and Marvels*, *Beowulf*, Bram Stoker's *Dracula*, and various episodes of the *X-Files* (Detour, Bad Blood, *Il Mundo Gira*, etc.), as well as critical material from Donna Haraway (*Simians, Cyborgs, and Women and Primate Visions*), Judith Butler (*Gender Trouble*), and Julia Kristeva (*Pouvoirs de l'horreur*).**FRLIT 354(3540) Sad Songs: Medieval Melancholia (LA)**Spring. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FRROM 301, or CASE placement. Conducted in French. C. Howie.

There is something about medieval lyric that always seems a little past its prime. Love songs are necessarily sad songs, whether the love in question is for a distant past (usually full of better singers) or a distant present (usually full of inaccessible ladies). This course provides an introduction to melancholia: to what it means not to let go, and how certain poetic forms lend themselves to this tenacity. We'll read extensively in the Old French *trouvères*, their Occitan counterparts (who, as the lyric goes, always acted on their part), and the variously besieged and be-sotted poets-for-hire of medieval France, particularly Rutebeuf and François Villon. At the same time, we'll read about melancholia, how it holds on and what it holds on to, as articulated by thinkers such as Agamben, Butler, and Freud. Conducted in French; no previous knowledge of Old French is necessary.**FRLIT 355(3550) He Said, She Said: The Battle of the Sexes in Medieval and Renaissance Writing (also ITALL 355(3550), FGSS 356(3560)) # (LA)**

Spring. 4 credits. Conducted in English.

K. Long and M. Migiel.

The Middle Ages and the Renaissance have been described by some modern scholars as the crucible of modern subjectivity, the period in which we see the emergence of the individual and the elaboration of new and dissenting perspectives on the relation between the self and the divine, as well as between the self and the social order. Our seminar will focus upon these emerging perspectives by exploring how human experience has been articulated differently by men and women. Literary works of the period

reveal a spirited debate about gender roles and notions of romantic love and sexuality. Gender, language, and power are enmeshed in these writings. Men and women wield words both to reinforce the status quo and to transform social reality, posing questions that continue to be asked today. Are men and women fundamentally different? Do they experience the same event in different ways? Do men acknowledge and respond to women's authority? How do women present themselves when they respond to male authority and assume authority themselves? We will look for answers to these questions in such works as the *Letters of Heloise and Abelard*, the *Lais* of Marie de France, Boccaccio's *Decameron*, Marguerite de Navarre's *Heptameron*, and the poetry of Veronica Franco.

**FRLIT 356(3560) Renaissance France # (CA)**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FRROM 301, or CASE placement. Conducted in French.

K. Long.

This course traces the importance of a number of movements/crises/events for the evolution of France as a nation and a culture, as well as the impact of these movements on the origin of modern thought. We consider the ongoing debate over the status of women, known as the *querelle des femmes*; the discovery of the "New World" and its subsequent colonization; the Reformation, which led eventually to a separation of religious and national interests; and the rise of modernization and scientific disciplines. Three areas of inquiry are studied by means of various texts: the works of Marguerite de Navarre, Louise Labé, François Rabelais, Joachim du Bellay, Pierre de Ronsard, Ambroise Paré, and Michel de Montaigne, among others.

**FRLIT 381(3810) 19th-Century French Women Writers (also FGSS 381(3810)) # (LA)**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221, FRROM 301 or 305, or CASE placement. Conducted in French. A. Berger.

While situating the works read within their specific historical and cultural context, this course will attempt to address a number of questions: can the literary works produced by women at that time be said to exhibit gender-related features? Given the operational hierarchy of literary genres in the 19th century, what accounts for women writers' preference for a given literary genre or exercise? How do women exploit or subvert literary canons? Finally, what portraits of gender difference and relations, what views of history on the one hand and sexuality on the other do these texts sketch? Writers read may include Mme de Staël, George Sand, Marceline Desbordes-Valmore, Flora Tristan, and Rachilde.

**FRLIT 419-420(4190-4200) Special Topics in French Literature**

419, fall; 420, spring. 2-4 credits each semester. Prerequisite: permission of instructor. Staff.

Guided independent study of special topics.

**FRLIT 429-430(4290-4300) Honors Work in French**

429, fall; 430, spring (yearlong). 8 credits. R grade given at end of fall semester and final letter grade at end of spring semester. Open to juniors and seniors. Consult

director of honors program for more information. Staff.

**FRLIT 444(4440) Thinking the Event: Alain Badiou's Philosophy (also FRLIT 644[6440], COM L 626[6260]) (LA)**

Spring. 4 credits. Conducted in English. B. Bosteels.

Based on the philosophy of Alain Badiou, especially in *Being and Event*, this course will study how we can think the radical change produced by an event, whether in politics, in art, in science, or in love. In a broad contextualization that will also serve as a generational portrait, we will discuss the relations of Badiou's thinking to psychoanalysis, mathematical set theory, poststructuralism, literary modernism, and Marxism. Readings will be limited to works translated into English, but a good reading knowledge of French and Spanish is recommended.

**FRLIT 449(4490) Mystics and Mystique (also FRLIT 649[6490], FGSS 449/649[4490/6490])**

Fall. 4 credits. Conducted in English.

C. Howie.

Mystics have a certain mystique. This is more redundant (and more true) than it might at first seem: mysticism is mystique, at least for a certain Francophone vocabulary of the visionary, and the difference that might take place between being and having is at the very heart of the mystical, or what at any rate has come down to us under that name. It is by now a commonplace that some of the most compelling vernacular writing of the high Middle Ages comes from the mouths (and, less frequently, the pens) of medieval visionaries. These women (and, less frequently, men) have challenged and contributed extensively to our understandings of language and gender, God and history, sex and sanctity. Furthermore, their hot and heavy (or occasionally austere and abstract) engagements with what surpasses human telling has inspired an entire generation (or two) of French thinkers (e.g. Bataille, Lacan) as well as entire theological traditions. In this seminar, we'll engage closely with an array of authors primarily from the medieval Mediterranean, including but not limited to Bonaventure, Marguerite Porete, Margaret of Oingt, Angela of Foligno, Iacopone of Todi, Catherine of Siena, John of the Cross, and Teresa of Avila. We'll also look at modern articulations of this tradition, from pious Victoriana to Bataille's *Érotisme* to Lacan's *Encore*, and theological reappraisals by Denys Turner, Mark McIntosh, and others. Readings and discussion in English.

**FRLIT 471(4710) The End of Narrative (also FRLIT 671[6710]) (LA)**

Fall. 4 credits. T. McNulty.

The irreducibility of literature to narrative is one of the dominant preoccupations of 20th century French literature and criticism, informing projects as diverse as André Gide's aspiration to strip narrative of its signifying currency in *Les faux monnayeurs*, Marguerite Duras' claim in *Détruire dit-elle* that she can no longer tolerate novels "because of the sentences," Emmanuel Lévinas' critique of narrative "themmatization" as a privileging of the "said" (*le dit*) over "saying" (*le dire*), and Roland Barthes' quest for what he calls "writing degree zero." We will divide our attention between literary and critical works,

with special attention to those authors (Proust, Gide, Bataille, Blanchot, Klossowski, Sarraute, Duras) who approached the problem of the "end of narrative" through literary works as well as critical essays and interviews. Reading knowledge of French required.

**FRLIT 475(4750) Exoticism and Eroticism: Figures of the Others in 18th Century Literature (also FRLIT 673[6730], FGSS 474[4740]) # (LA)**

Fall. 4 credits. *Satisfies Option 1.*

Prerequisite: FRLIT 221 and FRROM 301 or 305, or permission of instructor. Conducted in French. A. Berger.

Through travel, commerce and colonial expeditions, Europe "discovered" itself as it "encountered" others (good savages and cannibals, oriental women or despots, Persians, Indians, Zoroastrians, Tahitians, Americans, giants, etc.) Imagined or theorized, the exotic experience helped shape modern discourses on diversity and identity, on universalism and particularism, on the human species and community borders. In that context, a new literary genre emerged: the oriental (or orientalist) novel. Since literature itself traditionally occupies the place of the "other of reason", since it is the great language seducer in Western thought, it sided with the orient, or rather with the oriental woman. For exoticism is always eroticized (thus feminized) as the erotic is orientalized. How does the oriental novel stage or articulate the connections between fiction, femininity, sexuality and otherness? How does the oriental novel fit in or stray away from the Enlightenment intellectual and political program? (Readings include Montesquieu, Prévost, Crébillon, Diderot, and Rousseau).

**FRLIT 478(4780) Cinema and Writing in France and the Francophone World (LA)**

Spring. 4 credits. *Satisfies Option 1.*

Prerequisites: FRLIT 221 and FRROM 301 or 305, or permission of instructor.

Conducted in French. L. Dubreuil.

This course will explore the main kinds of relations between literature and cinema, and will include a theoretical reflection on language and image. Various cases of cooperation or interlacing will be studied. We will examine works belonging to the French and Francophone traditions, such as: *Une partie de campagne* (Maupassant's short story and Jean Renoir's movie), *Mouchette* (Bernanos' book adapted by Robert Bresson), *Xala* (Sembene Ousmane's adaptation of his own novel), *India Song* (Marguerite Duras' movie and book), *Le Polygraphe* (Robert Lepage's movie and play), and *Pour Louis de Funès* (Valère Novarina's text on acting).

**FRLIT 488(4880) Baudelaire and the Lyric (also FRLIT 688[6880], COM L 480/680[4800/6800])**

Spring. 4 credits. J. Culler.

For description see COM L 480.

**FRLIT 607(6070) Proseminar (also ITAL/SPANL 607[6070])**

Fall. 2 credits. D. Castillo and staff.

The proseminar is the place for sustained exchanges between graduate students, faculty, and visiting lecturers. Activities include reading and discussion of seminal texts, chapters from dissertations and works in progress, and articles and essays from visiting lecturers.

**FRLIT 639-640(6390-6400) Special Topics in French Literature**  
639, fall; 640, spring. 2-4 credits each semester. Staff.

Guided independent study for graduate students.

**FRLIT 644(6440) Thinking the Event: Alain Badiou's Philosophy (also FRLIT 444(4440), COM L 626(6260))**  
Spring. 4 credits. Conducted in English. B. Bosteels.

For description, see FRLIT 444.

**FRLIT 649(6490) Mystics and Mystique (also FRLIT 449(4490), FGSS 449/649(4490/6490))**  
Fall. 4 credits. C. Howie.

For description, see FRLIT 449.

**FRLIT 662(6620) The Extraordinary: Literature and Concept**  
Spring. 4 credits. Conducted in French. L. Dubreuil.

Literary thought is extraordinary since it passes the boundaries of philosophical concepts. Far from being attached to naïve affects or to sacred purity, literature articulates an impossible response to philosophy. Thus, an oeuvre constitutes an effective event, whose experience is sometimes related to the very representation of the extraordinary (plurality of worlds, ecstasy, possession, haunting, etc.). While the seminar will give a general introduction to the main positions on "literature and philosophy" in contemporary France (Deleuze, Derrida, Rancière, Badiou), the bulk of our time will be devoted to 19th century French writers such as Nerval, Baudelaire or Maupassant, as well as to some implied philosophers (e.g. Plato, Descartes, Schopenhauer, Hegel, etc.).

**FRLIT 671(6710) The End of Narrative (also FRLIT 471(4710))**  
Fall. 4 credits. T. McNulty.  
For description, see FRLIT 471.

**FRLIT 673(6730) Exoticism and Eroticism: Figures of the Other in 18th Century Literature (also FRLIT 475(4750))**  
Fall. 4 credits. Conducted in French. A. Berger.  
For description, see FRLIT 475.

**FRLIT 688(6880) Baudelaire and the Lyric (also FRLIT 488(4880), COM L 480/680(4800/6800))**  
Spring. 4 credits. J. Culler.  
For description see COM L 480.

## Italian

T. Alkire, M. Baraldi, K. Bättig von Wittelsbach, T. Campbell (director of undergraduate studies), F. Cervesi, C. Dye, M. Migiel, P. Swenson. Emerita: A. Grossvogel.

## The Major

The Italian section offers a major in Italian with tracks in Italian literature and culture and Italian studies. The first track is designed for students who wish to study Italian language, literature, and culture through the works of writers, artists, and cultural figures who have developed rich and varied aesthetic traditions. The track in Italian studies includes a broader progression of courses that entails work in related disciplines. Both are designed to provide students with proficiency in reading, speaking, and writing in Italian, to familiarize them with Italian culture, and to assist them

in analyzing Italian texts in related fields. For further information, students are asked to consult the director of undergraduate studies.

### Track 1: Italian Literature and Culture

Track 1 is designed for students who: (1) wish to study Italian language, literature, and culture through the works of writers, artists, and cultural figures; and (2) may wish to pursue a Ph.D. in Italian.

**Admission:** The prerequisite for official admission to Track 1 of the Italian major is successful completion of any ITALL course at the 200 level or higher conducted in Italian.

Students who wish to follow Track 1 in Italian are advised to consult with the director of undergraduate studies (DUS), Professor Timothy Campbell (tcc9@cornell.edu), whose office is 323C Morrill Hall. The DUS will take into account the student's interest, preparation, and career goals and assign the student to an advisor. Students majoring in Italian are expected to become conversant with a fair portion of the masterworks of Italian literature, to acquaint themselves with the outlines of Italian literary and cultural history, and to develop some skill in textual and cultural analysis. In conjunction with the major advisor, the student will craft an individualized plan of studies that will meet the minimum requirements for Track 1 as listed here:

- At least 10 ITALL courses at the 200 level and higher. (The prerequisite may be counted toward this requirement. The 1-credit Italian practicum and the 1- or 2-credit independent study options do not count as full courses). One of these courses must be at the 400 level and one must focus on Italian texts before the 18th century. With the permission of the advisor, the student may substitute for two of these courses other courses that are deemed relevant to the student's study of Italian, e.g., a course in another national literature, a course in critical theory, or a course in European history.
- At least 20 credits in courses conducted entirely in Italian. The Italian practica may be used to fulfill 3 of these credits. Twelve of these credits must be in courses in Italian at the 300 level or above.
- Competency in the Italian language (as demonstrated by examination or by course work approved by the DUS).

ITALA 402, History of the Italian Language, and ITALA 403, Linguistic Structure of Italian, may be counted toward the 10 courses required for the major. Note: An introductory linguistics course is a prerequisite for ITALA 402 and 403.

### Track 2: Italian Studies

Track 2 in Italian Studies is designed primarily for students who wish to pursue individual interests that do not fall within Track 1 of the major. Students select courses from the Italian section as well as courses from other departments that have a substantial Italian component, such as History of Art, Architecture, Government, Music, and Comparative Literature. For the list of approved Italian studies courses, please see the director of undergraduate studies.

**Admission:** By the end of their sophomore year, prospective majors in Track 2 should

have taken ITALA 219, Intermediate Conversation and Composition, or demonstrated the equivalent level of fluency.

To complete the program, students must:

1. Demonstrate competence in the Italian language by completing ITALA 313, Advanced Conversation and Composition, or its equivalent;
2. Complete the core series of Italian studies courses: ITALL 290, Perspectives in Italian Culture (fall), ITALL 295, Italian Cinema (fall), and ITALL 297, Introduction to Italian Literature (spring);
3. Complete at least five courses (20 credits) from the approved list of Italian studies courses at the 300 level or above from no more than three departments. Students planning on studying abroad for a year or a semester in Italy should plan their course work to emphasize their individual interests. Note: Students must maintain a B- in each of the five Italian studies courses; and
4. Select a committee of one or more faculty advisors to help formulate a coherent program of study. One of the advisors must come from the Italian studies section.

Students are encouraged to enrich the program by combining this option with other majors in related fields such as history of art, music, comparative literature, or architecture.

## Concentration in Italian Studies

In order to complete an undergraduate concentration in Italian Studies, students must take at least five courses (a minimum of 15 credits) by selecting courses from the Italian Studies Concentration Course List, one of which must be ITALL 290, Perspectives in Italian Culture. These courses must be allocated among at least three Cornell departments and must include one introductory course and one course at the advanced level. Courses not on the list may be approved by petition only. Language competence must be demonstrated by successfully completing ITALA 219. Please note that courses taken as part of a study abroad program approved by the Study Abroad Dean may count towards meeting the above requirements.

Students wishing to enroll in the concentration must register their intent by contacting Professor Timothy Campbell, director of undergraduate studies, 323C Morrill Hall, 607-255-8432, who will assign a faculty advisor to students.

**Study Abroad in Italy:** Italian studies faculty members strongly encourage students to consider studying abroad in Italy. Students will have the opportunity to immerse themselves in Italian and gain a singular perspective on the Italian cultural context.

Students are urged to consider the Bologna Cooperative Studies Program (BCSP), of which Cornell is an associate member. BCSP offers qualified undergraduate students an opportunity to study for a full academic year or a second semester at the University of Bologna for credit. During each semester of the academic year, which begins in October and extends through June, BCSP students enroll in one or two regular University of Bologna courses with Italian students.



Students may also take special courses in Italian literature, language, art history, film studies, and contemporary politics.

## Language

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance at the first scheduled class session. Because of the high demand for language courses, a student who fails to attend the first class meeting will be dropped so others may register.

### ITALA 121-122(1210-1220) Elementary Italian

121, fall; 122, spring. 4 credits each semester. Prerequisite: for ITALA 122, 121 or LPI 37-44 or SAT II 370-450. Intended for beginners or students placed by examination. At the end of ITALA 122, students who score lower than 56 on LPI may take ITALA 123, those with 56 or higher on LPI attain qualification and may enter 200-level sequence; otherwise ITALA 123 required for qualification. Evening prelims. Fall: F. Cervesi (course coordinator), T. Alkire, M. Baraldi, K. Bättig von Wittelsbach, and staff; spring: F. Cervesi (course coordinator), M. Baraldi, K. Bättig von Wittelsbach, C. Dye, and staff.

Provides a thorough grounding in all the language skills: listening, speaking, reading, and writing, with practice in small groups. Lectures cover grammar and cultural information.

### ITALA 123(1230) Continuing Italian

Fall or spring. 4 credits. Prerequisite: study of Italian; LPI 45-55 or SAT II 460-580. K. Bättig von Wittelsbach.

All-skills course designed to improve speaking and reading ability, establish a groundwork for correct writing, and provide a substantial grammar review.

### ITALA 209(2090) Italian Intermediate Composition and Conversation I

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: ITALA 123 or LPI 56-64, or SAT II 590-680, or CASE Q. Fall: P. Swenson (course coordinator), C. Dye, and staff; spring: P. Swenson and staff.

Provides a guided conversation, composition, reading, pronunciation, and grammar review, emphasizing the development of accurate and idiomatic expression in the language.

### ITALA 219(2190) Italian Intermediate Composition and Conversation II

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: ITALA 209 or equivalent. P. Swenson and staff.

Guided conversation, composition, reading, pronunciation, and grammar review emphasizing the development of accurate and idiomatic expression in the language.

Note: Students placed in 200-level courses also have the option of taking courses in introductory literature, cultural studies, and cinema; see separate listings under ITALL for descriptions of these courses.

### ITALA 300(3000) Directed Studies

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

### ITALA 313(3130) Advanced Italian: Language in Italian Culture (LA)

Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: ITALA 219 or equivalent or permission of instructor. Conducted in Italian. P. Swenson.

Focuses on developing oral and written language skills through the study of cultural and social issues of contemporary Italy. Students improve their fluency in the language through oral exercises, compositions, as well as group and individual presentations. The course also entails a grammar review of selected points and analysis of present-day Italian.

## Literature

### ITALL 227(2270) Family Life in Renaissance Italy (also HIST 227(2271)) # (HA)

Spring. 4 credits. Conducted in English. J. Najemy.

For description, see HIST 227.

### ITALL 255(2550) Sophomore Seminar: A Forkful of Spaghetti Westerns: The Italian Western and Its American Lineage (LA)

Spring. 3 credits. Limited to 15 students. Conducted in English. T. Campbell.

In this course we will attempt to construct a cinematic genealogy of the spaghetti western. Beginning with the classic American westerns, we'll examine the captivity, narratives, and sado-masochistic theater of the Hollywood Western associated with Native Americans, and discuss the figure of the gunman and the role of landscape as a space of both harmony and ruin. Turning to the films of Sergio Leone and a number of Italian directors who are most representative of the Italian Western, we will examine the cultural and social contexts surrounding the emergence of the Western in Italy (of all places), wonder about the Italian-ness of the genre, linking it to the pastoral, discuss the spaghetti's assumptions about race and family, and ask after its long-term impact on American cinema, in particular in the films of Sam Peckinpah. American westerns to be screened: *Stagecoach*, *My Darling Clementine*, *Fort Apache*, *The Bravados*, *The Searchers*, *Rio Bravo*, *The Man Who Shot Liberty Valence*, *The Wild Bunch*. Italian westerns to be screened: *A Fistful of Dollars*, *For a Few Dollars More*, *Once Upon a Time in the West*, *A Fistful of Dynamite*, *A Bullet for the General*, *Django*, *My Name is Nobody*.

This is a special seminar sponsored by the John S. Knight Institute sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

### ITALL 290(2900) Perspectives in Italian Culture (CA)

Fall. 3 credits. "Core course" in Italian studies major; offered every year. Conducted in English with a discussion section in Italian. T. Campbell.

Aims to provide students with the tools necessary to understand the most important social, political and artistic developments occurring in contemporary Italian culture.

These include the historical background of fragmentation in post-Risorgimento Italy; the "Southern" question and "Cosa Nostra"; Italian cinema, with particular attention paid to neo-realism; and the politics of food. By providing students with different perspectives on Italian culture, students can better situate their own interests in terms of the complex of beliefs and response that together form their culture. Through background lectures, discussions of readings in anthropology, history, literature, sociology, cultural studies, and film screenings, students are introduced to a full range of resources employed in the production and consumption of Italian culture globally today. Primary readings include selections from Peter Robb, Leonardo Sciascia, and Tim Parks; films from Amelio, Benigni, Sergio Leone, Moretti, and Muccino. A group of secondary readings stimulates the discussion of the historical and cultural panorama of contemporary Italy.

### ITALL 295(2950) Screenings in Italian Cinema (CA)

Fall. 3 credits. Prerequisites: ITALA 209 or permission of instructor. Conducted in Italian. T. Campbell and staff.

Aims to provide students with an introduction to Italian film from the 1940s to the present. Students will view the representative works of the most important Italian directors in order to create a perspective on one of the world's major national cinematic traditions. We will pay close attention to the socio-political context of the films, as well as consider the technical and theoretical issues that arise in our study of Italian cinema. Particular attention will be given to Italian neo-realism, Italian political cinema of the 1970s, and contemporary Italian cinema.

### ITALL 297(2970) Introduction to Italian Literature (LA)

Spring. 3 credits. Core course in Italian studies major. *Satisfies Option 1.* Conducted in Italian. T. Campbell and staff.

Aims to introduce students to Italian literature of the 20th century. The first half of the semester is dedicated to the short-story genre, in particular to prose works by Pirandello, Buzzati, Sciascia and others. The second half covers the writings of Primo Levi, reading his classic *Se questo è un uomo*. Throughout, a special interest is placed on representations of Italian modernity. In addition, the course includes significant practice in grammar and composition. To this end, the students are required to write five papers of medium length over the course of the semester.

### ITALL 300(3000) Italian Practicum

Fall or spring. 1 credit. Conducted in Italian. Staff.

Students enrolled in an Italian literature or culture course that is conducted in English (e.g., ITALL 290) may opt to take this practicum, provided that they have already attained proficiency in the language. Students in the practicum spend one class hour per week discussing selected issues or texts in Italian; they also complete an appropriate amount of written work in Italian.

### ITALL 301(3010) Screening "Cosa Nostra": The Mafia and the Movies from Scarface to The Sopranos

4 credits. Limited to 30 students.

Conducted in English. T. Campbell.

From Al Capone to Tony Soprano, the Mafia has been subject of numerous films over



the course of 70 years, so many in fact that one might speak of a "Mafia obsession" in American popular culture. Drawing upon a large number of American and Italian films, this course examines the cultural history of the Mafia through film. We will explore issues related to the figure of the gangster, the gender and class assumptions that underpin it, and the portrayal—almost always stereotypical—of Italian-American immigrant experience that emerges from our viewing. The aim will be to enhance our understanding of the role the Mafia plays in American and Italian culture in the 20th and 21st centuries. Film screening will include "Little Caesar," "Scarface: Shame of the Nation," "The Godfather I and II," "Goodfellas," "The Funeral," "Donnie Brasco," and several episodes from "The Sopranos." We will also watch a number of Italian treatments of the Mafia, including: "Salvatore Giuliano," "Johnny Stecchino," "The 100 Steps," and "Angela." Critical readings from Bondanella, Dickie, Gardaphe, Kolker, and Warshaw.

**ITALL 303(3030) Italian in Pre-Modern Times**

Spring. 4 credits. Prerequisites: ITALA 209 or permission of instructor. Conducted in Italian. M. Migiel.

The major objective of this seminar will be to have students develop competence in reading pre-modern Italian texts. Manageable readings will be drawn from a variety of sources (literary, religious, philosophical, historical). Students will have an opportunity to work with well-known Italian works that have been widely disseminated in multiple English translations and with lesser known Italian works that have never been translated into English.

**ITALL 340(3400) History of the Grotesque (LA)**

Fall. 3 credits. Prerequisites: ITALA 209 or permission of instructor. Conducted in Italian. C. Howie.

Italian literary history, seen from a certain angle, is a series of moments of rhetorical exaggeration, bodily deformity, sexual overkill, religious satire, and extreme violence; hallmarks of an aesthetic category that came, at some point in the modern period, to be called the grotesque. We'll examine the particular shapes to which this category can be applied across time, and which may in turn alter the very shape of the category. After all, the grotesque is nothing if not a question of shapes: of anticipated literary, embodied forms and their eventual disappointment or monstrous transformation; of how aesthetic devices not only represent but produce the 'normal' body as an effect of its many variations. We'll look at the fecal fantasies of Lacopone da Todi and Dante; Boccaccio's *femmes fatales*; the beautifully mangled bodies of Renaissance epic (Tasso) and pornography (Aretino); modern decadentism (Gozzano, Campana); and the return of blasphemy in Pasolini and Landolfi. We'll also see how Stephen Sondheim reimagines Tarchetti's *Fosca* (via Scola's *Passione d'amore*) and how critics as various as Bakhtin, Harpham, and Linda Hart have articulated the grotesque's offensive allure.

**ITALL 350(3500) Italian Renaissance (also HIST 350[3500]) # (HA)**

Spring. 3 credits. J. Najemy.  
For description, see HIST 350.

**ITALL 351(3510) Machiavelli (also HIST 351[3510]) # (HA)**

Fall. 3 credits. J. Najemy.  
For description, see HIST 351.

**ITALL 355(3550) He Said, She Said: The Battle of the Sexes in Medieval and Renaissance Writing (also FRLIT 355[3550], FGSS 356[3560]) # (LA)**

Spring. 4 credits. Conducted in English.  
M. Migiel and K. Long.  
For description, see FRLIT 355.

**ITALL 385(3850) Modern Italian Travel Writing**

Fall. 4 credits. Prerequisite: permission of instructor. Conducted in Italian.  
T. Campbell.

In this introduction to modern Italian travel narratives, students will read a range of texts dating from the late 19th to mid-20th centuries that urge travel as their theme (with a particular emphasis placed on Northeast Africa and Latin America). The course begins with missionary accounts from Eritrea, continues with the correspondence of Italian emigrants to Argentina and Brazil, and then turns to minor classics of Italian travel literature from Cecchi, Moravia, Pasolini, and Calvino. We will ask after the ways in which travel writing produces a space of displacement, consider the relation between technology, travel and aesthetics, and discuss the forms by which the distinction between Italian and non-Italian is observed.

**ITALL 389(3890) Modern Italian Novel (LA)**

Spring. 4 credits. *Satisfies Option 1.*  
Prerequisite: permission of instructor.  
Students who have taken ITALL 389 previously may retake course for credit, provided that readings are different.  
Conducted in Italian. P. Swenson.

Through the novels of N. Ginzburg, G. Bassani, P. Levi, R. Loy, this course examines the Italian social and political situation during the Fascist period, the Second World War, and the post-war years. Time, memory, family, the responsibility of the individual, the fate of the Jews, are common themes that pervade the narrative of the authors in both comparable and dissonant ways. Conducted in Italian.

**ITALL 400(4000) Morante (LA)**

Fall. 4 credits. M. Migiel.  
This seminar will be dedicated to a reading of Elsa Morante's 1974 novel, *La Storia*. Considered by many readers to be the most outstanding novel of the Italian 20th century, *La Storia* treats a grand event of History (World War II, the battle between the superpowers, the Shoah), from the perspective of a humble school teacher in Rome, Iduzza, and her family (most notably her illegitimate son, Usepe, and his canine companions). The novel offers students insights into how language, story, and literature can help us confront difference, conflict, loss, destruction, and grief.

**ITALL 419-420(4190-4200) Special Topics in Italian Literature**

419, fall; 420, spring. 2-4 credits each semester. Prerequisite: permission of instructor. Fall: T. Campbell; spring: T. Campbell and M. Migiel.  
Guided independent study of specific topics.

**ITALL 429-430(4290-4300) Honors in Italian Literature**

429, fall; 430, spring (yearlong). 8 credits.  
R, fall; letter grade, spring. Prerequisite: senior standing; permission of instructor.  
T. Campbell and staff.

**ITALL (4500) Renaissance Poetry (also ITALL 650[6500], COM L 450[4500], ENGL 422[4220]) # (LA)**

Spring. 4 credits. W. Kennedy.  
For description, see COM L 450.

**ITALL 468(4680) Love and Sex in the Italian Renaissance (also HIST 468[4680]) # (HA)**

Fall. 4 credits. J. Najemy.  
For description, see HIST 468.

**ITALL 607(6070) Proseminar (also FRLIT/SPANL 607[6070])**

Fall. 2 credits. D. Castillo and staff.  
For description, see FRLIT 607.

**ITALL 639-640(6390-6400) Special Topics in Italian Literature**

639, fall; 640, spring. 4 credits each semester. Fall: T. Campbell; spring: T. Campbell and M. Migiel.

**ITALL 650(6500) Renaissance Poetry (also ITALL 450[4500], COM L 450[4500])**

Spring. 4 credits. W. Kennedy.  
For description, see COM L 450.

**Portuguese**

Faculty: L. Horne, J. Oliveira.

**PORT 121-122(1210-1220) Elementary Brazilian Portuguese I-II**

121, fall; 122, spring. 4 credits each semester. PORT 121 is the prerequisite for PORT 122. J. Oliveria.

This is a full-year introductory course, intended for students with no knowledge of Portuguese, and with limited or no knowledge of Spanish\*. Stress is placed upon the development of the fundamental communication skills: listening, speaking, reading, and writing.

**PORT 209-219(2090-2190) Intermediate Brazilian Portuguese for Spanish Speakers\* I-II @**

209, fall; 219, spring. 4 credits each semester. *Satisfies Option 1.* Prerequisite for 209: PORT 122 or permission of instructor; Prerequisite for 219: PORT 209 or permission of instructor. J. Oliveira.

Portuguese 209-219 is a full year course intended for students who have already taken the first level of Portuguese, or as an intensive introductory course for those who are native/near native speakers of Spanish\*. An all-skills course with particular emphasis on Brazilian Portuguese spoken within the context of its culture, it presents a fast-paced review focused on improving grammatical accuracy, pronunciation and on enriching vocabulary.

\*Although most of the materials are geared to speakers of Spanish, speakers of other Romance languages, such as French, Italian, or Catalan, etc., will also find this course effective as an introduction to Portuguese.

On the difference between PORT 209-219 and 221-222. PORT 209 is the first semester of the full-year 209-219 intermediate sequence. Although students may enroll in 209 and not continue with 219, students who have not previously taken 209 are not eligible to enroll in 219. Likewise, PORT 221-222 is a full-year intermediate sequence designed specifically

for distance learning, and following a different syllabus, using different materials, and as such is distinct from 209-219. The differences in materials and course design are such that students from one sequence are not eligible to enroll in the second half of the other sequence.

**PORT 221-222(2210-2220) Intermediate Brazilian Portuguese via Distance Learning**

221, fall; 222, spring. 4 credits each semester. *Satisfies Option 1.* Prerequisite for 221: PORT 122 or permission of instructor; Prerequisite for 222: PORT 221 or permission of instructor. Staff.

PORT 221-222 is a full year course intended for students who have already taken the first level of Portuguese, or as an introductory course for those who are native/near native speakers of Spanish or of another Romance Language.

On the Distance Learning format. PORT 221-222 is designed in a distance learning format for access by two other institutions. The course is conducted in a specially equipped classroom at the Language Resource Center at Cornell, with a Cornell instructor and Cornell students working together on location, communicating with students from two other campuses via monitors, with native speakers of Portuguese as facilitators at each other site. The fact that there are members of the class at two other sites renders communication at times less natural; however at the same time this communication is in fact more motivated, and allows for greater richness of exchange and development of aural/oral skills. There being more than one native speaker of the language (the instructor and the facilitators) provides another level of enrichment as well. Because of the size of the classroom this course is limited to a maximum of 10 Cornell students, and to a maximum of 15 students at all three sites combined.

On the difference between PORT 209-219 and 221-222. PORT 221-222 is a full year course intended for students who have the same background as those entering the 209-219. Although students may enroll in 221 and not continue with 222, students who have not previously taken 221 are not eligible to enroll in 222. Likewise, PORT 209-219 is a full-year intermediate sequence following a different syllabus, using different materials, and as such is distinct from 221-222. The differences in materials and course design are such that students from one sequence are not eligible to enroll in the second half of the other sequence.

**PORT 280(2800) Perspectives on Brazil**

Fall. 3 credits. Conducted in English. L. Horne.

This course provides an introduction and overview of Brazilian Culture. It will study different periods of Brazilian history through the analysis of films, literature, essays, visual arts, and music. Students will explore different definitions of Brazilian identity and "Brazilianess" focusing on key topics including the formation of the Colonial Brazil and the emergence of the nation of Brazil as a tropical paradise; slavery and abolition; the particularities century; and the contradictions of the modernization process throughout the 20th century. We will consider elements of Brazilian popular culture such as Carnival, Samba, and "telenovelas," and some of the most important cultural movements of the 20th century such as "Modernismo," "Cinema

Novo," and "Tropicalia." The primary objective of the course is to provide students with the relevant background to understand Brazilian cultural history.

**PORT 311(3110) Portuguese Advanced Conversation**

Fall. 4 credits. Prerequisite: PORT 219 or 222, or permission of instructor. J. Oliveira. The focus of the course is expanding conversational language through an advanced systematic study of grammar review emphasizing accuracy, and enriching vocabulary in oral practice of Brazilian Portuguese. Designed for students who want to improve their comprehension and communication skills. The exercises target vocabulary and grammar development.

**PORT 312(3120) Portuguese Advanced Conversation and Composition**

Spring. 4 credits. Prerequisite: PORT 311, or permission of instructor. J. Oliveira. Content-based language course focused on selected readings including newspaper articles, magazines and the Internet in addition to the textbook. A systematic study of grammar is discontinued, however, the readings in the textbook continue to provide a review of more advanced grammatical and idiomatic structures. By engaging in more sustained interactions in the language, the course aims to help the students to express more complex ideas in Portuguese.

**PORT 319(3190) Readings in 19th and 20th Century Brazilian and Portuguese Literatures**

Spring. 4 credits. Prerequisites: PORT 219 or permission of instructor. Conducted in Portuguese. L. Horne.

This course aims to provide an overview of Modern Brazilian and Portuguese Literatures. It will cover the major literary movements and the essential canonical writers of 19th and 20th century in Portuguese language. Following a chronological order, we will read texts from both Portugal and Brazil, establishing a comparative approach and underlining the similarities and the differences of each context. Some of the topics to be discussed are: the formation of a national literature; literature and slavery; foreign models and rewritings; diverse definitions of national spaces and landscapes; relationships between aesthetic innovations and political issues; and different literary definitions of frontiers, margins and exclusions. The course also intends to introduce students to the practice of literary analysis, and to provide an opportunity to improve language skills in Portuguese through extensive oral and written practice. Some of the authors to be read include Oswald de Andrade, J. M. Machado de Assis, Clarice Lispector, Fernando Pessoa, Eça de Queirós, Graciliano Ramos, João Guimarães Rosa, and José Saramago.

**PORT 390(3900) Brazilian Cinema: 1960s to the Present**

Spring. 4 credits. L. Horne. This course will explore the major trends in Brazilian cinema from the sixties to the present. We will begin by examining the different phases of the famous "Cinema Novo"; followed by the most important films of the seventies and eighties and ending with a unit centered around the "New Brazilian Cinema" (1990-present). We will address diverse issues including the following: How has Brazilian Cinema used allegory in order to represent national identity? How formal

innovations have been related to the creation of a political cinema? What is the relation of "art" and "commercial film" within the context of Brazilian culture? How has the notion of the popular changed over these decades? Can we talk about a change from a utopic vision of the future to a dystopic or disenchanted one? How are melodrama, historical satire and realist aesthetic understood in the contemporary moment? We will analyze the films within the context of Brazilian cultural history along with readings on popular culture, cultural studies and film theory.

**PORT 419-420(4190-4200) Special Topics in Portuguese Literature**

419, fall; 420, spring. 2-4 credits each semester. Prerequisite: permission of instructor. L. Horne. Guided independent study of special topics.

**PORT 480(4800) The Return of the Real: Realisms in Latin American Literature (also SPANL 480[4800])**

Fall. 4 credits. Prerequisites: SPANL 214 (formerly 316), SPANL 215 (formerly 318), and SPANL 217 (formerly 318) or permission of instructor. Conducted in Spanish. L. Horne.

In recent years, the realist ambition to represent contemporary life has returned with considerable force. This course proposes an in-depth study of realism in recent narrative from Latin America with a special emphasis on Brazil. We will explore the main conceptual problems of this aesthetic current and its particularities in the context of contemporary Latin American culture. The central question that runs through this course is whether it is possible to speak a new form of realism and if so, to try to specify where the novelty lies. The course will also address the following debates: Can we still talk about "realism" after Poststructuralism and the Avant-gardes? How does the "culture of the image" affect the concepts of "representation" and "verisimilitude"? If Realism has been traditionally identified as a political literature, can we still talk about a political force of realism in the present moment? How is the traditional interest of realism for the ugly and the banal transformed in contemporary writings? Readings include texts of Cesar Aira, Caio Fernando Abreu, Sergio Chejfec, Rodolfo Fogwill, Pedro Juan Gutierrez, Daniel Mella, Luiz Ruffato, and André Sant' Anna.

**PORT 639-640(6390-6400) Special Topics in Portuguese Literature**

Fall (639); spring (640). 2-4 credits each semester. L. Horne. Guided independent study of special topics.

**Quechua**

Faculty: L. Moratón-Peña.

**QUECH 121-122(1210-1220) Elementary Quechua**

121, fall; 122, spring. 4 credits each semester. Prerequisite: for 122, QUECH 121. L. Moratón-Peña. Beginning conversation course in Quechua.

**QUECH 136(1360) Quechua Writing Lab**

Spring. 1 credit. Corequisite: QUECH 122 or permission of instructor. Letter grades only. L. Moratón-Peña. Computer-assisted drill and writing instruction in elementary Quechua.

**QUECH 209-219(2090-2190) Continuing Quechua @**

209, fall; 219, spring. 3 credits each semester. *Satisfies Option 1.* Prerequisites: for 209, QUECH 122 or equivalent; for 219: QUECH 209 or equivalent. L. Morató-Peña. Intermediate conversation and reading course. Study of the Huarochiri manuscript.

**QUECH 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. L. Morató-Peña. Taught on a specialized basis to address particular student needs.

**Romance Studies****ROM S 507(5070) Methodology of Romance Language Learning and Teaching**

Spring. 3 credits. J. Luks and B. Teutli. Focuses on language teaching as facilitation of learning, thus on the learner's processing of language acquisition and the promotion of reflective teaching. Pedagogical approaches will be addressed from a learner-centered perspective involving effective language learning strategies and analysis.

**ROM S 508(5080) TA Practicum**

Fall. 1 credit. Required for all graduate TAs teaching language for the first time in the Department. Staff. This practicum is designed to better enable the TAs to meet the needs of their students in the understanding and acquisition of the linguistic forms, notions and functions covered in their course.

**Spanish**

S. Amigo-Silvestre, M. Arellano, I. Auffret, B. Bosteels, L. Carrillo, D. Castillo, E. Dozier (associate chair for language instruction), M. A. Garcés (director of undergraduate studies), J. Rodríguez García, J. Hernandez, Z. Iguina, C. Lawless, N. Maldonado-Méndez, L. Morató-Peña, J. E. Paz-Soldán, S. Pinet, M. K. Redmond, J. R. Resina, J. Routier-Pucci, E. Sánchez-Blake, A. Stratakos-Tiò, B. Teutli. Emeritus: C. Morón Arroyo.

**The Major**

The Spanish major is designed to give students proficiency in the oral and written language, to acquaint them with Hispanic culture, and to develop their skill in literary and linguistic analysis. Satisfactory completion of the major should enable students to meet language and literature requirements for teaching, to continue with graduate work in Spanish or other appropriate disciplines, and to satisfy standards for acceptance into the training programs of the government, social agencies, and business concerns. A Spanish major combined with another discipline may also allow a student to undertake preprofessional training for graduate study in law or medicine. Students interested in a Spanish major are encouraged to seek faculty advice as early as possible. For acceptance into the major, students should consult Professor María Antonia Garcés (mg43@cornell.edu), director of undergraduate studies, in 315 Morrill Hall, who will admit them to the major, and assign them an advisor from the Spanish faculty. Spanish majors will then work out a plan of study in consultation with their advisors. Spanish majors have great flexibility in devising their programs of study

and areas of concentration. Previous training and interests as well as vocational goals will be taken into account when the student's program of courses is determined.

SPANR 219 is a prerequisite to entering the major in Spanish.

All majors will normally include the following core courses in their programs:

1. SPANL 214, 215, and 217 (not necessarily in that order).
2. SPANR 310 and 311.
3. one of the two annually designated senior seminars.

**The Spanish Literature Option**

The Spanish literature option normally includes at least 15 credits of Spanish literature beyond the core courses. Literature majors are strongly urged to include in their programs courses in all the major periods of Hispanic literature.

**Concentration in Spanish**

The concentration promotes a broad understanding of Spanish and Spanish American culture, literature, and society; it also encourages students to refine and practice their language skills. In order to complete the concentration, students must take a minimum of 5 courses (15 credits), distributed as follows: Language competence must be demonstrated by successfully completing either SPANR 310 (Advanced Spanish Conversation and Pronunciation) or SPANR 311 (Advanced Spanish Composition and Conversation I). Concentrators must furthermore complete either SPANL 220 (Perspectives on Latin America) or SPANL 223 (Perspectives on Spain), as well as three elective courses to be chosen in consultation with the student's advisor. Among these electives, at least one course must be taken at the advanced 400 level.

Students wishing to enroll in the concentration must register their intent by contacting Professor M. A. Garcés (mg43@cornell.edu), director of undergraduate studies, 315 Morrill Hall, who will assign a faculty advisor to each concentrator.

**Area Studies Option (Spanish, Latin American, or U.S. Latino Studies):**

At least 15 credits of courses at the 300 level and above in any of these focus areas beyond the core, all courses to be approved through consultation with the major advisor. Courses should reflect interdisciplinary interests in the area and may include up to three other academic fields of interest. For example, a student interested in Latin American studies may want to include courses on such topics as Latin American history, government, rural sociology, and economics. Students who want to specialize in U.S. Latino issues may want to include such topics as sociology of Latinos, Latino history, and Latino medical issues in addition to further studies in literature. Students specializing in Spanish studies planning on spending a year or semester in Spain (but not exclusively such students) frequently plan their course work to emphasize Spanish history, art, political economy, and other related field courses, such as courses on Islam and Moorish or Jewish Spain.

Students are encouraged to enrich the major program by including a variety of courses from related fields or by combining Spanish with related fields such as history, philosophy, sociology, anthropology, art, music, classics, English, comparative literature, and other foreign languages and literatures. The interdepartmental programs in Latin American studies and Latino studies sponsor relevant courses in a variety of areas.

The J. G. White Prize and Scholarships are available annually to undergraduate students who achieve excellence in Spanish.

**Study Abroad in Spain:** Cornell, the University of Michigan, and the University of Pennsylvania co-sponsor an academic year in Spain program. Students enrolled in this program spend the first month before the fall semester begins in an orientation session at the University of Seville, where they take courses in Spanish language and culture and take advantage of special lectures and field trips in Andalusia. The College of Arts and Sciences awards 3 credits for orientation. Once the semester begins, students enroll in regular classes at the University of Seville and at the program's center facility. Center courses are designed for the program and include a seminar offered by the resident director, from the faculty of either Cornell, Michigan, or Pennsylvania. Other center courses typically include history of art, history of the Mediterranean region, a literature course, and Spanish composition and syntax. In Seville, students live in private homes and a rich array of cultural activities and excursions are organized every semester.

Applicants are expected to have completed SPANR 219 before departure. Completion of SPANR 311 is highly recommended. Students are strongly encouraged to study abroad for the entire year rather than one semester. Students interested in the study abroad program should visit Cornell Abroad in 474 Uris Hall and see the Cornell Abroad web site: [www.einaudi.cornell.edu/cuabroad](http://www.einaudi.cornell.edu/cuabroad).

**Study Abroad in Bolivia:** The summer program in Cochabamba, Bolivia, is sponsored by the Latin American Studies Program and accepts both undergraduate and graduate students. Students live with Bolivian families and normally take two courses with Cornell faculty who participate in this program. In addition to course work in Bolivian culture, politics, and social movements, the program features the opportunity to do intensive study in Quechua, the native language spoken by many Bolivians, as well as Spanish, and to participate in research and internships with grass-roots communities, government offices, and businesses.

**Honors:** Honors in Spanish may be achieved by superior students who want to undertake guided independent reading and research in an area of their choice. Students in the senior year select a member of the Spanish faculty to supervise their work and direct the writing of their honors essay (see SPANL 429-430).

**Language**

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance of the first scheduled class session. Because of the high demand for language courses, a student who fails to attend the first class meeting will be dropped so others may register.

**SPANR 112(1120) Elementary Spanish: Review and Continuation**

Fall only. 4 credits. Prerequisite: LPS 37-44 or SAT II 370-450. Students who have taken SPANR 121 may enroll. S. Amigo-Silvestre (course coordinator), and staff.

Provides a basic review and then moves on to cover new material for the remainder of the semester. As part of the final exam, students take the LPS and, according to their score, may place into SPANR 123 (score below 56) or into the 200-level courses (score 56 or above).

**SPANR 121-122(1210-1220) Elementary Spanish**

121, fall and summer; 122, spring. 4 credits each semester. Intended for students with no experience in Spanish; students who have previously studied two or more years of Spanish may not attend unless they have LPS lower than 37 or SAT II lower than 370. Prerequisite: for 122, SPANR 121 or LPS 37-44 or SAT II 370-450. B. Teutli (course coordinator), M. Arellano, and staff.

Provides a thorough grounding in all language skills.

**SPANR 123(1230) Continuing Spanish**

Fall, spring, or summer. 4 credits. Prerequisite: SPANR 112 or 122, or LPS 45-55, or SAT II 460-580. Fall: M. K. Redmond (course coordinator), N. Maldonado-Méndez, L. Morato-Peña, and staff; spring: M. K. Redmond (course coordinator), S. Amigo-Silvestre, L. Morato-Peña, and staff; summer: A. Stratakis-Tiö.

Lower intermediate-level course providing an intensive grammar review in communicative contexts and practice in all skills. After this course, the student may take SPANR 200, 207, or 209.

**SPANR 200(2000) Spanish for English/Spanish Bilinguals (also LSP 202(2020))**

Fall. 4 credits. *Satisfies Option 1.* Prerequisite: LPS 56 or higher, SAT II 590 or higher, CASE placement, or permission of instructor. Not open to students who have taken SPANR 207 or 209. N. Maldonado-Méndez and staff.

Designed to expand bilingual students' knowledge of Spanish by providing them with ample opportunities to develop and improve each of the basic language skills.

**SPANR 207(2070) Intermediate Spanish for the Medical and Health Professions**

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: SPANR 123, LPS 56-64, or SAT II 590-680, Q on CASE exam, or permission of instructor. Students who have taken SPANR 200 or 209 should speak to instructor. A. Stratakis-Tiö.

Provides a conversational grammar review, with dialogues, debates, compositions, and readings on health-related themes. Special attention is given to relevant cultural differences.

**SPANR 209(2090) Spanish Intermediate Composition and Conversation I**

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: SPANR 123, LPS 56-64, or SAT II 590-680. Not open to students who have taken SPANR 200 or SPANR 207. J. Routier-Pucci (course coordinator), I. Auffret, C. Lawless, E. Sánchez-Blake, and staff; spring: J. Routier-Pucci (course coordinator), I. Auffret, C. Lawless,

N. Maldonado-Méndez, L. Meza-Riedewald, E. Sánchez-Blake, and staff.

Provides a conversational grammar review with special attention to the development of accurate and idiomatic oral and written expression. Assignments include composition-writing, reading and discussing Spanish and Spanish American short stories and poetry, and viewing several films.

**SPANR 219(2190) Spanish Intermediate Composition and Conversation II**

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: SPANR 207 or 209, or CASE Q+. Fall: Z. Iguina (course coordinator), and E. Dozier. Spring: E. Dozier (course coordinator), Z. Iguina, and N. Maldonado-Méndez.

Advanced-intermediate course designed for students who want to further broaden their knowledge of the language and related cultures, as well as improve their comprehension and communication skills.

**SPANR 300(3000) Directed Studies**

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor. Staff.

Taught on a specialized basis to address particular student needs.

**SPANR 310(3100) Advanced Spanish Conversation and Pronunciation**

Fall or spring. 3 credits. *Satisfies Option 1.* Prerequisite: SPANR 219 or CASE Q++ or permission of instructor. Z. Iguina.

Conversation course with intensive oral practice obtained through the production of video programs. Students practice the fundamental aspects of communication in the standard spoken and written Spanish, with some focus on dialectal variations. There are weekly pronunciation labs.

**SPANR 311(3110) Advanced Spanish Composition and Conversation I**

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: SPANR 219 or CASE Q++ or equivalent. Fall: C. Lawless (course coordinator) and staff.

Advanced language skills developed through reading, grammar review and intensive practice in speaking and writing. The reader and DVD developed for the course provide a multimedia approach that enables students to hear the actual voices—and accents—of the authors from various regions of Spain and Spanish America, and to gain an awareness of their cultural milieu.

**SPANR 312(3120) Advanced Spanish Composition and Conversation II**

Fall or spring. 4 credits. *Satisfies Option 1.* Prerequisite: SPANR 311 or permission of instructor. E. Sánchez-Blake.

Readings and class discussion focus on the stylistic analysis of modern texts. Increased emphasis, through weekly essays, on students' development of an effective Spanish prose style.

**SPANR 313(3130) Spanish Writing Workshop for Advanced English/Spanish Bilinguals**

Fall. 1 credit. Prerequisite: permission of instructor. N. Maldonado-Méndez and staff.

Designed for the advanced bilingual seeking support in the development of written accuracy; this workshop can serve as a complement for a literature or culture course conducted in Spanish. Meets one hour per week, concurrently with one of the weekly sessions of SPANR 200. Students

enrolled in this course are expected to work autonomously, to keep up with the syllabus of SPANR 200, and to come to class with focused questions drawn from writing tasks either assigned from other courses, or prepared as self-assigned exercises. The workshop will be conducted in a peer-editing format. The final exam will consist of preparing a term paper in Spanish that demonstrates progress achieved in written accuracy. Students who have taken other Spanish language courses in the department including SPANR 200, and who have difficulties with writing identified as specific to the English/Spanish bilingual, are eligible to enroll in the 1 credit SPANR 313, with the instructor's permission. Course may be repeated for credit.

**Literature****SPANL 214(2140) The Spanish Difference: Readings in Modern Iberian Literatures**

Fall or spring. 4 credits. Prerequisites: SPANR 207 or 209, CASE Q+, or permission of instructor. Conducted in Spanish. Fall: M. Stycos and staff; spring: J. M. Rodríguez-García and staff.

Introductory survey of modern Spanish literatures. Students develop their analytical skills and learn basic literary concepts such as genre (drama, lyric, short story and novel) and style (romanticism, realism, the fantastic, etc.) as well as male/female perspectives and the translation of literature to film language. The survey introduces students to Spain's cultural complexity through readings of works by authors representative of its diverse linguistic and literary traditions.

**SPANL 215(2150) The Tradition of Rupture: Latin American Writing from Modernism to the Present (also LAT A 215(2150))**

Fall or spring. 4 credits. Prerequisites: SPANR 207 or 209, or CASE Q+, or permission of instructor. Conducted in Spanish. Fall: J. M. Rodríguez-García and staff; spring: J. A. Hernández and staff.

Readings and discussion of representative texts of the 19th and 20th centuries from various regions of Spanish America. Among the authors considered are Sarmiento, Hernández, Martí, Darío, Agustini, Borges, Cortázar, García Márquez, Poniatowska, and Valenzuela.

**SPANL 217(2170) Early Hispanic Modernities: Readings in Medieval and Early Modern Iberian and Spanish-American Literatures (also LAT A 217(2170))**

Fall or spring. 4 credits. Prerequisites: SPANR 207 or 209, or placement by CASE Q+, or permission of instructor. Conducted in Spanish. Fall: M. A. Garcés; spring: S. Pinet.

This course explores major texts and themes of the Hispanic tradition from the 11th to the 17th centuries. We will examine general questions on literary analysis and the relationship between literature and history around certain events, such as Medieval multicultural Iberia, the creation of the Spanish Inquisition in the 15th century and the expulsion of the Jews in 1492; the encounter between the Old and the New Worlds; the 'opposition' high/low popular culture or the secular and the sacred in poetry and prose. Issues of representation regarding gender, identities, and subjectivity may also be studied. Readings may be drawn from

medieval short stories and miracle collections; chivalric romances, Columbus and the literary discovery, *Lazarillo de Tormes*, Cervantes, Lope de Vega, Calderón, and Sor Juana Inés de la Cruz, among others. Course will be conducted in Spanish.

**SPANL 220(2200) Perspectives on Latin America (also HIST 251[2511], LAT A 220[2200]) @ (CA)**

Spring. 3 credits. Highly recommended for Latin American studies concentrators.

Conducted in English. E. Paz-Soldán.

Interdisciplinary, co-taught course offered every spring through the Latin American Program. Topics vary by semester, but readings always focus on current research in various disciplines and regions of Latin America. The range of issues addressed include the economic, social, cultural, and political trends and transitions in the area. In the weekly meetings, instructors and guest lecturers facilitate student discussions. Students taking the course are required to participate in all class discussions and write one research paper in their chosen focus area.

**SPANL 223(2230) Perspectives on Spain (LA)**

Fall. 4 credits. Prerequisite: SPANR 219 or permission of instructor. Conducted in Spanish. C. Lawless.

An introduction to the history of Spain and its present day society. How did Spain come into existence, what cultures contributed to shape its national sense, what political alternatives were left behind or discarded, what are its strengths and weaknesses, its present and its possible futures? These and other questions will be discussed, combining the long view with emphasis on the contemporary period. Political, social, and cultural materials will be selected with the aim of providing a bare bones introduction to a complex society. This course is crucial to students who anticipate taking courses in Spanish literature and culture or plan to visit Spain.

**SPANL 234(2340) Faith, Love and Adventure in Medieval Spain # (LA)**

Spring. 4 credits. Conducted in Spanish. Prerequisite: SPANR 219, CASE Q++, or permission of instructor. S. Pinet.

Examines a wide variety of cultural objects and practices of Medieval Spain—from art objects to religious practices, from poetry to music—to address questions of identity, faith, institutions, historicity, and nation-building in multicultural Iberia. Students are expected to participate actively in class discussion and to prepare written critical analyses. Primary sources constitute the main corpus, but modern perspectives on the Spain of the Middle Ages are also included.

**SPANL 246(2460) Contemporary Narratives by Latina Writers (also LSP/FGSS 246[2460]) (LA)**

Fall. 3 credits. Conducted in English. L. Carrillo.

Survey of narratives, including novels, short fiction, essays, political/feminist manifestoes, and memoirs by representative Latina writers of various Latino ethnic groups in the United States and the Americas, including Chicana, Chilean, Cuban, Dominican, and Puerto Rican, among others. Investigates the parallel development of a Latina perspective on personal, social and cultural issues alongside that of the U.S. ethnic liberation/revitalization movements of the 1960s to contemporary feminist activism and women of color

movements. The course investigates these works as artistic attempts to deal with issues of culture, language and bilingualism, family, gender, sexuality, and domesticity among others. Regional distinctions and contributions are accounted for. Readings include works by Julia Alvarez, Elena Castedo, Sandra Cisneros, Judith Ortiz Cofer, Cristina García, Ana Lydia Vega, and others.

**SPANL 247(2470) Spanish through Media and Culture**

Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: SPANR 219, CASE Q++, or permission of instructor. Conducted in Spanish. E. Sánchez-Blake.

Offers hands-on media analysis and production. Oriented to students with interest in Spain and Latin America and uses media to support research on topics in their areas of interest. Emphasizes intensive use of Spanish in a cultural context. Conducted in a computer classroom with access to electronic media and sources of information in the Spanish world. Students conduct a research project that is produced and presented as a news media program.

**SPANL 248(2480) Poetry of the Latino Experience (also LSP 248[2480]) (LA)**

Spring. 3 credits. L. Carrillo.

Survey of the central importance of poetry in the modern and contemporary Latino/a experience. Readings chart and critique the developments beginning in the civil rights struggles during the 1960s among Chicanos/as in the West and Southwest United States and among Nuyorican writers in the East Coast through to the 1980s development of feminist, lesbian, and gay poetry, the Cuban poets emerging as the "American" generation, and concluding with recent poetry produced in the atmosphere of immigration, labor issues, globalization, and the institutional academy.

**SPANL 261(2610) The General and His Labyrinths: Representing Bolívar in Contemporary Latin American Culture (LA)**

Fall. 3 credits. Prerequisites: SPANR 219, CASE Q++, or permission of instructor. Conducted in Spanish. J. A. Hernández.

The current sociopolitical situation in Latin America, particularly in the Andean countries, has once again directed attention to the thin line separating revolutionary action from dictatorial politics. Bolívar inhabited this fluid space. The Liberator was perceived by his own contemporaries as a self-deluded hero (Don Quijote). Our class discussions will survey Bolívar's main writings as well as the poems, pamphlets, and popular histories in which he was either denigrated or extolled. Special attention will be given to folk rituals, contemporary novels, theater plays, public art, and films that use the larger-than-life hero of the Spanish American Revolution of Independence as their main pre-text.

**SPANL 301(3010) Hispanic Theater Production (also LAT A 301[3010])**

Fall or spring. 1–3 credits. Fall: D. Castillo, spring: E. Sánchez-Blake.

Students develop a specific dramatic text for full-scale production. The course involves selection of an appropriate text, close analysis of the literary aspects of the play, and group evaluation of its representational value and effectiveness. All students in the course are involved in some aspect of production of the play, and write a final paper as a course requirement. Credit is variable depending

upon the student's role in play production: a minimum of 50 hours of work is required for 1 credit; a maximum of 2 credits are awarded for 100 hours or more of work.

**SPANL 331(3310) Tales of Love and Lust (also NES 343[3430])**

Fall. 4 credits. Prerequisites: two of the following courses: SPANL 214 (formerly 316), SPANL 215 (formerly 318), and SPANL 217 (formerly 319), or permission of instructor. Conducted in Spanish.

M. A. Garces.

The novella, a short fiction whose name alludes to both "novelty" and "news" (nouvelles), attained such perfection in the hands of Cervantes that he was called by one of his contemporaries "the Spanish Boccaccio." Despite the title of his collection, *Novelas ejemplares*, these narratives are not exemplary: their scenes of rape, seduction, adultery, and witchcraft not only challenged social structures and reigning ideologies, but also constituted daring literary experiments which question the status of fiction. This course will trace the development of the novella in the 17th-century Spain, studying a range of short fictions by Cervantes, María de Zayas, and other authors.

**SPANL 333(3330) Latin American Short Story**

Fall. 4 credits. Prerequisites: two of the following courses: SPANL 214 (formerly 316), SPANL 215 (formerly 318), and SPANL 217 (formerly 319), or permission of instructor. Conducted in Spanish.

E. Paz-Soldán.

The short story is one of the most prestigious genres of the Latin American tradition. In this course, we will trace the development of the genre in its modern version, from the modernistas in late 19th-century until present times. We will focus on the major canonical writers of the genre: Quiroga, Borges, Cortázar, Rulfo, García Márquez, Lispector.

**SPANL 375(3750) Literature and Cinema of the Cuban Revolution**

Spring. 4 credits. Prerequisites: SPANR 214 (formerly 316), SPANR 215 (formerly 318), and SPANR 217 (formerly 319) or permission of instructor. J. A. Hernandez.

An introduction to some of the most relevant cultural expressions created in Cuba after the triumph of the Revolution (1959). How did the movies, novels, short stories and poetry represent the conflicts generated by the Revolution? How were issues of class, race and gender expressed by filmmakers, poets and novelists? We will approach the above mentioned and other relevant topics (like the representation of Cuban nationhood and its relation to Latin America and the U.S.) reading authors like Alejo Carpentier, Jesús Díaz, Nicolás Guillén, Tomás Gutiérrez Alea, Sergio Giral, Nancy Morejón, Heriberto Padilla, José Lezama Lima and Reynaldo Arenas, among others.

**SPANL 419–420(4190–4200) Special Topics in Hispanic Literature**

419, fall; 420, spring. 2–4 credits each semester. Prerequisite: permission of instructor. Staff.

Guided independent study of specific topics. For undergraduates interested in special problems not covered in courses.



**SPANL 429-430(4290-4300) Honors Work in Hispanic Literature**

429, fall; 430, spring (yearlong). 8 credits. R grade fall semester, letter grade spring semester. Prerequisite: seniors with superior academic record; permission of instructor. M. A. Garcés and staff.

**SPANL 431(4310) 20th-Century Poetry (LA)**

Spring. 4 credits. Prerequisites: senior standing only; SPANL 217 (formerly 319), 214 (formerly 316) and 215 (formerly 318) or permission of instructor. Required of Spanish majors. Conducted in Spanish. J. M. Rodríguez-García.

How has 20th-century poetry shaped our modern consciousness and how has it in turn been shaped by the modernizing forces of positivism, liberalism, and secularization? The poetry of Spain and Spanish America written between 1900 and 1960 registers such perennial dichotomies as the celebration of the ephemeral and the nostalgia for transcendent truths; the need for solitude and the search for human fellowship; and the paradoxical attractions of primitivism and scientific progress. Through readings of canonical poems by the four most influential poets of 20th-century Spain (Antonio Machado, Juan Ramón Jiménez, Federico García Lorca, and Miguel Hernández) and the three Spanish American poets who have been awarded the Nobel Prize for Literature (Gabriela Mistral, Pablo Neruda, and Octavio Paz), we will examine a broad range of poetic modes and traditions. Special attention will be given to the political contexts informing the work of these poets as well as their ability to fuse the political, the elegiac, and the amorous impulses in lyrics of unsurpassed emotional power and beauty.

**SPANL 433(4330) Literature of the 19th Century Hispanic Caribbean (also SPANL 633 [6330]) # (LA)**

Fall. 4 credits. Prerequisites: SPANL 217 (formerly SPANL 319), 214 (formerly SPANL 316) and 215 (formerly 318) or permission of instructor. Conducted in Spanish. J. A. Hernández.

An introduction to the main topics of the 19th century Hispanic Caribbean. Nationalism, colonialism, race, slavery and abolitionism will be discussed. Authors like Martí, Saco, Hostos, Betances, Gómez de Avellaneda will be among our readings.

**SPANL 442(4420) The City as Text (also COM L 448[4480])**

Spring. 4 credits. Conducted in English. J. R. Resina.

For description, see COM L 446.

**SPANL 444(4440) Spanish Novel of the Franco Era (also SPANL 644[6440]) (LA)**

Spring. 4 credits. Prerequisites: SPANL 217 (formerly SPANL 319), 214 (formerly SPANL 316) and 215 (formerly SPANL 318) or permission of instructor. Conducted in Spanish. J. R. Resina.

Despite the exile of the majority of prestigious writers in 1939 and the dismal quality of the works published in the 40s, the novel begins to reassert itself in Spain in the 1950s and 60s. In this course we will trace the recuperation of this genre and the formation of an audience from the early work of Cela to the more experimental novels by Goytisolo and Benet. We will read selected works by authors such as Camilo José Cela, José María

Gironella, Ana María Matute, J. Amat-Piniella, Rafael Sánchez Ferlosio, Llorenç Villalonga, Luis Martín Santos, Juan Benet, María Aurelia Capmany, and Juan Goytisolo.

**SPANL 450(4500) Literature of the Conquest (also SPANL 650 [6500]) # @ (LA)**

Spring. 4 credits. Prerequisite: SPANL 217 (formerly SPANL 319), 214 (formerly SPANL 316) and 215 (formerly SPANL 318) or permission of instructor. Conducted in Spanish. M. A. Garcés.

This course examines the cultural and psychological impact of the "Discovery" on the literatures of the Old and the New World. In a voyage that takes us from the Caribbean to the mesetas of Ancient Mexico and the Andean regions of South America, we will explore the formation of various discourses on the New World through a close reading of 16th- and 17th-century European and Amerindian texts. Particular attention will be paid to the formation of an "American discourse" in the literary subjects who launched a counter-offensive against the political views of the colonizers. Reading selections may be drawn from Columbus, Cabeza de Vaca, Bartolomé de las Casas, Hernán Cortés, Bernal Díaz, Aztec and Maya Testimonies on the Conquest, Michel de Montaigne, Pedro Cieza de León, Inca Garcilaso de la Vega, Guaman Poma, and Alonso de Ercilla among others.

**SPANL 480(4800) The Return of the Real: New Realisms in Latin American Narrative (also PORT 480[4800])**

Fall. 4 credits. Prerequisites: SPANL 214 (formerly SPANL 316), SPANL 215 (formerly SPANL 318), and SPANL 217 (formerly SPANL 319) or permission of instructor. Conducted in Spanish. L. Horne.

For description see PORT 480.

**SPANL 607(6070) Proseminar (also FRLIT/ITAL 607[6070])**

Fall. 2 credits. D. Castillo and staff.

For description, see FRLIT 607.

**SPANL 633(6330) Literature of the 19th Century Hispanic Caribbean (also SPANL 433[4330])**

Fall. 4 credits. Conducted in Spanish. J. A. Hernández.

For description, see SPANL 433.

**SPANL 639-640(6390-6400) Special Topics in Hispanic Literature**

639, fall; 640, spring. 2-4 credits each semester. Staff.

**SPANL 644(6440) Spanish Novel of the Franco Era (also SPANL 444[4440])**

Spring. 4 credits. Conducted in Spanish. J. R. Resina.

For description, see SPANL 444.

**SPANL 650(6500) Literature of the Conquest (also SPANL 450[4500])**

Spring. 4 credits. Conducted in Spanish. M. A. Garcés.

For description, see SPANL 450.

**SPANL 667(6670) Modern Lyric Forms**

Fall. 4 credits. J. M. Rodríguez-García.

Are poetry and literary translation intrinsically "empty forms" [formas vacías]? Has it always been so, since at least the 17th century, for poets interested in effecting a "linguistic turn" in lyric discourse? The tropes of silence, fragmented bodies, and empty forms are all constituent elements of the anti-romantic

strand of modernist poetics. More generally, they enjoyed great currency among Spanish-language poets of both the 17th and the 20th centuries. The authors featured in this course include numerous self-reflexive lyricists whose contribution to either "pure poetry" or the so-called "writing of the body" (or both) has long been recognized. This is the case with Luis de Góngora, Francisco de Rioja, Sor Juana Inés de la Cruz, Stéphane Mallarmé, Wallace Stevens, Juan Ramón Jiménez, Jorge Guillén, and especially Octavio Paz. The Mexican author's ideas about language, poetry, translation, and history will be discussed in the context of his engagement with baroque, symbolist, and surrealist traditions of writing. A substantial part of the course will focus on the work of translator-poets, from Francisco de Quevedo to Andrés Sánchez Robayna.

**SPANL 690(6900) Hispanic Feminisms**

Spring. 4 credits. Conducted in Spanish. D. Castillo.

This seminar is designed to explore the interrelationship of feminist literary theory and the narrative production of the Hispanic world. We will be looking at key literary and theoretical texts that grounded the 1980s boom in attention to women's literature (Castellanos, Valenzuela, Franco, Sommer, Martín-Márquez) through more recent interest in lesbian/gay/queer theory (Molloy, Blanco, Muñoz) and transgender theory (Sifuentes-Jauregui, Carrier, Prieur). As case studies we will be looking at examples from a range of sub-genres: best-sellers, testimonios, popular culture and high art texts and films.

**RUSSIAN**

N. Pollak, chair (on leave 2006-2007); P. Carden, acting chair (fall 2006) and director of undergraduate studies (on leave spring 2007) (226B Morrill Hall, 255-8350); S. Paperno, director of Russian language program (226E Morrill Hall); W. Browne (on leave fall 2006), R. Krivitsky, S. Senderovich (on leave fall 2006), G. Shapiro, V. Tsimberov. Visiting: K. Bättig von Wittelsbach, G. Golkowska, G. Nehler

For updated information, consult our web sites:

(literature) [www.arts.cornell.edu/russian](http://www.arts.cornell.edu/russian) (language) <http://russian.cornell.edu>

**The Russian Major**

Russian majors study Russian language, literature, and linguistics and emphasize their specific fields of interest. It is desirable, although not necessary, for prospective majors to complete RUSSA 121-122, 203-204, and RUSSL 209 as freshmen and sophomores, because these courses are prerequisites to most of the junior and senior courses that count toward the major. Students may be admitted to the major upon satisfactory completion of RUSSA 122 or the equivalent. Students who elect to major in Russian should consult the director of undergraduate studies as soon as possible. For a major in Russian, students are required to complete (1) RUSSA 303-304 or the equivalent, and (2) 18 credits from 300- and 400-level literature and linguistics courses, of which 12 credits must be in literature in the original Russian.

With the permission of the instructor, students may add 1 credit to certain literature courses

by registering for RUSSA 491. Such courses involve a one-hour section each week with work in the Russian language. Students may count two 1-hour credits toward the 12 hours of Russian literature in the original language required for the major.

## Satisfying the Foreign Language Requirement

### 1. Under Options 1a and 1b:

1a. Any Russian-language (RUSSA) course totaling 3 or 4 credits at the 200 level or above (with the exception of RUSSA 300 Directed Study) satisfies the Arts and Sciences language requirement under Option 1a.

1b. Under Options 1a and 1b: After completing the prerequisites RUSSA 121 and RUSSA 122, students may satisfy the language requirement by taking RUSSL 209. Students who qualify may satisfy the language requirement by taking RUSSL 212. Other RUSSL courses that are taught in Russian may also be used when appropriate.

### 2. Under Option 2:

- In two semesters: RUSSA 103 and 121 in the fall, RUSSA 104 and 122 in the spring.
- In three semesters: RUSSA 121 in the fall, 122 in the spring, 203 the following fall.
- In four semesters: RUSSA 121 in the fall, 122 in the spring, 125 the following fall, 126 the following spring.

## Study Abroad

Students from Cornell frequently participate in the Council on International Educational Exchange and the American Council of Teachers of Russian programs for language study, as well as other Russian language programs. Opportunities are available for study during the summer, a single semester, or the full year. Further information is available from Professor Wayles Browne in the Department of Linguistics (220 Morrill Hall) and from the Cornell Abroad Office.

**Honors.** Students taking honors in Russian undertake individual reading and research and write an honors essay. Students planning to take honors should consult the director of undergraduate studies in their junior year.

## Russian Language

Detailed information and schedules of the Russian language courses, as well as office hours of the instructors, are available at: <http://russian.cornell.edu>.

Suggested tracks for first- and second-year Russian language study:

- First-year intensive: 103 + 121 in the fall, 104 + 122 in the spring
- First-year nonintensive: 121 in the fall, 122 in the spring
- Second-year intensive: 125 + 203 in the fall, 126 + 204 in the spring
- Second-year nonintensive: 203 in the fall, 204 in the spring
- Second-year "mostly reading; lighter load": 125 in the fall, 126 in the spring

### RUSSA 103-104(1103-1104)

#### Conversation Practice

103, fall; 104, spring. 2 credits each semester. Students must enroll in one sec of 103 and one sec of 121 in fall and one sec of 104 and one sec of 122 in spring. R. Krivitsky.

Reinforces the speaking skills learned in RUSSA 121 and 122. Homework includes assignments that must be done in the language lab or on the students' own computers.

### RUSSA 121-122(1121-1122) Elementary Russian through Film

121, fall or summer; 122, spring or summer. 4 credits each semester.

Prerequisite for RUSSA 122, RUSSA 121.

R. Krivitsky, S. Paperno, and V. Tsimberov.

Gives a thorough grounding in all the language skills: listening, speaking, reading and writing. Course materials include clips from original Russian films and TV programs. Homework includes assignments that must be done in the language lab or on the students' own computers.

### RUSSA 125-126(1125-1126) Reading Russian Press

125, fall; 126, spring. 2 credits each semester. Sec. 1 for non-native speakers of Russian; sec. 2 for native speakers of Russian. Prerequisite for 125 sec. 1: RUSSA 122 or placement by department; prerequisite for 126 sec. 1: RUSSA 125 or placement by department; prerequisite for 125 and 126 sec. 2: placement by department. Times TBA with instructors.\* See starred (\*) note at end of RUSSA section. S. Paperno and V. Tsimberov.

The emphasis is on reading unabridged articles on a variety of topics from current Russian periodicals and web pages and translating them into English; a certain amount of discussion (in Russian) may also be undertaken.

### RUSSA 203-204(2203-2204) Intermediate Composition and Conversation

203, fall; 204, spring. 3 credits each semester. Prerequisite: for RUSSA 203, RUSSA 122 and 104, or RUSSA 122 with grade higher than B, or placement by department; for RUSSA 204, RUSSA 203 or equivalent. R. Krivitsky, S. Paperno, and V. Tsimberov.

Guided conversation, translation, reading, pronunciation, and grammar review, emphasizing the development of accurate and idiomatic expression in the language. Course materials include video clips from an original Russian feature film and work with Russian web sites.

### RUSSA 300(3300) Directed Studies

Fall or spring. 1-4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor.\* See starred (\*) note at end of RUSSA section. Staff.

Taught on a specialized basis for students with special projects (e.g., to supplement a non-language course or thesis work).

### RUSSA 303-304(3303-3304) Advanced Composition and Conversation

303, fall; 304, spring. 4 credits each semester. Prerequisite: for RUSSA 303, RUSSA 204 or equivalent; for RUSSA 304, RUSSA 303 or equivalent. R. Krivitsky, S. Paperno, and V. Tsimberov.

Reading, writing, and conversation: current Russian films (feature and documentary), newspapers, TV programs, Russian web sites, and other materials are used. In some years,

completing interviews with native speakers of Russian is a component of RUSSA 304.

### RUSSA 305-306(3305-3306) Reading and Writing for Heritage Speakers of Russian

305, fall; 306, spring. 2-3 credits, variable. Prerequisite: placement by department. Times TBA with instructor.\* Please see starred (\*) note at end of RUSSA section. Course may be cancelled if enrollment is insufficient. S. Paperno and R. Krivitsky.

Intended for students who speak grammatically correct Russian but do not know Russian grammar and have not learned to read or write Russian well (or have not learned written Russian at all). The two courses are very similar and do not constitute a sequence. Each may be taught slightly faster or slower in a given year, depending on the needs and interests of the students. Two classes a week teach writing and grammar and include related reading. These classes are required, and the students who take them receive 2 credit hours. The third (optional) class teaches reading and discussion, and grants an additional credit hour.

### RUSSA 308(3308) Russian Through Popular Culture

Spring. 2-3 credits, variable. Prerequisite: RUSSA 304 for non-native speakers of Russian; RUSSA 305 or 306 for heritage speakers of Russian; for all others with advanced knowledge of Russian, placement by department. Not open to fluent native speakers of Russian (recommended: RUSSA 309/310 and RUSSL courses). Conducted in Russian. Times TBA with instructor.\* Please see starred (\*) note at end of RUSSA section. R. Krivitsky.

Aims to expand the students' vocabulary and their comprehension, speaking, reading, and writing skills, as well as cultural competence, through a mosaic study and discussion of a variety of styles in contemporary Russian popular culture (1970's through the present). Course materials include traditional and urban folklore, film, animation, published texts (prose and poetry), and recordings of songs. Includes two or three essays or similar writing assignments. Work is distributed so that a student may attend all three weekly meetings for 3 credit hours or only two of the meetings for 2 credit hours.

### RUSSA 309-310(3309-3310) Advanced Reading

309, fall; 310, spring. 4 credits each semester. Sec. 1 for non-native speakers of Russian; sec. 2 for native speakers of Russian. Prerequisites: for sec. 1 of RUSSA 309, RUSSA 204; for RUSSA 310, RUSSA 309 or equivalent; for sec. 2 of 309 and 310, placement by department. Times TBA with instructors.\* See starred (\*) note at end of RUSSA section. May be canceled if enrollment is insufficient. S. Paperno and V. Tsimberov.

Designed to teach advanced reading and discussion skills. In section 1, weekly reading assignments include 20-40 pages of unabridged Russian, fiction or nonfiction. In section 2, the weekly assignments are 100-130 pages. Discussion of the reading is conducted entirely in Russian and centered on the content of the assigned selection.

### RUSSA 401(4401) History of the Russian Language (also LING 417[4417]) (HA)

Spring. 4 credits. W. Browne.

For description, see LING 417-418.

**[RUSSA 403(4403) Linguistic Structure of Russian (also LING 443[4443]) (KCM)]**

Fall. Next offered 2007-2008.

For description, see LING 443-444.]

**RUSSA 413-414(4413-4414) Advanced Conversation and Stylistics**

413, fall; 414, spring. 2 credits each semester. Prerequisites: for RUSSA 413, RUSSA 304 or equivalent; for RUSSA 414, RUSSA 413 or equivalent. Times TBA with instructor.\* Please see starred (\*) note at end of RUSSA section. V. Tsimberov.

Involves discussion of authentic Russian texts and films (feature or documentary) in a variety of nonliterary styles and genres.

**RUSSA 491(4491) Reading Course: Russian Literature in the Original Language**

Fall or spring. 1 credit each semester.

Prerequisite: permission of instructor. Times TBA with instructor.\* Please see starred (\*) note at end of RUSSA section. Staff.

To be taken in conjunction with any Russian literature course at the advanced level. Students receive 1 credit for reading and discussing works in Russian in addition to their normal course work.

**[RUSSA 601(6601) Old Church Slavonic (also LING 661[6661])]**

Fall. Next offered 2007-2008.

For description, see LING 661.]

**[RUSSA 602(6602) Old Russian Texts (also LING 662[6662])]**

Spring. Next offered 2007-2008.

For description, see LING 662.]

**RUSSA 633-634(6633-6634) Russian for Russian Specialists**

633, fall; 634, spring. 1-4 credits, variable.

Prerequisite: four years of college Russian or equivalent. Times TBA with instructor.\* Please see starred (\*) note at end of RUSSA section. Staff.

Designed for students whose areas of study require advanced active control of the language. Fine points of syntax, usage, and style are discussed and practiced. Syllabus varies from year to year.

**[RUSSA 651(6651) Comparative Slavic Linguistics (also LING 671[6671])]**

Fall. Next offered 2007-2008.

For description, see LING 671.]

\*\*For courses marked "Times TBA with instructor (\*\*)" taught by Wayles Browne, contact Professor Browne (ewb2@cornell.edu or 255-0712) for the time and place of his organizational meeting.

**Russian Literature**

A variety of courses is offered in Russian literature. Readings may be in English translation or in the original Russian or both (see course descriptions). Instruction often encompasses culture and intellectual history as well as literature. Some courses are cross-listed with appropriate departments.

First-Year Writing Seminars: consult the John S. Knight Institute brochure for times, instructors, and descriptions. Next offered 2008-2009.

**[RUSSL 207-208(2207-2208) Themes from Russian Culture # (LA)]**

Spring. 3 credits. In translation. Offered alternate years; next offered 2008-2009. G. Shapiro.

These courses are based on lectures, discussions, and audio-visual presentations and cover various aspects of Russian culture, such as literature, art, architecture, music, religion, philosophy, and social thought. RUSSL 207 extends through the 18th century, and RUSSL 208 covers the 19th and 20th centuries.]

**RUSSL 209(2209) Readings in Russian Prose and Poetry # (LA)**Fall. 3 credits. *Satisfies Option 1.*

Prerequisite: For students with 2+ semesters of Russian language (RUSSA 121/122 or equivalent). Readings in Russian/discussion in English. G. Shapiro.

Short classics of 19th-20th centuries, including Pushkin, Dostoevsky, Tolstoy, Blok, Pasternak. Assignments adjusted for native fluency. May be used as a prerequisite for RUSSL 300-400 courses with reading in Russian.

**RUSSL 212(2212) Readings in 20th-Century Russian Literature (LA)**Spring. 3 credits. *Satisfies Option 1.*

G. Shapiro.

Goals are to introduce students to 20th-century Russian literature in the original and to improve their Russian reading and writing skills. Readings are from 20th-century masters such as Bunin, Bulgakov, and Nabokov. All reading, writing, and discussion in Russian. Course designed for students with native background needing another course to satisfy the language requirement. May be used as a prerequisite for RUSSL 300-400 courses with reading in Russian.

**[RUSSL 279(2279) The Russian Connection, 1830 to 1867 (also COM L 279[2790]) # (LA)]**

4 credits. Next offered 2008-2009.

P. Carden.

Examines Russian prose of mid-19th century (Lermontov, Tolstoy) against background of European prose (Rousseau, Musset, Stendhal, Thackeray, et al.).

**[RUSSL 280(2280) The Russian Connection, 1870 to 1960 (also COM L 280[2800]) (LA)]**

4 credits. Next offered 2008-2009.

P. Carden.

Examines the Dostoevskian novel against background of European prose (Diderot, Camus, Sarraute, et al.).

**RUSSL 331(3331) Introduction to Russian Poetry # (LA)**

Spring. 4 credits. Prerequisite: proficiency in Russian or permission of instructor. May be counted toward 12 credits of Russian literature in original language for Russian major. S. Senderovich.

A survey of Russian poetry, with primary emphasis on the analysis of individual poems by major poets.

**[RUSSL 332(3332) Russian Drama and Theater (also THETR 322[3220]) # (LA)]**

4 credits. Next offered 2008-2009.

S. Senderovich.

19th-20th century plays (Gogol, Ostrovsky, Chekhov). Historical period, cultural atmosphere, literary trends. In translation.]

**[RUSSL 333(3333) 20th-Century Russian Poetry (LA)]**

4 credits. May be counted toward 12 credits of Russian literature in original language for Russian major. Next offered 2008-2009. N. Pollak.

Close readings of lyrics by major 20th-century poets. All readings are in Russian.]

**[RUSSL 334(3334) The Russian Short Story # (LA)]**

Fall. 4 credits. Prerequisite: proficiency in Russian or permission of instructor. May be counted toward 12 credits of Russian literature in original language for Russian major. Next offered 2008-2009. P. Carden. Survey two centuries of Russian storytelling. Analysis of individual stories by major writers. Emphasis on narrative structure and on related landmarks of Russian literary criticism.]

**RUSSL 335(3335) Gogol # (LA)**

Spring. 4 credits. G. Shapiro. Selected works of Gogol are read closely and viewed in relation to his life and to the literature of his time. Readings are in English translation.

**[RUSSL 337(3337) Films of Russian Literary Masterpieces (also COM L 338[3380]) (LA)]**

4 credits. Next offered 2008-2009.

S. Senderovich.

Comparative analysis of American films based on Russian novels: *War and Peace* and *Dr. Zhivago*. Problems of translation between media and cultures.]**[RUSSL 338(3338) Lermontov's Hero of Our Time # (LA)]**

Spring. 4 credits. Next offered 2008-2009. N. Pollak.

Mikhail Lermontov's *Hero of Our Time* has been called the first major Russian novel. Readings in Russian, with attention to linguistic and literary problems.]**RUSSL 350(3350) Education and the Philosophical Fantasies (also COM L 350[3500]) # (LA)**

Fall. 4 credits. P. Carden.

A major philosophical tradition has conceived of education as encompassing the whole of our lives. What we should do or be is seen as the result of every choice we make. The whole of our human context is understood as a school in which we form ourselves. This all-encompassing vision of education has been embodied in the works of the great philosopher-fantasists who use the forms of fiction to explore fundamental issues of education. Students examine several key philosophical fantasies, among them Plato's *Republic*, Rousseau's *Emile*, and Tolstoy's *War and Peace*. The aim is to understand how the discourse on education became a central part of our modern tradition.**[RUSSL 367(3367) The Russian Novel # (LA)]**

Spring. 4 credits. Next offered 2008-2009. Students who read Russian may sign up for a discussion section of the Russian text for 1 credit (RUSSA 491). N. Pollak.

The rise of the Russian novel in the 19th century: Pushkin, Lermontov, Turgenev, Dostoevsky, Tolstoy, Chekhov. Readings in translation.]

**[RUSSL 368(3368) 20th-Century Russian Literature (LA)]**

Spring. 4 credits. In translation. Students who read Russian may sign up for discussion of Russian text for 1 credit (RUSSA 491). In translation. Next offered 2007-2008. G. Shapiro.

A survey of 20th-century Russian prose, including such writers as Bunin, Bulgakov, and Nabokov, as well as Solzhenitsyn, Shalamov, and Voinovich.]

**[RUSSL 369(3369) Dostoevsky # (LA)**

Fall. 4 credits. Limited to 40 students. Next offered 2007–2008. P. Carden.

A survey of Dostoevsky's major novels: *Notes from Underground*, *Crime and Punishment*, *The Idiot*, and *The Brothers Karamazov*. Readings in English translation.]

**[RUSSL 373(3373) Chekhov in the Context of Contemporary European Literature and Art # (LA)**

4 credits. Next offered 2008–2009. S. Senderovich.

Anton Chekhov's stories in the context of the European art of the short story and contemporary paintings. Readings in English translation.]

**[RUSSL 385(3385) Reading Nabokov (also ENGL 379[3790]) (LA)**

Fall. 4 credits. Limited to 18 students; priority given to seniors. G. Shapiro. Offers an exciting trip into the intricate world of Nabokovian fiction. After establishing himself in Europe as a distinguished Russian writer at the outbreak of World War II, Nabokov came to the United States, where he re-established himself as an American writer of world renown. In our analysis of the Nabokovian artistic universe, we focus on his Russian corpus of works, from *Mary* (1926) to *The Enchanter* (writ. 1939), all in English translation, and examine the two widely read novels that he wrote in Ithaca while teaching literature at Cornell, *Lolita* (1955) and *Invitation to a Beheading* (1957).

**[RUSSL 393(3393) Honors Essay Tutorial**

Fall and spring. 8 credits. Must be taken in two consecutive semesters in senior year; credit for first semester is awarded upon completion of second semester. For information, see director of undergraduate studies. Times TBA with instructor. Staff.

**[RUSSL 409(4409) Russian Stylistics (LA)**

Spring. 4 credits. Also open to graduate students. Prerequisite: proficiency in Russian or permission of instructor. This course may be counted toward the 12 credits of Russian literature in the original language for the Russian major. Next offered 2008–2009. S. Senderovich.

Beyond normative grammar. Introduction to idiomatic Russian (morphology, syntax, vocabulary, phraseology) and genres of colloquial and written language. Development of writing skills.

**[RUSSL 415(4415) Post-Symbolist Russian Poetry (LA)**

4 credits. Prerequisite: proficiency in Russian or permission of instructor. This course may be counted toward the 12 credits of Russian literature in the original language for the Russian major. Next offered 2008–2009. N. Pollak.

Verse, critical prose, and literary manifestos by selected early 20th-century Russian poets, including Annenskii, Pasternak, and Mandelstam.]

**[RUSSL 430(4430) Practice in Translation (LA)**

Spring. 4 credits. Prerequisite: proficiency in Russian or permission of instructors. Next offered 2007–2008. W. Browne and S. Senderovich.

Practical workshop in translation: documents, scholarly papers, literary works (prose and poetry). Mostly Russian to English, some English to Russian.]

**[RUSSL 432(4432) Pushkin # (LA)**

Spring. 4 credits. Prerequisite: proficiency in Russian or permission of instructor. May be counted toward 12 credits of Russian literature in original language for Russian major. Next offered 2007–2008. S. Senderovich.

Reading in the original language and discussion of selected works by Pushkin: lyrics, narrative poems, and *Eugene Onegin*.]

**[RUSSL 433(4433) Short Works of Tolstoy**

Fall. 4 credits. Prerequisite: RUSSL 209 or 212 or equivalent mastery of Russian language skills. P. Carden.

A selection of short stories and short novels will be read in the original Russian text. Class discussion will focus on the themes and style of Tolstoy's writings, with particular attention to his use of the Russian idiom. The assignments will be adjusted to take into account the language capabilities of those enrolled. Discussion and papers will be in English.

**[RUSSL 437(4437) A Moralist and a Pornographer (LA)**

Spring. 4 credits. Limited to 15 students. Next offered 2008–2009. S. Senderovich.

Bestsellers *Doctor Zhivago* and *Lolita* (both October 1958) concerned the sexual exploitation of a teenage girl. Pasternak's novel, hailed as highbrow and highly moral, received the Nobel Prize. Nabokov's novel, perceived as a pornographic text, could not be published in the U.S.]

**[RUSSL 492(4492) Supervised Reading in Russian Literature**

Fall or spring. 1–4 credits each semester. Independent study. Prerequisite: students must find an advisor and submit a plan before signing up. Times TBA with instructor. Staff.

**[RUSSL 493(4493) Anton Chekhov # (LA)**

4 credits. Prerequisite: proficiency in Russian or permission of instructor. Next offered 2008–2009. S. Senderovich. Major works of Chekhov in Russian; focus on style and language. Readings include stories ("Anna on the Neck," "Darling," "Steppe") and plays (*Uncle Vanya* and *Seagull*).]

**[RUSSL 499(4499) The Avant-Garde in Russian Literature and the Arts (LA)**

Fall. 4 credits. Prerequisite: proficiency in Russian or permission of instructor. Next offered 2007–2008. P. Carden. Literature, theater, and the visual arts in the richly innovative period 1890–1920.]

**Graduate Seminars****[RUSSL 605(6605) Russian Analytical Approaches to Literature**

Fall. 4 credits. Prerequisite: proficiency in Russian or permission of instructor. Next offered 2008–2009. Staff.

Russian critical and theoretical approaches to literature (19th–20th centuries) against the background of contemporary American and European critical theory. Veselovsky, Tynianov, Jakobson, Bakhtin, Senderovich.]

**[RUSSL 611(6611) Supervised Reading and Research**

Fall or spring. 2–4 credits each semester. Prerequisite: proficiency in Russian or permission of instructor. Times TBA with instructor. Staff.

**Related Languages****Czech****CZECH 300(3300) Directed Studies**

Spring. 1–4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor.\*\* See double-starred (\*\*) note at end of UKRAN section. W. Browne. Taught on a specialized basis to address particular student needs.

**Hungarian****[HUNGR 131–132(1131–1132) Elementary Hungarian**

3 credits. Prerequisite: For 132: HUNGR 131 or permission of instructor. This language series (131–132) is not sufficient to satisfy the language requirement. Next offered 2007–2008. G. Nehler.

Teaches the basic grammar of Hungarian. Designed to aid the student in all facets of language acquisition: speaking, listening comprehension, reading, and writing. Second-semester Hungarian (132) teaches more advanced grammar of the language at an intermediate level.]

**[HUNGR 133–134(1133–1134) Continuing Hungarian**

133, fall; 134, spring. 3 credits. Prerequisite: for 133, HUNGR 132 or permission of instructor; for 134, HUNGR 133 or permission of instructor. This language series (133–134) is not sufficient to satisfy the language requirement. G. Nehler.

A conversation and reading course designed to aid the student in all facets of language acquisition: speaking, listening comprehension, reading, and writing. Fourth-semester Hungarian (134) teaches more advanced instruction of the language at an intermediate level.

**[HUNGR 300(3300) Directed Studies**

1–4 credits, variable. Prerequisite: permission of instructor. Times TBA with instructor.\*\* See double-starred (\*\*) note at end of UKRAN section. Next offered 2007–2008. Staff.

Taught on a specialized basis to address particular student needs.]

**[HUNGR 427(4427) Structure of Hungarian (also LING 427[4427]) (KCM)**

Next offered 2008–2009. For description, see LING 427.]

**Polish****[POLSH 131–132(1131–1132) Elementary Polish**

131, fall; 132, spring. 3 credits each semester. Prerequisite: for POLSH 132, POLSH 131 or equivalent. This language series (131–132) is not sufficient to satisfy the language requirement. Offered alternate years. K. Golkowska.

Covers all language skills: speaking, listening comprehension, reading, and writing.

**[POLSH 133–134(1133–1134) Continuing Polish**

133, fall; 134, spring. 3 credits each semester. Prerequisites: for POLSH 133, POLSH 132 or permission of instructor; for POLSH 134, POLSH 133 or equivalent. Times TBA with instructor. \*\*Offered alternate years; next offered 2007–2008. See double-starred (\*\*) note at end of UKRAN section. Staff.

An intermediate conversation and reading course.]

### **POLSH 300(3300) Directed Studies**

Fall or spring. 1-4 credits, variable.  
Prerequisite: permission of instructor.  
Times TBA with instructor.\*\* See double-starred (\*\*) note at end of UKRAN section.  
K. Golkowska.

Taught on a specialized basis to address particular student needs.

### **POLSH 301(3301) Polish through Film and Literature**

Spring. 3 credits. *Satisfies Option 1.*  
Prerequisite: POLSH 134 or permission of instructor. Times TBA with instructor.\*\*  
K. Golkowska.

All-skills course designed to build communicative proficiency in the language and provide insight into Polish culture. Short videos, films, and contemporary texts chosen for their thematic interest and linguistic accessibility provide the basis for practice in listening and reading comprehension, guided conversation, and a grammar review.

### **Serbo-Croatian**

#### **[SEBCR 131-132(1131-1132) Elementary Serbo-Croatian**

131, fall; 132, spring. 3 credits each semester. Prerequisite for SEBCR 132: SEBCR 131 or equivalent. This language series (131-132) is not sufficient to satisfy language requirement. Times TBA with instructor.\*\* Offered alternate years; next offered 2007-2008. See double-starred (\*\*) note at end of UKRAN section. Staff.

Covers all language skills: speaking, listening comprehension, reading, and writing. Includes Bosnian.]

#### **[SEBCR 133-134(1133-1134) Continuing Serbo-Croatian**

133, fall; 134, spring. 3 credits each semester. Prerequisite for SEBCR 133: SEBCR 132 or equivalent; for SEBCR 134: SEBCR 133 or equivalent. Times TBA with instructor.\*\* See double-starred (\*\*) note at end of UKRAN section. Offered alternate years; next offered 2008-2009. Staff.

An intermediate conversation and reading course.]

### **SEBCR 300(3300) Directed Studies**

Fall or spring. 1-4 credits variable.  
Prerequisite: permission of instructor.  
Times TBA with instructor.\*\* See double-starred (\*\*) note at end of UKRAN section.  
Staff.

Taught on a specialized basis to address particular student needs.

### **SEBCR 302(3302) Advanced Serbo-Croatian**

Fall. 3 credits. Prerequisite: SEBCR 134 or permission of instructor. K. Bättig von Wittelsbach.

Includes Bosnian as well as Croatian and Serbian. This is a third-year course with intensive speaking and writing practice. Selections from a variety of fictional and argumentative texts, as well as video materials illustrative of contemporary South Slavic societies (Croatia, Bosnia and Herzegovina, Serbia, Montenegro), will provide basis for discussions and essays. Review of select grammar topics is included. Students' grade will be based on participation, compositions, oral presentations, grammar exercises and a final exam.

### **Ukrainian**

#### **UKRAN 300(3300) Directed Studies**

Spring. 1-4 credits variable. Prerequisite: permission of instructor. Times TBA with instructor.\*\* See double-starred (\*\*) note at end of section. W. Browne.

Taught on a specialized basis to address particular student needs.

\*\*For these courses, contact Professor Browne (ewb2@cornell.edu or 255-0712) for time and place of organizational meeting(s).

### **SANSKRIT**

See "Asian Studies."

## **SCIENCE AND TECHNOLOGY STUDIES**

T. J. Pinch, chair (309 Rockefeller Hall, 255-6048); R. N. Boyd, P. R. Dear, S. H. Hilgartner, R. Kline, C. Leuenberger, B. V. Lewenstein, M. Lynch, A. G. Power, R. Prentice, J. V. Reppy, M. W. Rossiter, P. J. Sengers, S. Seth, K. Vogel. Emeritus: W. R. Lynn, L. P. Williams. Adjunct faculty: R. W. Miller, H. Shue, Z. Warhaft

In today's world, issues at the intersection of the technical and the social arise continually in all aspects of life, from the role of computers in society, the history of evolutionary theory, and the challenges of environmental controversies, to the ethical dilemmas of genomics and biomedicine. The field of science and technology studies (S&TS) addresses such issues through the study of the social aspects of knowledge, especially scientific and technological knowledge. S&TS explores the practices that shape science and technology, examines their social and cultural context, and analyzes their political and ethical implications. S&TS provides a strong liberal arts background from which students can go on to careers in law, medicine, environmental policy, business, and a variety of other professions where the social aspects of science and technology loom large.

### **The Science and Technology Studies Major**

S&TS courses are organized into a set of core courses plus three themes. Students select the theme that best represents their interests. In consultation with a faculty member, students may devise their own theme as long as it meets the general criteria of coherence and rigor.

#### **Admission to the Major**

Students intending to major in Science and Technology Studies should submit an application during their sophomore year. Juniors are considered on a case-by-case basis. The application includes (1) a one-page statement explaining the student's intellectual interests and why the major is consistent with the student's academic interests and goals; (2) the theme the student wishes to pursue in the major; (3) a tentative plan of courses fulfilling S&TS requirements; and (4) an up-to-date transcript of work completed at Cornell University (and elsewhere, if applicable).

Acceptance into the major requires completion of the following prerequisites:

1. S&TS 101 and 102, or S&TS 101 or 102 and an additional Social Science or Humanities course. (Students who have not taken S&TS 101 or 102, but have taken a different S&TS course and an additional Social Science or Humanities course should contact the S&TS department for guidance about whether those courses can substitute for the prerequisites.)
2. the science and quantitative requirement of the College of Arts and Sciences;

These courses cannot be used to fulfill the core or other course requirements for the major and must be taken for a letter grade. Sophomores in the process of completing these prerequisites may be admitted to the major on a *provisional* basis. Further information and application materials are available in 306 Rockefeller Hall (255-6047).

#### **Requirements**

S&TS majors must complete the following requirements:

Note: All courses used to fulfill major requirements must be taken for a letter grade, which must be C- or above.

1. Core: one course in each of the following groups (a-c).
  - a. Foundation (S&TS 201)
  - b. Ethics (choose from S&TS 205, 206, 360, or 490)
  - c. History (choose from S&TS 233, 250, 281, 282, 330, 355, 357, 447, 458, or 475)
2. Theme: Students must elect a theme and take four courses in the theme. Courses taken to satisfy the core course requirements may not be used as part of the required four courses in the theme. At least two of the courses should be at the 300 level or higher, and at least one should be at the 400 level.

Available themes are:

- a. Minds and Machines (S&TS 212, 250, 281, 282, 286, 292, 349, 354, 355, 356, 381, 387, 400, 409, 422, 431, 453, 481)
- b. Science, Technology, and Public Policy (S&TS 281, 282, 324, 331, 352, 357, 360, 390, 391, 401, 407, 411, 412, 433, 442, 444, 466, 468, 471, 473, 483, 487, 490)
- c. Life in Its Environment (S&TS 205, 206, 233, 281, 282, 285, 286, 287, 301, 311, 324, 331, 333, 411, 412, 420, 422, 431, 444, 447, 468, 471, 487, 495, or 496)

In consultation with an S&TS faculty advisor, students may also devise their own theme as long as it meets the general criteria of coherence and rigor.

3. Additional Science and Technology Studies Courses: additional courses to total 34 credit hours in the major, chosen from the general list of S&TS courses.
4. Science Requirement: in addition to the science requirement of the College of Arts and Sciences, Science and Technology Studies majors are required to take an additional two semesters of a natural science or engineering (including computer science). Mathematics sufficient to provide background for the additional



science requirement should be completed before undertaking that requirement. Choice of these courses should be made in consultation with the student's major advisor and should be related to the theme selected by the student.

### The Honors Program

The honors program is designed to provide independent research opportunities for academically talented S&TS majors. Students who enroll in the honors program are expected to do independent study and research, with faculty guidance, on issues in science and technology studies. Students who participate in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career. S&TS majors are considered for entry into the honors program at the end of the second semester of their junior year. To qualify for the S&TS honors program, students must have an overall Cornell cumulative grade point average (GPA) of at least 3.00 and a 3.30 cumulative GPA in courses taken for the major. Additionally, the student must have formulated a research topic, and have found a project supervisor and a second faculty member willing to serve as the advisors; at least one of these must be a member of the S&TS department. More information on the honors program is available from the S&TS undergraduate office at 306 Rockefeller Hall (255-6047).

### The Biology and Society Major

The Department of Science and Technology Studies also offers the Biology and Society major, which includes faculty from throughout the university. The Biology and Society major is designed for students who wish to combine the study of biology with exposure to perspectives from the social sciences and humanities. In addition to providing a foundation in biology, Biology and Society students obtain background in the social dimensions of modern biology and in the biological dimensions of contemporary social issues.

The Biology and Society major is offered to students enrolled in the College of Arts and Sciences, the College of Human Ecology, and the College of Agriculture and Life Sciences. The major is coordinated for students in all colleges through the Biology and Society office. Students can get information, specific course requirements, and application procedures for the major from the office in 306 Rockefeller Hall, 255-6047.

A full description of the Biology and Society major can be found on p. 477 of this catalog.

### The Concentration in Science and Technology Studies

T. J. Pinch, chair; R. N. Boyd, P. R. Dear, S. H. Hilgartner, R. Kline, C. Leuenberger, B. V. Lewenstein, M. Lynch, A. G. Power, R. Prentice, J. V. Reppy, M. W. Rossiter, P. J. Sengers, S. Seth, K. Vogel. Emeritus: W. R. Lynn, L. P. Williams. Adjunct faculty: R. W. Miller, H. Shue, Z. Warhaft

The concentration (or minor) in Science and Technology Studies (S&TS) is designed for students who wish to engage in a systematic, interdisciplinary exploration of the role of science and technology in modern societies. The concentration is intended for students with varied academic interests and career

goals. Majors in the natural sciences and engineering have an opportunity to explore the social, political, and ethical implications of their selected fields of specialization, while students majoring in the humanities and social sciences have a chance to study the processes, products, and impacts of science and technology from an S&TS perspective.

To satisfy the requirements for the S&TS concentration, students must complete with letter grades of C- or above a minimum of four courses selected from the course offerings listed for the major. At least one course must be chosen from the list of core courses. Two courses must be chosen from one of the themes listed below:

1. Minds and Machines
2. Science, Technology, and Public Policy
3. Life in Its Environment

The concentration is completed with one other course in S&TS. Interested students may obtain further information about courses and a list of course descriptions by contacting the S&TS undergraduate office, 306 Rockefeller Hall (255-6047).

#### Course Offerings

##### Introductory Course

##### Core Courses

Foundation Course

Ethics

History

##### Theme Courses

Minds and Machines

Science, Technology, and Public Policy

Life in Its Environment

##### Independent Study

##### Graduate Seminars

### First-Year Writing Seminars

Consult the John S. Knight Institute web site for times, instructors, and descriptions. Web site: [www.arts.cornell.edu/Knight\\_institute/index.html](http://www.arts.cornell.edu/Knight_institute/index.html).

### Introductory Courses

#### S&TS 101(1101) Science and Technology in the Public Arena (SBA)

Fall. 3 credits. S&TS 101 and 102 may be taken separately or in any order. Recommended as introduction to field; not required and may not be used to fulfill a major requirement. J. Reppy.

Introduction to public policy issues involving developments in science and technology. Studies such topics as secrecy and national security, the politics of expertise, public understanding of science, computers and privacy, and the management of risk. Applies concepts from the field of science and technology studies to analyze how issues are framed and public policy produced.

#### S&TS 102(1102) Histories of the Future (CA)

Spring. 3 credits. Recommended as introduction to field; not required and may not be used to fulfill a major requirement. S&TS 101 and 102 may be taken separately or in any order. R. Prentice.

From *Frankenstein* to *The Matrix*, science fiction and film have depicted contemporary science, technology, and medicine for almost two centuries. This course introduces students to historical and social studies of science and technology using science fiction films and novels, as well as key readings in science and technology studies. What social questions can fictional accounts raise that factual ones can only anticipate? How have "intelligent machines" from Babbage's Analytical Engine to Hal raised questions about what it means to be human? What can Marvel Comics teach us about changes in science and technology? When can robots be women and, in general, what roles did gender play in scientific, technological, and medical stories? How was the discovery that one could look inside the human body received? How do dreams and nightmares of the future emerge from the everyday work of scientific and technological research?

### Core Courses

#### Foundation Course

#### S&TS 201(2011) What Is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210[2100]) (CA)

Spring. 3 credits. K. Lambert.

Introduces some of the central ideas in the field of Science and Technology Studies (S&TS). As well as serving as an introduction to students who plan to major in Biology and Society or in Science and Technology Studies, the course is aimed at students with backgrounds in either the sciences or the humanities who are challenged to think more critically about what we mean by science, what counts as scientific knowledge and why, and how science and technology intervene in the wider world. The course is a mixture of lecture, discussion, and other activities. The discussion sections are an integral part of the course and attendance is required. In addition, a series of written assignments throughout the semester and a take-home final during exam week compose the majority of the grade.

#### Ethics

#### S&TS 205(2051) Ethical Issues in Health and Medicine (also B&SOC 205[2051]) (KCM)

Fall. 4 credits. Limited to 150 students. S. Hilgartner.

For description, see B&SOC 205.

#### S&TS 206(2061) Ethics and the Environment (also B&SOC 206[2061], PHIL 246[2460]) (KCM)

Spring. 4 credits. Limited to 50 students. P. Doing.

For description, see B&SOC 206.

#### S&TS 360(3601) Ethical Issues in Engineering (also ENGRG 360[3600])

Spring. 3 credits. Limited to juniors and seniors only. P. Doing.

For description, see ENGRG 360.

#### History

#### S&TS 233(2331) Agriculture, History, and Society: From Squanto to Biotechnology (HA)

Fall. 3 credits. M. Rossiter.

For description, see "Life in Its Environment" theme.

**S&TS 250(2501) Technology in Society  
(also ENGRG/ECE/HIST 250[2500])  
(HA)**

Fall. 3 credits. Offered alternate years.  
R. Kline.

For description, see ENGRG 250.

**S&TS 281(2811) Science in Western  
Civilization (also HIST 281[2810]) #  
(HA)**

Fall. 4 credits. P. Dear.

For description, see HIST 281.

**S&TS 282(2821) Science in Western  
Civilization (also HIST 282[2820]) #  
(HA)**

Spring. 4 credits. S&TS 281 is *not* a  
prerequisite to 282. P. Dear.

For description, see HIST 282.

**S&TS 330(3301) Physical Sciences in the  
Modern Age (also HIST 329[3290])  
(HA)**

Spring. 4 credits. K. Lambert.

Examines the history of the physical sciences in Europe and the United States from 1800 to the present. Students study such topics as the development of thermodynamics and electrodynamics, the quantum and relativity theories, science during the world wars, and post-war "big science." As well as a history of ideas, the course emphasizes the broader historical contexts in which physical science has been produced, focusing on issues raised in relation to Romanticism, the first and second industrial revolutions, social statistics, train travel, and the military-industrial-scientific complex, among others. Reading for the course ranges from primary source material (original papers by Thomson, Helmholtz, Planck, and Einstein) to extracts from Mary Shelley's *Frankenstein* and Michael Frayn's *Copenhagen*.

**[S&TS 357(3571) Engineering in  
American Culture (also ENGRG/HIST  
357[3570])**

Fall. 3 credits. Next offered 2007-2008.

R. Kline.

For description, see ENGRG 357.]

**S&TS 447(4471) Seminar in the History  
of Biology (also BIOEE 467[4670],  
B&SOC 447[4471], HIST 415[4150])  
(PBS)**

Summer and fall. 4 credits. W. Provine and  
K. Kennedy.

For description, see BIOEE 467.

**S&TS 458(4581) Intelligibility in Science  
(also HIST 458[4580])**

Spring. 4 credits. P. Dear.

For description, see HIST 458.

**S&TS 474(4741) Science and Race: A  
History (also S HUM 404)**

Fall. 4 credits. Limited to 15 students.

S. Seth.

For description, see S HUM 404.

**[S&TS 475(4751) Historical Issues of  
Science, Technology, Race, and  
Colonialism (also HIST 464[4640])  
(HA)**

Fall. 4 credits. Next offered 2007-2008.

S. Seth.]

**S&TS 476(4761) Science, Technology,  
Colonialism (also S HUM 426)**

Spring. 4 credits. Limited to 15 students.

S. Seth.

For description, see S HUM 426.

## Theme Courses

### Minds and Machines

**S&TS 250(2501) Technology in Society  
(also ECE/ENGRG/HIST 250[2500])  
(HA)**

Fall. 3 credits. Offered alternate years.

R. Kline.

For description, see ENGRG 250.

**S&TS 281(2811) Science in Western  
Civilization (also HIST 281[2810]) #  
(HA)**

Fall. 4 credits. P. Dear.

For description, see HIST 281.

**S&TS 282(2821) Science in Western  
Civilization (also HIST 282[2820]) #  
(HA)**

Spring. 4 credits. P. Dear.

For description, see HIST 282.

**S&TS 286(2861) Science and Human  
Nature (also PHIL 286[2861]) (KCM)**

Spring. 4 credits. R. Boyd.

For description, see PHIL 286.

**S&TS 292(2921) Inventing an Information  
Society (also ECE/ENGRG 298[2980],  
HIST 292[2920]) (HA)**

Spring. 3 credits. R. Kline.

For description, see ENGRG 298.

**S&TS 349(3491) Media Technologies  
(also INFO 349[3491], COMM  
349[3490]) (HA)**

Spring. 3 credits. Offered alternate years.

T. Gillespie.

For description, see COMM 349.

**S&TS 354(3541) The Sociology of  
Contemporary Culture (also SOC  
352[3520]) (CA)**

Fall. 4 credits. C. Leuenberger.

Introduces students to the rapidly expanding body of work at the intersection of sociology, cultural studies, and science and technology studies. Provides an introduction to theoretical debates in cultural studies and to sociological studies of culture. Discusses the emergence of the tourist industry, the significance of consumption in modern life, the culture of music and art, the use of rhetoric in social life, cultural and feminist analyses of knowledge and science, and the social construction of self, bodies, and identities.

**S&TS 355(3551) Computers: From  
the 17th Century to the Dot.com  
Boom (also INFO 355[3551], COMM  
355[3550]) (HA)**

Fall. 4 credits. No technical knowledge of  
computer use is presumed or required.

S&TS 355 and 356 can be taken separately  
or in any order. K. Lambert.

Computers have not always been ubiquitous boxes gracing our desktops: in Victorian London, Charles Babbage tried to build an analytical engine using brass gears and steel rods, and during World War II the Allied governments used sophisticated electro-mechanical and electronic "brains" to break Axis codes. How did computing technology, once useful only to technical specialists, come to colonize industry, academia, the military, and the home? This course explores the history of computing, placing ideas and technologies in social and historical context: for example, it relates Charles Babbage's difference engines to the factory system, IBM to the population census, and feedback systems and Turing machines to the demands of war. Looking at the history of the computer

teaches something of how technology, society and knowledge depend on and change one another. It also helps students discover something about the relationship between machines and society today. This is a course in the history of computing; a background in computer science is not required.

**[S&TS 356(3561) Computing Cultures  
(also INFO/VISST 356[3560], COMM  
356[3560]) (CA)**

Spring. 4 credits. No technical knowledge  
of computer use presumed or required.

S&TS 355 and 356 may be taken separately  
or in any order. Next offered 2007-2008.

P. Sengers and R. Prentice.

Computers are powerful tools for working, playing, thinking, and living. Laptops, PDAs, webcams, cell phones, and iPods are not just devices, they also provide narratives, metaphors, and ways of seeing the world. This course critically examines how computing technology and society shape each other and how this plays out in our everyday lives. Identifies how computers, networks, and information technologies reproduce, reinforce, and rework existing cultural trends, norms and values. Looks at the values embodied in the cultures of computing and consider alternative ways to imagine, build, and work with information technologies.]

**S&TS 381(3811) Philosophy of Science:  
Knowledge and Objectivity (also  
PHIL 381[3810]) (KCM)**

Fall. 4 credits. R. Boyd.

For description, see PHIL 381.

**[S&TS 387(3871) The Automatic  
Lifestyle: Consumer Culture and  
Technology (also INFO 387[3871])  
(CA)**

Spring. 4 credits. Next offered 2007-2008.

P. Sengers.]

**S&TS 400(4001) Components and  
Systems: Engineering in a  
Social Context (also M&AE  
400/401[4000/4010])**

Spring. 3 credits. Offered alternate years.

Z. Warhaft.

For description, see M&AE 400.

**S&TS 409(4091) From the Phonograph to  
Techno (also SOC 409[4090])**

Spring. 4 credits. T. Pinch.

In this seminar, we treat music and sound and the ways they are produced and consumed as socio-cultural phenomena. We specifically investigate the way that music and sounds are related to technology and how such technologies and sounds have been shaped by and have shaped the wider society and culture of which they are a part. We look at the history of sound technologies like the phonograph, the electronic music synthesizer, samplers, and the Sony walkman. Our perspective is drawn from social and cultural studies of science and technology. Students are encouraged to carry out a small original research project on their own favorite sound technology.

**S&TS 422(4221) New York Women (also  
FGSS 422[4220], HIST 445[4450])**

Fall. 4 credits. M. Rossiter.

For description, see S&TS 422 Life in Its  
Environment Theme.

**S&TS 431(4311) From Surgery to  
Simulation (SBA)**

Spring. 4 credits. R. Prentice.

A cliché among medical professionals says,  
"If you have a hammer, every problem

looks like a nail." In other words, treatment decisions often are dictated by available technologies. This course looks at medical technologies from dissection to x-rays to antidepressants and the ways they shape how medical professionals look at and practice upon the human body. Takes a broad view of technology, encompassing systems of practice that shape how work is conducted and the body is understood, as well as specific machines and treatments with specific uses. Considers how these technologies often are not only treatments for individual patients but also metaphors for larger cultural questions.

**S&TS 453(4531) Knowledge and Society (also SOC 453[4530]) (CA)**

Fall. 4 credits. Limited to 15 students.  
C. Leuenberger.

Focuses on the historical evolution of the sociology of knowledge as a theoretical paradigm and an empirical research field. Examines the phenomenological origins of the sociology of knowledge and many of its central texts. Studies how it has been applied to such areas as personhood, interaction, religion, identity, and the emotions. Also considers epistemological questions that arise, and cover various theoretical and empirical approaches that have been influenced by the sociology of knowledge such as ethnomethodology, conversation analysis, and the sociology of science and technology.

**S&TS 468(4681) Understanding Innovation**

Fall. 4 credits. J. Reppy.  
For description, see S&TS 468 Science, Technology and Public Policy.

**S&TS 481(4811) Philosophy of Science (also PHIL 481[4810], S&TS 681[6811]) (KCM)**

Spring. 4 credits. R. Boyd.  
For description, see PHIL 681.

**Science, Technology, and Public Policy**

**S&TS 281(2811) Science in Western Civilization (also HIST 281[2810]) # (HA)**

Fall. 3 credits. P. Dear.  
For description, see HIST 281.

**S&TS 282(2821) Science in Western Civilization (also HIST 282[2820]) # (HA)**

Spring. 4 credits. P. Dear.  
For description, see HIST 282.

**S&TS 324(3241) Environment and Society (also D SOC 324[3240]) (SBA)**

Fall and spring. 3 credits. Fall, C. Geisler; spring, G. Gillespie.  
For description, see D SOC 324.

**S&TS 331(3311) Environmental Governance (also B&SOC 331[3311], NTRES 331[3310]) (CA)**

Spring. 3 credits. S. Wolf.  
For description, see NTRES 331.

**S&TS 352(3521) Science Writing for the Mass Media (also COMM 352[3520])**

Fall. 3 credits. B. Lewenstein.  
For description, see COMM 352.

**[S&TS 357(3571) Engineering in American Culture (also ENGRG 357[3570], AM ST 356[3570], HIST 357[3570])**

Fall. 4 credits. Offered alternate years; next offered 2007–2008. R. Kline.  
For description, see ENGRG 357.]

**S&TS 360(3601) Ethical Issues in Engineering (also ENGRG 360[3600])**

Spring. 3 credits. P. Doing.  
For description, see ENGRG 360.

**S&TS 391(3911) Science in the American Polity, 1960 to Now (also GOVT 309[3091], AM ST 389[3911]) (SBA)**

Spring. 4 credits. S. Hilgartner.  
Reviews the changing political relations between science, technology, and the state in America from 1960 to the present. It focuses on the politics of choices involving science and technology in a variety of institutional settings, from Congress to courts and regulatory agencies. The tensions and contradictions between the concepts of science as an autonomous republic and as just another special interest provide a central theme for the course. Topics addressed include research funding, technological controversies, scientific advice, citizen participation in science policy, and the use of experts in courts.

**[S&TS 401(4011) Genomics and Society (also NS 401[4010])**

Fall. 3–4 credits. Taught in Washington, D.C. D. Pelletier.  
For description, see NS 401.]

**S&TS 407(4071) Law, Science, and Public Values (also B&SOC 407[4071]) (SBA)**

Spring. 4 credits. M. Lynch.  
Examines problems that arise at the interface of law and science. These problems include the regulation of novel technology, the role of technical expertise in public decision-making, and the control over scientific research. The first part of the course covers basic perspectives in science and technology studies (S&TS) and how they relate to legal decisions and processes. The second part covers a series of examples and legal cases on the role of expert judgments in legal and legislative settings, intellectual property considerations in science and medicine, and legal and political oversight of scientific research. The final part examines social processes and practices in legal institutions, and relates these to specific cases of scientific and technological controversy. Lectures and assignments are designed to acquaint students with relevant ideas about the relationship between legal, political, and scientific institutions, and to encourage independent thought and research about specific problems covered in the course.

**S&TS 411(4111) Knowledge, Technology, and Property (SBA)**

Spring. 4 credits. Prerequisite: one course in science and technology studies.  
S. Hilgartner.  
Should the human genome be treated as private property or a public resource? How should copyright be managed in the digital environment of the Internet? Is music "sampling" high-tech theft or artistic expression? Does bioprospecting represent an enlightened strategy for preserving biodiversity or a post-colonial means for transferring resources from the developing world to the North? Debate about the nature and scope of intellectual property is an increasingly salient feature of contemporary politics. This course examines the ownership of knowledge and technology, exploring fundamental tensions that intellectual property systems express and incompletely reconcile. Perspectives from science and technology studies, sociology, law, and economics inform the course.

Case studies explore the construction of property in contexts ranging from the early history of copyright to the ownership of life forms, airwaves, algorithms, artistic content, electronic databases, and the personal identities of celebrities.

**[S&TS 412(4101) Science, Technology, and Culture (also COM L 410[4100]) (CA)**

Fall. 4 credits. Next offered 2007–2008.  
A. Banerjee.  
For description, see COM L 410.]

**S&TS 433(4331) International History of Science # (HA)**

Spring. 4 credits. M. Rossiter.  
Survey of the major scientific events and institutions in several foreign nations, including developing countries. Covers the period 1660 to the present and gives some attention to who in each country becomes a scientist, who rises to the top, and who emigrates. Weekly readings and a research paper.

**S&TS 444(4441) Historical Issues of Gender and Science (also FGSS 444[4440]) (CA)**

Spring. 4 credits. Not open to freshmen.  
M. Rossiter.  
For description, see "Life in Its Environment" theme.

**S&TS 466(4661) Public Communication of Science and Technology (also COMM 466[4660])**

Spring. 3 credits. Limited to 15 students.  
B. Lewenstein.  
For description, see COMM 466.

**S&TS 468(4681) Understanding Innovation**

Fall. 4 credits. J. Reppy.  
Ideas about innovation occupy a central place in any description of our era, whether the topic is economic growth, military power, or globalization. The course will explore different ways of understanding the innovation process, the institutions and practices that are meant to foster innovation, and the issues that governments face when they seek to regulate innovations. We will read across a range of literature in economics, history, and science and technology studies.

**S&TS 471(4711) The Dark Side of Biology: Biological Weapons, Bioterrorism, and Biocriminality (also B&SOC 471[4711]) (SBA)**

Fall. 4 credits. K. Vogel.  
For description, see B&SOC 471.

**S&TS 483(4831) The Military and New Technology (also GOVT 483[4837]) (SBA)**

Spring. 4 credits. K. Vogel.  
For description, see GOVT 483.

**[S&TS 487(4871) Seminar in the History of the Environment (HA)**

Fall. 4 credits. Next offered 2007–2008.  
M. Rossiter.]

**[S&TS 490(4901) The Integrity of Scientific Practice (KCM)**

Fall. 4 credits. Next offered 2007–2008.  
S. Hilgartner.]

**Life in Its Environment**

**S&TS 205(2051) Ethical Issues in Health and Medicine (also B&SOC 205[2051]) (KCM)**

Fall. 4 credits. S. Hilgartner.  
For description, see B&SOC 205.

**S&TS 206(2061) Ethics and the Environment (also B&SOC 206[2061], PHIL 246[2460]) (KCM)**

Spring. 4 credits. P. Doing.  
For description, see B&SOC 206.

**S&TS 233(2331) Agriculture, History, and Society: From Squanto to Biotechnology (HA)**

Fall. 3 credits. M. Rossiter.  
Surveys the major themes in the development of agriculture and agribusiness in the United States in the 19th and 20th centuries. These include particular individuals (e.g., Liberty Hyde Bailey, Luther Burbank, G. W. Carver, Henry A. Wallace, and Norman Borlaug), the rise of government support and institutions (including U.S.D.A. and Cornell), noteworthy events (the dust bowl, World War II, and the environmental movement), and the achievements of the Green and "Gene" Revolutions.

**S&TS 281(2811) Science in Western Civilization (also HIST 281[2810]) # (HA)**

Fall. 3 credits. P. Dear.  
For description, see HIST 281.

**S&TS 282(2821) Science in Western Civilization (also HIST 282[2820]) # (HA)**

Spring. 4 credits. P. Dear.  
For description, see HIST 282.

**S&TS 285(2851) Communication in the Life Sciences (also COMM 285[2850])**

Spring. 3 credits. B. Lewenstein.  
For description, see COMM 285.

**S&TS 286(2861) Science and Human Nature (also PHIL 286[2861]) (KCM)**

Spring. 4 credits. R. Boyd.  
For description, see PHIL 286.

**S&TS 287(2871) Evolution (also BIOEE 207[2070], HIST 287[2870]) (PBS)**

Fall. 3 credits. W. Provine.  
For description, see BIOEE 207.

**S&TS 301(3011) Life Sciences and Society (also B&SOC 301[3011]) (SBA)**

Spring. 4 credits. M. Lynch.  
For description, see B&SOC 301.

**S&TS 311(3110) Sociology of Medicine (SBA)**

Spring. 4 credits. Not open to freshmen.  
C. Leuenberger.  
Provides an introduction to the ways in which medical practice, biomedical technology, and the medical profession are embedded in society and shaped by social phenomena. Accountability to patients and the public, and struggles over the control of medical practice in a world where medicine is connected to gender, class, race, and personal autonomy are important overarching themes. This course examines the structure of the medical profession; medical training and professional socialization; the social organization of the hospital; and doctor-patient interactions. Also explores how biomedical knowledge and technology are produced, assessed, and introduced into clinical practice. Topics may include the intensive-care unit, the training of surgeons, the regulation of pharmaceuticals, AIDS and breast cancer activism, genetic testing, and priority setting in biomedical science.

**S&TS 324(3241) Environment and Society (also D SOC/SOC 324[3240]) (SBA)**

Fall and spring. 3 credits. Fall, C. Geisler; spring, G. Gillespie.  
For description, see D SOC 324.

**S&TS 331(3311) Environmental Governance (also B&SOC 331[3311], NTRES 331[3310]) (CA)**

Spring. 3 credits. S. Wolf.  
For description, see NTRES 331.

**S&TS 409(4091) From the Phonograph to Techno (also SOC 409[4090])**

Spring. 4 credits. T. Pinch.  
In this seminar, we treat music and sound and the ways they are produced and consumed as socio-cultural phenomena. We specifically investigate the way that music and sounds are related to technology and how such technologies and sounds have been shaped by and have shaped the wider society and culture of which they are a part. We look at the history of sound technologies like the phonograph, the electronic music synthesizer, samplers, and the Sony walkman. Our perspective is drawn from social and cultural studies of science and technology. Students are encouraged to carry out a small original research project on their own favorite sound technology.

**S&TS 411(4111) Knowledge, Technology, and Property (SBA)**

Spring. 4 credits. Prerequisite: one course in science and technology studies.  
S. Hilgartner.

For description, see S&TS 411, "Science, Technology, and Public Policy" theme.

**[S&TS 412(4101) Science, Technology, and Culture (also COM L 410[4100]) (CA)**

Fall. 4 credits. Next offered 2007-2008.  
A. Banerjee.

For description, see COM L 410.]

**S&TS 420(4201) The Darwinian Scientific Revolution (also B&SOC 420[4201]) (HA)**

Fall. 4 credits. Offered only fall 2006.  
K. Lambert.

For description, see B&SOC 420.

**S&TS 422(4221) New York Women (also HIST 445[4450], FGSS 422[4220])**

Fall. 4 credits. M. Rossiter.  
Over the centuries New York State has been the site of activity for a great many women of consequence. This course is a one-semester survey of the past and present activities and contributions of rural and urban women in a variety of fields of interest to Cornell students—politics, medicine, science, the law, education, business (including hotels), entertainment, communications, government, labor, religion, athletics, the arts and other areas. Weekly readings and discussion and a paper, possibly using local or university archives. Limited to 15 students.

**S&TS 431(4311) From Surgery to Simulation (SBA)**

Spring. 4 credits. R. Prentice.  
For description, see "Minds and Machines."

**S&TS 444(4441) Historical Issues of Gender and Science (also FGSS 444[4440]) (CA)**

Spring. 4 credits. Not open to freshmen.  
M. Rossiter.

A one-semester survey of women's role in science and engineering from antiquity to the 1980s, with special emphasis on the United

States in the 20th century. Readings include biographies and autobiographies of prominent women scientists, educational writings and other primary sources, and recent historical and sociological studies. By the end of the semester, students attain a broad view of the problems that have faced women entering science and those that still remain.

**S&TS 447(4471) Seminar in the History of Biology (also B&SOC 447[4471], HIST 415[4150], BIOEE 467[4670]) (PBS)**

Summer and fall. 4 credits. Limited to 18 students. S-U grades optional. W. Provine and K. Kennedy.

For description, see BIOEE 467.

**S&TS 471(4711) The Dark Side of Biology: Biological Weapons, Bioterrorism, and Biocriminality (also B&SOC 471[4711]) (SBA)**

Fall. 4 credits. K. Vogel.  
For description, see B&SOC 471.

**[S&TS 487(4871) Seminar in the History of the Environment (HA)**

Spring. 4 credits. Next offered 2007-2008.  
M. Rossiter.]

**[S&TS 495(4951) Social Studies of the Human Sciences (CA)**

Spring. 4 credits. Next offered 2007-2008.  
C. Leuenberger.

Explores how the human and social sciences have provided the knowledge and categories we use to make sense of people and their behavior. Looking across a range of disciplines—including sociology, psychology, psychiatry, and economics—the course examines how human beings have become objects of scientific investigation. Discusses the rise of the human sciences and their role in politics, culture, and society.]

**S&TS 496(4961) Medicine and Healing in China (also HIST 496[4960], B&SOC 496[4961], ASIAN 469[4469])**

Spring. 4 credit. T. Hinrichs.  
For description, see HIST 496.

## Independent Study

**S&TS 399(3991) Undergraduate Independent Study**

Fall, spring. 1-4 credits. No more than 8 hours total of independent study (not including honors) can count toward S&TS major. Prerequisite: permission of instructor.

More information and applications available in 306 Rockefeller Hall.

**S&TS 499(4991/4992) Honors Project**

Fall and spring (yearlong)\*. Prerequisite: senior S&TS students by permission of department; overall Cornell cumulative GPA of 3.00 and 3.30 cumulative GPA in courses taken for major. Apply in 306 Rockefeller Hall.

Students admitted to the honors program are required to complete two semesters of honors project research and to write an honors thesis. The project must include substantial research, and the completed work should be of wider scope and greater originality than is normal for an upper-level course. The student must find a project supervisor and a second faculty member willing to serve as faculty reader; at least one of these must be a member of the S&TS department.

\*Students must register for total credits desired for the whole project each semester (e.g., 8 credits for the fall semester and 8 credits for the spring semester). After the fall semester, students will receive a letter grade of "R" for the first semester with a letter grade for both semesters submitted at the end of the second semester whether or not they complete a thesis, and whether or not they are recommended for honors. Minimally, an honors thesis outline and bibliography should be completed during the first semester. In consultation with the advisors, the director of undergraduate studies will evaluate whether the student should continue working on an honors project. Students should note that these courses are to be taken in addition to those courses that meet the regular major requirements. If students do not complete the second semester of the honors project, they must change the first semester to independent study to clear the "R" and receive a grade. Otherwise, the "R" will remain on their record and prevent them from graduating.

#### Graduate Seminars

##### [S&TS 626(6261) Seminar in the History of Technology (also HIST 525[5250])]

Spring. 4 credits. Next offered 2007–2008. R. Kline.

Exploration of the history of technology in Europe and the United States from the 18th century to the present. Typical topics include the industrial revolution in Britain, the emergence of engineering as a profession, military support of technological change, labor and technology, the "incorporation" of science and engineering, technological utopias, cultural myths of engineers and inventors, social aspects of urbanization in the city and on the farm, post-war consumerism, and gender and technology. The interests of students and recent literature in the field are considered in selecting the topics for the seminar.]

##### S&TS 627(6271) Making People Through Expert Knowledge

Spring. 4 credits. C. Leuenberger.

This seminar explores how the human and social sciences have provided the knowledge and categories we use to make sense of human beings and their behavior. Looking across a range of disciplines—including sociology, psychiatry, psychology, psychoanalysis, anthropology, and economics—we will look at how human beings have become objects of scientific investigation. We will focus on how culture, politics, and the professional environment impact the human sciences and how the use of rhetoric constitutes academic discourse. We will also focus on the social scientific construction of selves, sex, gender, and race.

##### [S&TS 628(6281) Self and Society]

Fall. 4 credits. Next offered 2007–2008. C. Leuenberger.

How has the self become a political, scientific, and cultural project caught up in the ideological battles of modern times? What roles do cultural institutions, politics and science play in making human beings visible, understandable, and treatable? Students in this course will read and discuss texts at the intersection of sociology, cultural studies, history of the human and behavioral sciences, and science and technology studies that treat the self as a social construction. The course focuses on how culture, politics, science, as well as bureaucratic and economic imperatives

help shape modern and postmodern conceptions of the self.]

##### S&TS 630(6301) Social Theory for Science Studies

Fall. 4 credits. R. Prentice.

Sociologist C. Wright Mills challenged his readers to develop their "sociological imaginations" to understand the social and historical forces at work in seemingly individual events, such as the receipt of a pink slip, a draft card, or a drug prescription. Within science and technology studies, scholars have documented how social issues can become scientific, technological, or medical, often appearing to leave the social realm altogether to become biological, technical, or pathological. The best social constructivist work in Science and Technology Studies reveals how scientific, technological, and medical worlds are thoroughly social; that is, theories of social structure and action underpin the best empirical work in the field. This course introduces graduate students to classic texts and concepts in social theory with a focus on applying such theories to empirical research in science, technology, and medicine. It will consider major thinkers and schools of social thought, such as Marx, Weber, Durkheim, Mannheim, Foucault, and the Frankfurt School. It will also consider how a nuanced interplay of theory and empirical data can bring critically important insights to both theoretical and empirical understandings of the world.

##### S&TS 631(6311) Qualitative Research Methods for Studying Science (also SOC 631[6310])

Spring. 4 credits. M. Lynch.

Much has been learned about the nature of science by sociologists and anthropologists donning lab coats and studying scientists in action. This course looks at the methods used in this new wave of science studies. Examines what can be learned by interviewing scientists, from videos, and from detailed examinations of scientific texts. Students gain hands-on experience by conducting a mini-project in which they investigate some aspect of scientific culture.

##### S&TS 632(6321) Inside Technology: The Social Construction of Technology (also SOC 632[6320])

Fall. 4 credits. T. Pinch.

Rather than analyze the social impact of technology upon society, this course investigates how society gets inside technology. In other words, is it possible that the very design of technologies embody assumptions about the nature of society? And, if so, are alternative technologies, which embody different assumptions about society, possible? Do engineers have implicit theories about society? Is technology gendered? How can we understand the interaction of society and technology? Throughout the course the arguments are illustrated by detailed examinations of particular technologies, such as the ballistic missile, the bicycle, the electric car, and the refrigerator.

##### S&TS 634(6341) Information Technology in Sociocultural Context

Fall. 4 credits. P. Sengers.

Analyzes information technology using historical, qualitative, and critical approaches. Discusses questions such as: In what ways is information technology—often portrayed as radically new—actually deeply historical? How do information technologies represent

and intervene in debates and struggles among people, communities, and institutions? How is the design of information technology tools entangled in the realms of law, politics, and commerce? In what ways are the social consequences of information technologies produced as much by the claims we make about the technologies as about the raw functionality of the tools themselves? This course investigates these issues through the lenses of long-standing debates and current controversies.

##### [S&TS 640(6401) Science, Technology, Gender: Historical Issues (also FGSS 640[6400], HIST 641[6410])]

Spring. 4 credits. Next offered 2007–2008. S. Seth.

Explores five, often interrelated, aspects of the literature on gender, science, and technology: (1) The historical participation of women (and men) in scientific work, (2) the embodiment of scientific, medical and technical knowledge, (3) the scientific construction of sexuality, (4) the gendering of technological systems and artifacts, and (5) feminist critiques of scientific knowledge. Examines the origins of modern western science in the scientific revolution, considering the claim that "science," by its very nature, is an andocentric enterprise. The rise of scientific and medical disciplines and professions in the 19th century provides a focus for discussions of the systematic exclusion of women from the production of scientific knowledge at precisely the point that women's bodies become the object of intensive scientific study. Drawing on a range of material, the course considers the construction of homosexual and intersexual individuals in scientific discourse. In later weeks, it discusses so-called "postmodernist" critiques of science, and debates the possibilities for "feminist science."]

##### [S&TS 644(6441) Topics in the History of Women in Science (also FGSS 644[6440])]

Spring. 4 credits. Next offered 2008–2009. M. Rossiter.]

##### S&TS 645(6451) The New Life Sciences: Emerging Technologies, Emerging Politics (also GOVT 634[6349])

Fall. 4 credits. S. Hilgartner.

The new life sciences (including genetics, genomics, and biotechnology) are highly controversial areas of emerging science and technology. They inspire both hope and anxiety, and are a source of ongoing conflicts. This course will examine the politics of the new biology, both to consider the issues in their own right and to examine the relationships among science, technology, and politics. In particular, the course will focus on three themes—the politics of property, the politics of identity, and the politics of risk—as they pertain to the emerging technologies of life. Topics may include the social shaping biological research; eugenics and genetics; genomic medicine; risk; commercial biotechnology; university-industry relationships; social movements; North-South issues; the Human Genome Project; genetics and race; intellectual property; the debate over human cloning; and the capacity of contemporary societies to manage emerging technologies.

##### [S&TS 675(6751) Science, Race, and Colonialism]

Spring. 4 credits. Next offered 2008–2009. S. Seth.



Scholarly work in the last two decades has come increasingly to pay attention to the oft-neglected linkages between the sciences and the discourses and practices of colonialism. Texts of broad conception like Michael Adas's *Machines as the Measure of Men* and Gyan Prakash's recent *Another Reason* have made an attempt to provide an overview of many of the issues involved, but the field awaits a genuinely synthetic treatment. This course aims to provide the framework for such a treatment by looking at a number of key areas of current interest. Beginning with a survey of the history of ideas of race and the development of "race science," the course moves on to consider a series of specific topics, including the importance of social statistics and technologies of identification (fingerprinting), medicine, hygiene, technologies of overt control, scientific nationalism and nationalist science, the periphery as laboratory, gender, and savagery and criminality. Readings comprise a mixture of primary and secondary sources, and students are encouraged to contribute topics and texts of particular interest.]

**S&TS 681(6811) Philosophy of Science (also PHIL 481[4810], S&TS 481[4811])**

Fall. 4 credits. R. Boyd.  
For description, see PHIL 681.

**[S&TS 693(6931) Economics Meets Science Studies]**

Fall. 4 credits. Next offered 2008-2009.  
J. Reppy.

Covers a variety of possible interactions between the disciplines of economics and science and technology studies. Some economists are interested in science and technology as important components in economic growth, while scholars in science studies often appeal to economic motives and institutions to explain behavior in the production of scientific and technological knowledge. This course explores ways in which economics can provide new questions and theoretical approaches for science and technology studies. From another perspective, economics, as the most "scientific" of the social sciences, is itself a subject for study. Internal critiques by economists are compared to external analyses in the science studies literature. Readings include works on the epistemology and use of rhetoric in economics and on the "new economics of science," and examples of the use of economic analysis in the science studies literature.]

**[S&TS 700(7001) Special Topic 1: Science Studies and the Politics of Science]**

Fall. 4 credits. Prerequisites: S&TS 711 or permission of instructor. Next offered 2007-2008. M. Rossiter.

Theoretical developments in science and technology studies have called attention to the contingent and socially embedded character of both knowledge claims and technological systems. Drawing on literature from several disciplines, this seminar explores the consequences of these findings for social and political studies of science. Issues and problems considered include trust and skepticism, political and legal agency, reflexive institutions, relativism and social action, science and norms, and the co-production of knowledge and social order.]

**[S&TS 700(7002) Special Topic 2: Technology Transfer Issues]**

Fall. 4 credits. Next offered 2007-2008.  
J. Reppy.

The goal of this course is to develop a coherent analytical framework for analyzing technology transfer, using insights from economics, sociology, history, and science and technology studies, and to employ that framework to evaluate current policy issues. Studies the process of technology transfer in different contexts, ranging from intra-firm and intra-industry to technology transfer between civil and military sectors, and between industrialized and less-industrialized countries. The readings include a mix of theoretical writings and case studies.]

**S&TS 700(7003) Special Topic 3: Issues in the Social and Cultural History of Technology]**

Spring. 4 credits. R. Kline.  
This seminar focuses on different issues in the social and cultural history of technology each semester. Typical issues include Gender and Technology, Rethinking Technological Determinism, Was there an Information Revolution?, Consumerism, and the Military and Technology in the United States. Students read and discuss exemplary books and articles on a topic for the first half of the course, then give presentations on their research papers.

**S&TS 711(7111) Introduction to Science and Technology Studies (also HIST 711[7110])**

Fall. 4 credits. P. Dear.  
Provides students with a foundation in the field of science and technology studies. Using classic works as well as contemporary exemplars, seminar participants chart the terrain of this new field. Topics for discussion include, but are not limited to: historiography of science and technology and their relation to social studies of science and technology; laboratory studies; intellectual property; science and the state; the role of instruments; fieldwork; politics and technical knowledge; philosophy of science; sociological studies of science and technology; and popularization.

**[S&TS 720(7201) Emerging Technologies]**

Spring. 4 credits. Prerequisite: graduate students in social sciences, sciences, and humanities. Next offered 2007-2008.  
S. Hilgartner and B. Lewenstein.  
Examines the peculiar speculative world of emerging technologies—a social and technical "space" found at the edges of expanding technological systems, where new technologies are being most actively constructed and transformed. In this dynamic world, emerging technologies exist in a state of flux as a mixture of blueprint and hardware, plan and practice, the nearly online and the almost obsolete, surrounded by speculation and speculators, who make often-contested claims about their promises, perils, and possibilities. Among the characteristics of this space are: the frequent appearance of unverifiable claims about technologies that have yet to materialize; an entrepreneurial drive for commercial implementation; ongoing institutional innovation; frequent public controversies; and problems of political legitimacy. The course examines the epistemic, discursive, institutional, and political dimensions of emerging technologies in an effort to understand the social worlds that shape technological change.]

**[S&TS 721(7211) Archiving Contemporary Science]**

Spring. 4 credits. Next offered 2008-2009.  
B. Lewenstein.

Methodology course exploring the conceptual and practical issues associated with creating archives of science "as it happens." Readings focus on issues in historiography of contemporary science and on issues in contemporary archiving. Practical examples are drawn from several Cornell-based archives (on cold fusion, on the role of science in the O. J. Simpson trial, on the "Y2K bug," and on voting technologies in the 2000 presidential election).]

**Independent Study**

**S&TS 699(6991) Graduate Independent Study**

Fall or spring. 2-4 credits. Permission of department required.  
Applications and information are available in 306 Rockefeller Hall.

**SCIENCE OF EARTH SYSTEMS**

See "Department of Earth and Atmospheric Sciences."

**SERBO-CROATIAN**

See "Department of Russian."

**SINHALA (SINHALESE)**

See "Department of Asian Studies."

**SOCIETY FOR THE HUMANITIES**

Brett de Bary, Director  
Fellows for 2006-2007  
Steffan Igor Ayora-Diaz (Universidad Autónoma de Yucatán)  
Jefferson Cowie (Cornell University)  
Belinda Edmondson (Rutgers University)  
Sarah Evans (University of California, Berkeley)  
Matthew Hart (University of Illinois, Urbana-Champaign)  
Andrew Hoberek (University of Missouri-Columbia)  
Petrus Liu (Cornell University)  
Natalie Nelas (Cornell University)  
Micol Seigel (California State University, Los Angeles)  
Suman Seth (Cornell University)  
Philip Stern (American University)  
Gabriela Vargas-Cetina (Universidad Autónoma de Yucatán)  
The Society annually awards fellowships for research in the humanities. The fellows offer, in line with their research, informal seminars intended to be exploratory or interdisciplinary. These seminars are open to graduate students, suitably qualified undergraduates, and interested auditors. Students who want credit for a seminar should formally register

in their own college. Persons other than those officially enrolled may attend as visitors with permission of the fellow. The theme for 2006–2007 is “Historicizing the Global Postmodern.”

**S HUM 404 Science and Race: A History (also S&TS 474)**

Fall. 4 credits. Limited to 15 students.  
S. Seth.

This course examines the social construction and utilization of scientific conceptions of race in the West. We begin with the existence (or not) of conceptions of biological race in the early-modern period, focusing on early voyages of discovery and so-called “first encounters” between the peoples of the Old and New Worlds. In the second part of the course we will look at enunciations of racial thought in the late 18th century and at the problems of classification that these raised, before examining the roots of “Scientific Racism.” Part three looks at Darwin, Social Darwinism, and eugenics movements in different national contexts, concluding with a study of Nazi science and the subsequent trials of doctors at Nuremberg. The last part of the course examines recent and contemporary applications of racial thinking, including the debate over the origin of AIDS, race and IQ, and the question of whether doctors should make use of race as a category when researching and prescribing new treatments.

**S HUM 408 Global Martial Arts Film & Lit (also ASIAN 452, COM L 408[4080])**

Fall. 4 credits. Limited to 15 students.  
P. Liu.

With recent blockbusters such as *Kill Bill*, *Kung Fu Hustle*, *Hero*, and *The Matrix*, a cultural practice from the East called “martial arts” has transformed itself from a spiritual and bodily discipline in medieval China into a popular visual spectacle housed in transnational cinema and arcade games. This course studies the Asianization of global postmodern culture by comparing the historical routes, institutional bases, and ideologies of different modes of representing martial arts in film and literature. Our questions will include: the historical origins of martial arts and martial arts cinema; kung fu as a racialized bodily performance; the cult of Bruce Lee; and the relation of martial arts to women, muscles, and the gendering of the body. Mandatory weekly film screenings will be scheduled.

**S HUM 412 America in the 1970s (also AM ST 402, ILRCB 608)**

Fall. 4 credits. Limited to 15 students.  
J. Cowie.

This course will investigate the social, cultural, and political history of what is often thought of as the first postmodern decade: the long 1970s. We will attempt to trace the major issues of the era in order to explain the rise of postmodern cultural forms, the coming of postindustrial society, the triumph of neo-conservatism, and the consolidation of a neo-liberal model of political economy. As the prefixes “post” and “neo” suggest, the seventies rested upon a series of disassembled and rebuilt ideas that form the foundation of our own time.

**S HUM 413 Noise, Music, Power (also ANTHR 414, MUSIC 413)**

Fall. 4 credits. Limited to 15 students.  
G. Vargas-Cetina.

This seminar will bring together different fields of discussion around the musical phenomenon. Post-structural philosophy, post-

colonial studies, anthropology, musicology and film will be juxtaposed in the discussion of the musical, from acoustic to electronic beats. We will examine the place of noise and music in society, and the power structures surrounding and inhabiting music and its enjoyment.

**S HUM 415 Post-national Gastroidentities (also LAT A 415)**

Fall. 4 credits. Limited to 15 students.  
S. Ayora-Diaz.

Explorations into the relationship between gastronomy and identity often assume a coextension between the territory of the Nation-State and its people's culinary tradition. This seminar interrogates the nature of this relationship. Participants will examine, through the discussion of how diverse national and regional cuisines are constituted, the general discursive and practical strategies deployed by the State to ensure governmentality whilst, on the other hand, citizens take advantage of the multicultural politics of identity to explode the monolithic nature of the Nation-State. The seminar will include a discussion of the writings of Foucault, Deleuze, Guattari, Derrida, Bhabha, Spivak and others as they bear on the understanding of the complexities of the postcolonial, postmodern, postnational global order and its implications for gastronomic trends.

**S HUM 416 Modern Art and Popular Culture (also ART H 417[4917], VISST 417[4170])**

Fall. 4 credits. Limited to 15 students.  
S. Evans.

This course will examine a range of art-historical approaches to the relationship between modern art and popular culture from the 19th century to now. While we will read pertinent critiques—by Benjamin, Greenberg, and others—of mass culture, we will also investigate the elite-mass interface as the site at which the social dimension of art production and reception is made manifest. In pursuit of methods more sensitive to the common culture, we will revisit the “myth” of bohemia via the model of the artist subculture and investigate the social and sociable dimensions of avant-garde projects. We will study Manet, Toulouse-Lautrec, Picasso, Rodchenko, Johns, Fluxus, the Exploding Plastic Inevitable, Collaborative Projects, Sherman, Tiravanija, and Bradley.

**S HUM 419 Transnational Method Then and Now (also AS&RC 419)**

Fall. 4 credits. Limited to 15 students.  
M. Seigel.

Full title: Transnational Method Then and Now: Historiography, Theory, and Practice. This course will explore contemporary transnational scholarship and some of its possible antecedents, both acknowledged and implicit. Its premise is that the popularity of transnational method encourages amnesiac engagements, often erasing the genealogy of less visible schools or sorts of transborder thinking. We will attempt to discern the contours of transnationalism avant la lettre thinkers pursuing a global vision from a variety of disciplines and political positions over the past three hundred years. The course focuses mostly in the Americas due to the instructor's focus, so such thinkers include Latin American anti-imperialists, Jesuits and Jansenists, early Afro-diasporic historians, Marxists, pan-Americanists, Boltonites, anti-colonial scholars active in the 1930s such as Fanon, C.L.R. James, Eric Williams, and W.E.B.

Du Bois, early Chicano Studies scholars such as Américo Paredes, world systems theorists, neoliberal practitioners of globalization studies, postwar third world women of color and their heirs in poststructuralist feminist theory such as Evelyn Brooks Higginbotham and Elsa Barkley Brown, and then recent scholarship claiming the transnational mantle, including work by Nestor Garcia-Canclini, Michael Denning, Brent Edwards, Martha Hodes, Neil Smith, and the instructor. With these current and prior transnational studies as guides, we will explore the parameters of transnational method and consider whether the various approaches grouped under its rubric—comparison, migration studies, Diaspora Studies, globalization theory, etc.—deserve or distort the legacy our historiography will uncover. Students will read course materials and participate in seminar discussions, offer in-class presentations, and write critical historiographic essays or multi-work book reviews. In addition, undergraduates will propose a substantive research project in any field of transnational study; graduate students will write a 15- to 20-page research paper on the transnational topic of their choice.

**S HUM 420 Culture, Sovereignty, the State (also COM L 442)**

Spring. 4 credits. Limited to 15 students.  
M. Hart.

This course combines reading in political and cultural theory with works of literature and artistic practice, asking whether humanists have neglected the importance of the state as opposed to concepts like national culture. Theoretical readings will include works of Matthew Arnold, Hannah Arendt, Raymond Williams, Giorgio Agamben, and others. Seminars will also feature modernist poetry, contemporary British fiction, and architecture in Israel/Palestine and New York.

**S HUM 421 Modernization and Fiction (also ENGL 408.01)**

Spring. 4 credits. Limited to 15 students.  
A. Hoberek.

In this course we will attempt to rethink 20th-century fiction outside the standard categories of modernism and postmodernism, concentrating instead on fiction's relationship to the processes of economic, technological, and organizational development known collectively as “modernization.” We will focus primarily on works by American authors, from Hamlin Garland and Willa Cather to Don DeLillo and Ruth Ozeki. Because modernization has been central to the United States' relationship to the rest of the globe in this period, however, we will also consider, for comparative and historical purposes, fiction from other nations, including examples from the Soviet realist tradition and from the so-called “developing world.”

**S HUM 423 Caribbean Popular Literature (also ENGL 408.02, AS&RC 427)**

Spring. 4 credits. Limited to 15 students.  
B. Edmondson.

This course will explore, and historicize, popular, non-canonical Anglophone Caribbean Literature as a site of Caribbean middle class cultural production. By linking early (19th and early 20th century) popular texts to contemporary ones, the course goal is to interrogate critical tenets of Caribbean literary criticism by examining Caribbean society through its apparently non-serious, or “middlebrow,” literature.

**S HUM 424 Time and the Other**

Spring. 4 credits. Limited to 15 students.  
N. Melas.

This course will address the relation between time and belonging in a wide-ranging selection of key texts, mainly in philosophy and literature with special attention to the intersection of experience and politics. Authors may include Heraclitus, St Augustine, Nietzsche, Marx, Freud, Levinas, Fabian, Conrad, Achebe, Glissant, Oulougouem, Bugul.

**S HUM 425 Cold War Aesthetics in E. Asia (also ASIAN 465)**

Spring. 4 credits. Limited to 15 students.  
P. Liu.

This course is concerned with the Cold War in East Asia—the “partitioning” of China, Japan, and Korea into mutually hostile, geographically fractured and temporally de-synchronized “zones” in the post-WWII era—and how this historical experience produced a postmodern aesthetics in East Asia. We will be interested in recent research projects on Taiwan, Hong Kong, South Korea and Japan as “anomalous colonies” of the U.S., the “East Asian economic miracle” as an exception to capitalist development, and the limitations of the dialectic of foreign domination/nativist resistance for an understanding of postmodernity in East Asia.

**S HUM 426 Science, Technology, Colonialism (also S&TS 476[4761])**

Spring. 4 credits. Limited to 15 students.  
S. Seth.

Scholarly work in the last two decades has come increasingly to pay attention to the oft-neglected linkages between technology and science on the one hand and the discourses and practices of colonialism and imperialism on the other. Texts of broad conception like Michael Adas' *Machines as the Measure of Men* and Gyan Prakash's recent *Another Reason* have made an attempt to provide an overview of many of the issues involved, but the field awaits a genuinely synthetic treatment. This advanced seminar will aim to provide the framework for such a treatment by looking at a number of key areas of current interest. The course is organized thematically and topics will include the importance to the colonial project of social statistics and technologies of identification (fingerprinting), medicine and hygiene, scientific nationalism and nationalist science, “guns, phones and steam,” the periphery as laboratory, and gender, savagery and criminality. We will also draw on some aspects of post-colonial literature, especially the writing of those involved in Subaltern Studies, to take up a question poorly explored in the field so far: the relationship between science and violence. Readings will be comprised of a mixture of primary and secondary sources, and students are encouraged to contribute topics and texts of particular interest.

**S HUM 428 The State and Its Rivals, 1500-1800**

Spring. 4 credits. Limited to 15 students.  
P. Stern.

Full title: *Rethinking Leviathan: The State and Its Rivals in the Early Modern World*. This course examines the definitions, foundations, and development of modern state formation in early modern Europe and the wider world. Drawing upon contemporary writings as well as interdisciplinary scholarship in history, sociology, political science, historical geography, and literary studies, this course

historicizes and problematizes the centrality of the modern western European nation-state in our understanding of the formation of political communities. It investigates the contingencies and strategies that led to the rise of the state, as well as the myriad possible alternatives and rivals to it, including religious authorities, corporations, companies, mercenaries, composite states, pirates, thieves, and secret societies.

**SOCIOLOGY**

M. Macy, chair (322 Uris Hall, 255-3820), A. Basu, M. Berezin, S. Caldwell, S. Correll, D. Harris, D. Heckathorn, E. Hirsh, E. Lawler, P. McLaughlin, S. Morgan, V. Nee, T. Pinch, S. Soule, D. Strang, R. Swedberg, S. Tarrow, K. Weeden, E. Wethington, Emeritus: D. Hayes, B. C. Rosen, R. M. Williams, Jr.

Sociology is the study of human social organization, institutions, and groups. The Department of Sociology offers courses in a number of key areas, including comparative sociology, culture, economy and society, family and the life course, gender inequality, political behavior and public policy, organizations, race and ethnicity, social inequality, social psychology and group processes, social and political movements, and social networks. A particular emphasis of the department is the linkage of sociological theory to issues of public concern such as ethnic conflict, drugs, poverty, and gender and race segregation. Interests of faculty members range from the study of interaction in small groups to the study of economic and social change in a number of different countries. The department offers the opportunity for students to develop fundamental theoretical insights and understanding as well as advanced research skills in quantitative and qualitative methods. Graduates of the department take up careers in university, government, and business settings, and enter professions such as law, management, and urban policy.

**Sociology Courses for Nonmajors**

Sociology provides students with particularly effective ways to understand the complexities of modern life. For many students, the undergraduate years are a last opportunity to gain the insights these fields have to offer. The Department of Sociology is continuing to design an array of beginning and advanced courses that convey a broad understanding of the methods and insights of sociological analysis—courses that is of particular interest to undergraduates who may not major in sociology. First- and second-year students should note that the introductory courses (101, 103, 105, and 115) focus on the sociological analysis of major issues of public life, and that a wide selection of general education courses is available at the 200 level. Advanced undergraduates who are majors in other fields should also see, in particular, descriptions of the 300- and 400-level courses, for which there are no prerequisites other than junior or senior standing.

**Related Courses in Other Departments**

Students interested in sociology should consult the course lists of the other social science departments in the College of Arts and Sciences (including Anthropology, Economics, Government, and Psychology)

and of the following departments in other colleges: Organizational Behavior (School of Industrial and Labor Relations), Human Development (College of Human Ecology), and Development Sociology (College of Agriculture and Life Sciences).

**The Sociology Major**

The Department of Sociology is one of the social science departments at Cornell with the highest national ranking. Faculty members are internationally recognized for their scholarly work, and have received numerous awards, research fellowships, and research grants.

The 23 professors currently in the department are dedicated to scholarly inquiry that is both methodologically rigorous and theoretically innovative. The breadth of their substantive interests and the variety of their methodological styles are well demonstrated in the different fields that are represented within the department. These include comparative societal analysis, culture, deviance and social control, education, economic sociology, family, gender, inequality, social networks, organizations, political sociology, public policy, race and ethnic relations, religion, science and technology, social movements, and social psychology.

**Career Opportunities for Graduates**

An undergraduate degree in sociology is one of the most popular degrees with employers. After engineering and computer science, sociology is the most able to place graduates into jobs immediately after completing their bachelor's degree. This is not altogether surprising, since sociology can lead to a rewarding career in any of the following fields:

- **government:** urban/regional planning, affirmative action, foreign service, human rights management, personnel management
- **research:** social research, consumer research, data analysis, market research, survey research, census analysis, systems analysis
- **criminal justice:** corrections, criminology assistance, police work, rehabilitation counseling, criminal investigation, parole management
- **teaching:** public health education, school admissions, college placement
- **community affairs:** occupational counseling, career counseling, public health administration, hospital administration, public administration, social assistance advocacy, fund-raising, community organizing, social work
- **business:** advertising, sales, project management, sales representation, market analysis, real estate management, journalism, public relations, insurance, human resource management, production management, labor relations, quality control management

A large number of sociology majors also go onto graduate school and obtain advanced (i.e., master's and Ph.D.) degrees in such varied fields as sociology, political science, philosophy, economics, and psychology. Many also complete professional degrees in education, law, medicine, social work, and business administration.

## Requirements for the Major

In addition to the academic requirements established by the College of Arts and Sciences, students must also fulfill requirements toward a specified major. Ten courses are required in the sociology major. All courses toward the major must be taken for a letter grade, and students must maintain at least a 2.0 grade point average (GPA) while enrolled in the major. The 10 courses required for the major are divided into the following categories:

- SOC 101
- SOC 375
- two research methods courses (SOC 301 and 303)
- one advanced-level sociology course (400-level or higher)
- five additional (i.e., elective) courses in sociology

## Declaring the Sociology Major

Students in the College of Arts and Sciences who wish to declare a major in sociology should do so as soon as possible. Students who are *not* currently in the College of Arts and Sciences need to be admitted to A&S *before* declaring the major. To declare the sociology major, students need to take the following steps:

- Obtain a **campus copy** of their transcript from Day Hall and bring it to the department office (316 Uris Hall).
- Obtain a sociology major packet from Susan Meyer, undergraduate assistant, during her office hours (316 Uris Hall). During the meeting, the student fills out a major declaration form.
- Leave this form and the transcript with the undergraduate assistant. The declaration will be reviewed by the director of undergraduate studies and sent on to the College of Arts and Sciences for official notification that the student has declared a major. Please allow two weeks for the declaration to be approved and entered into the campus computer.

A student file will be set up to maintain the student's records in the department. Once the students are officially recognized as a major in sociology, the Sociology Department will receive a copy of the transcript at the end of each semester, which will be kept in the student's file at 316 Uris Hall. Records are maintained until five years after graduation.

## Academic Advising in Sociology

Cornell students are ultimately responsible for the policies, procedures, and requirements regarding their degree as stated in the current *Courses of Study*. After reading this document, students may find that they are still confused or unclear about some of the requirements, and may have questions and concerns that pertain to their individual situation. Several sources of academic assistance and advice are available.

**College Advisor:** Because sociology majors are students in the College of Arts and Sciences, college advisors are available by appointment in the Office of Undergraduate Admissions and Academic Advising (Goldwin Smith Hall). It is recommended that students consult with a college advisor sometime before their last semester to discuss the completion of college

requirements, graduation, and residency requirements.

**Undergraduate Program Coordinator:** The undergraduate assistant (Susan Meyer) in the Department of Sociology is located in 316 Uris Hall. She is available to provide assistance with the following:

- the process of declaring the sociology major.
- information about transferring courses from other universities and/or other departments.
- other administrative matters or concerns (e.g., forms, adding and dropping courses).

**Director of Undergraduate Studies:** The director of undergraduate studies will:

- provide information about departmental curricula and the requirements for the major.
- meet with applicants to the major.
- review applications for sociology majors and accept students into the program.
- assist students in finding an advisor in the sociology department.
- screen sociology classes taken outside Cornell for acceptance as Cornell credit.
- serve as the backup for faculty advisors who are absent during advising periods.

**Faculty Advising:** Once a student is a declared sociology major, he or she is assigned a faculty advisor within the Sociology Department. The student is asked to name his or her preference for an advisor; however, if he or she is not sufficiently familiar with the program, the director of undergraduate studies can assist in selecting a faculty member. Faculty advisors are there to:

- discuss education, career goals, and graduate school opportunities.
- meet to talk about courses and plan your program of study within the department.
- go over the student's academic program each semester.

**Sociology Peer Advisors:** Approximately 10 advanced sociology majors serve as peer advisors in the department. These advisors change from year to year, but a complete list of their names and e-mail addresses is available from the undergraduate assistant in the sociology office (316 Uris Hall). Peer advisors do not provide academic counseling; they are there to help students adjust to life in the major, as well as to let them know about the department's many support services and activities.

## Research Opportunities

Qualified sociology majors are invited to participate with faculty members in conducting research. Such projects are usually initiated in one of two ways: the student may offer to assist the faculty member in an ongoing project, or the student may request that the faculty member supervise the execution of a project conceived by the student. In either case, the student should enroll in SOC 491 Independent Study. Interested students may direct inquiries to any faculty member.

## The Sociology Honors Program

Honors in sociology are awarded for excellence in the major, which includes overall GPA and completion of an honors thesis. In addition to the regular requirements of the major, candidates for honors must maintain a cumulative GPA of at least a A- in all sociology classes, complete SOC 495 and 496 (in the senior year), and write an honors thesis.

Students are awarded either honors (*cum laude*), high honors (*magna cum laude*), or highest honors (*summa cum laude*) in the program based on the honors advisors' evaluation of the level and the quality of the work completed towards the honors thesis and the quality of the course work. The honors distinction will be noted on the student's official transcript and it will also be indicated on the student's diploma.

## Admission to the Honors Program

To qualify for entrance into the honors program, students must have at least a B+ GPA overall and an A- GPA in the major. In addition, they must secure the permission of a faculty member in the Department of Sociology who will guide their honors thesis.

Students who wish to be considered for honors should apply to the director of undergraduate studies no later than the second semester of their junior year. Honors program application forms are available in 316 Uris Hall. The application must include a copy of the student's undergraduate transcript, a brief description of the proposed research project (due May 15), and the endorsement of a faculty member in the Sociology Department who will supervise the honors work (due September 15).

## The Honors Thesis

During the senior year, each candidate for honors in sociology enrolls in a yearlong tutorial (SOC 495 and 496) with the faculty member who has agreed to serve as the student's thesis advisor. During the first semester of their senior year, students determine the focus of their honors thesis, and submit a 10- to 15-page overview (or, alternatively, a preliminary draft) of the thesis to their advisor. During the second semester, they complete their honors thesis and submit final copies to the department.

The text of the honors thesis may not exceed 60 pages except by permission of the honors advisor. Two copies of the honors thesis are due to the undergraduate assistant (316 Uris Hall) during the third or fourth week of April. Honors thesis preparation guidelines are available from the undergraduate assistant (316 Uris Hall).

Any honors candidate whose research directly involves working with human subjects must receive approval for the project from the Cornell University Committee on Human Subjects.

## Introductory Courses

### SOC 101(1101) Introduction to Sociology (SBA)

Fall, spring, 3 credits. Staff.  
Introduces students to the distinctive features of the sociological perspective, as opposed to psychological, historical, or economic approaches. First discusses the sociological perspective in the context of small groups



and face-to-face interaction. As the course unfolds, the same perspective is applied to progressively larger social groupings, such as peer groups and families, formal organizations, social classes, racial and ethnic groups, and nation states. This approach also provides new insights into such topics as deviance, gender inequality, culture, and lifestyles. Whenever possible, class lectures and discussions illustrate these themes by exploring contemporary social problems and developments, including the rise of Generation X (and Generation Y?), the sources of current racial tensions, and the gender gap in the workplace.

**SOC 105(1105) Introduction to Economic Sociology (SBA)**

Fall. 3 credits. Staff.

Modern social thought arose out of attempts to explain the relationship between economic development and the social transformations that gave rise to the contemporary world. Classical theorists from Karl Marx and Max Weber to Karl Polanyi focused their writings on emergent capitalist economies and societies. Contemporary social theorists likewise have sought to understand the interaction between capitalism and the social forces reacting against and emerging from modern economic development. From exchange and rational choice theories to network analysis and institutional theory, a central theme in contemporary social thought has been the relationship between the economy and society, economic action and social structure, and rationality and fundamental social processes. This course provides an introduction to social thought and research seeking to understand and explain the relationship between economy and society in the modern era.

**[SOC 115(1150) Utopia in Theory and Practice (SBA)]**

Spring. 3 credits. Next offered 2008-2009. D. Strang.

People have always sought to imagine and realize a better society, with both inspiring and disastrous results. This course discusses the literary utopias of Moore, Morris, and Bellamy, and the dystopias of Huxley, Orwell, and Zamyatin. Also examines real social experiments, including 19th-century intentional communities, 20th-century socialisms and religious cults, and modern ecological, political, and millennial movements. Throughout, the emphasis is on two sociological questions: What kinds of social relationships appear as ideal? How can we tell societies that might work from those that cannot?

**General Education Courses**

**SOC 202(2202) Population Dynamics (also D SOC 201[2010]) (CA)**

Spring. 3 credits. L. Williams.

For description, see D SOC 201.

**[SOC 203(2203) Work and Family in Comparative Perspective (SBA)]**

Fall. 4 credits. Next offered 2008-2009. Staff.

Family life is often portrayed in the popular media as a haven away from the harsh realities of public life, suggesting that work and family constitute separate and distinct spheres. By contrast, many sociologists point out the links between work and family, and how these links have different consequences for men and women. This course highlights the responses of individuals, employers, and

governments, both in the United States and internationally, to the dilemmas posed by the interface between work and family.]

**SOC 206(2206) International Development (also D SOC 205[2050]) (HA)**

Spring. 3 credits. Staff.

For description, see D SOC 205.

**SOC 207(2070) Problems in Contemporary Society (SBA)**

Spring. 4 credits. Staff.

Examines contemporary social problems, with a focus on their sources in the organization of society. Modern societies are based on three fundamental types of institutions—social norms, hierarchies, and markets. Each is subject to distinctive types of failures resulting in problems that include poverty, prejudice and discrimination, intolerance and hate, alcohol and drug abuse, physical and mental illness, crime and delinquency, and urban problems. In analyzing these problems the course emphasizes the institutions through which they are created and perpetuated and the form of institutional change required to address them.

**[SOC 208(2208) Social Inequality (also D SOC 209[2090]) (SBA)]**

Spring. 4 credits. Next offered 2007-2008. Staff.

Reviews contemporary approaches to understanding social inequality and the processes by which it comes to be seen as legitimate, natural, or desirable. We address questions of the following kind: What are the major forms of stratification in human history? Are inequality and poverty inevitable? How many social classes are there in advanced industrial societies? Is there a "ruling class?" Are lifestyles, attitudes, and personalities shaped fundamentally by class membership? Can individuals born into poverty readily escape their class origins and move upward in the class structure? Are social contacts and "luck" important forces in matching individuals to jobs and class positions? What types of social processes serve to maintain and alter racial, ethnic, and gender discrimination in labor markets? Is there an "underclass?" These and other questions are addressed in light of classical and contemporary theory and research.]

**SOC 209(2090) Networks (also ECON 204) (SBA)**

Spring. 4 credits. D. Easley and J. Kleinberg.

For description, see ECON 204.

**SOC 210(2100) What Is Science? (also S&TS 201[2011]) (CA)**

Spring. 3 credits. T. Pinch.

For description, see S&TS 201.

**SOC 215(2150) Organizations: An Introduction (SBA)**

Fall. 4 credits. Staff.

This course examines the fundamental and pervasive role that organizations play in modern society. From universities, hospitals, banks, factories, prisons and churches to museums, art galleries and NGOs, contemporary society is inconceivable without organizations. Whether one struggles for change, seeks to protect the status quo, or simply wants to get things done in the modern world, it is crucially important to understand how organizations work. This course will explore such issues as the historical origins of complex organizations,

the internal structure and dynamics of organizations, organizations interactions with their external environments, and how organizations change over time.

**[SOC 221(2210) Race, Class, and Gender Research in Practice (SBA)]**

Spring. 4 credits. Sophomore seminar. Next offered 2007-2008. K. Weeden.

What are the promises and limitations of social science as a tool for understanding the sources and consequences of social inequality? This course introduces the underlying logic of social scientific research in the context of contemporary debates about social inequality: e.g., educational testing and tracking, race-based affirmative action, and the roles of intelligence and parental resources in affecting who gets ahead. Its goals are to encourage students to be critical consumers of social scientific data, evidence, and discourse and to develop their own rigorous, informed explanations of social phenomena.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program Seminars Program Seminars offer discipline-specific study within and an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating the knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.]

**[SOC 222(2220) Controversies about Inequality (also PAM/ILROB/D SOC 222[2220]) (SBA)]**

Spring. 3 credits. Next offered 2007-2008. S. Morgan.

Introduces students to contemporary debates and controversies about the underlying structure of inequality, the processes by which it is generated and maintained, the mechanisms through which it comes to be viewed as legitimate, natural, or inevitable, and the forces making for change and stability in inequality regimes. These topics are addressed through readings, class discussion, visiting lectures from distinguished scholars of inequality, and debates staged between students who take opposing positions on pressing inequality-relevant issues (e.g., welfare reform, school vouchers, immigration policy, affirmative action.)

**SOC 231(2310) Latino Communities (also D SOC 230) (SBA)**

Spring. 3 credits. R. Mize.

For description, see D SOC 230.

**[SOC 248(2480) Politics and Culture (also GOVT 363[3633]) (HA)]**

Spring. 4 credits. Next offered 2007-2008. M. Berezin.

Focuses on currently salient themes of nationalism, multiculturalism, and democracy. It explores such questions as who is a citizen; what is a nation; what is a political institution; and how do bonds of solidarity form in modern civil society. Readings are drawn principally from sociology and where applicable from political science and history. Journalist accounts, films, and web site research supplement readings.]

**SOC 265(2650) Latinos in the United States (also LSP 201[2010], D SOC 265[2650]) (SBA)**

Spring. 3 credits; 4-credit option available. H. Velez.



Exploration and analysis of the Hispanic experience in the United States. Examines the sociohistorical background and economic, psychological, and political factors that converge to shape a Latino group identity in the United States. Perspectives are suggested and developed for understanding Hispanic migrations, the plight of Latinos in urban and rural areas, and the unique problems faced by the diverse Latino groups. Groups studied include Mexican Americans, Dominicans, Cubans, and Puerto Ricans.

**SOC 270(2700) Gender: Meanings and Practice (also FGSS 270(2700)) (SBA)**

Spring. 3 credits. S. Correll.

People have many ideas about gender—about women, men, femininity, and masculinity. These ideas organize our social lives in important ways and often in ways that we do not even notice. They are often so taken for granted that we simply assume they are part of the “normal” or natural way that life works. As part of its focus, sociology investigates and exposes aspects of social life that are usually taken for granted. This course critically examines the ways that gender structures the social world in which we live. After laying the theoretical groundwork, the course examines cultural conceptions about gender, paying special attention to how beliefs about masculinity and femininity create and enforce a system of gender difference and inequality. Next it attempts to reveal the “common sense” world of gender that surrounds us by exposing the workings of institutions, such as the family, the classroom, and the workplace. Next, it explores how gender stereotypes and the interactions between and among women and men create and recreate gender. Then it briefly examines the link between gender, friendship, and sex/sexuality. Concludes by considering the possibilities of a “degendered” or less-gendered society.

**SOC 280(2800) Social Movements (SBA)**

Spring. 3 credits. S. Soule.

This course presents a sociological examination of the emergence and development of social movements and collective action at both the societal and individual levels. Students will learn about the major theoretical perspectives on social movements, as well as several recent and classical empirical works in the area. Students will learn about a variety of different social movements (both contemporary and historic).

**Methods and Statistics Courses**

**SOC 301(3010) Evaluating Statistical Evidence (MQR)**

Fall. 4 credits. Prerequisite: Arts and Sciences students only. Staff.

First course in statistical evidence in the social sciences, with emphasis on statistical inference and multiple regression models. Theory is supplemented with numerous applications.

**SOC 303(3030) Design and Measurement (SBA)**

Spring. 4 credits. D. Harris.

Research methods are the foundation upon which all research rests. When there are flaws in the methodology, the whole project usually crumbles. This course uses methods texts, and examples from real research projects, to investigate the research methods and logic employed by sociologists. Topics explored include surveys, experimentation, sampling,

observation, causal inference, and ethics. By the end of the course, students are able to identify methodological weaknesses in others' research, and design projects that can withstand a critical eye.

**SOC 304(3040) Social Networks and Social Processes (SBA)**

Fall. 4 credits. D. Strang.

How do groups self-segregate? What leads fashions to rise and fall? How do rumors spread? How do communities form and police themselves on the Internet? This course examines these kinds of issues through the study of fundamental social processes such as exchange, diffusion, and group formation. Focuses on models that can be explored through computer simulation and improved through observation.

**SOC 307(3070) Society and Party Politics (also GOVT 306) (SBA)**

Spring. 4 credits. S. Van Morgan.

This course will focus on the role that society plays in the emergence and functioning of political parties. In addition to investigating different types of party systems, the societal roots of political parties, and the influence of institutions on electoral politics, the course will also examine contemporary debates, such as the relationship between culture and electoral behavior. Case studies will be drawn from a number of Western and non-Western democracies.

**Intermediate Courses**

**SOC 311(3110) Group Solidarity (SBA)**

Fall. 4 credits. M. Macy.

What is the most important group that you belong to? What makes it important? What holds the group together, and how might it fall apart? How does the group recruit new members? Select leaders? Make and enforce rules? Do some members end up doing most of the work while others get a free ride? This course explores these questions from an interdisciplinary perspective, drawing on sociobiology, economics, and social psychology, as it applies alternative theories of group solidarity to a series of case studies, such as urban gangs, spiritual communes, the civil rights movement, pro-life activists, athletic teams, work groups, and college fraternities.]

**[SOC 321(3210) Environmental Sociology (SBA)]**

Spring. 3 credits. Next offered 2007–2008. Staff.

This course will provide an overview of the field of environmental sociology. The course will begin by examining the history of various Western ideas—e.g., essentialism, the idea of progress, the Great Chain of Being and Darwinian evolution—that have shaped our understanding of human-environment interactions. We will then consider the origins of the field of environmental sociology and conduct a brief overview of the various theoretical perspectives in the field. The core course will be devoted to using these perspectives to illuminate various historical and current environmental problems such as overpopulation, the energy crisis, toxic wastes, the ecological impacts of the green and biotechnological revolutions, rainforest destruction in the Amazon and vulnerability to climate change. In the final section of the course we will examine the origins, growth and diversification of the U.S. environmental movement.]

**SOC 324(3240) Environment and Society (also S&TS 324(3241), D SOC 324(3240)) (SBA)**

Fall or spring. 3 credits. Staff. For description, see D SOC 324.

**SOC 327(3270) Toleration and Fundamentalism (SBA)**

Spring. Sophomore seminar. M. Berezin.

**SOC 327(3270) SSP: Toleration and Fundamentalism (SBA)**

Spring. M. Berezin.

The purpose of this course is to help students to think historically and sociologically about the resurgence of religion as a political issue. In order to cover a wide range of time periods and cultures, this seminar views religion through an institutional framework concentrating particularly on the separation of Church and State which has been the hallmark of modern Western political organization. The seminar asks students first, to think about how the boundary between church and state, sacred and secular was negotiated in various nation-states; and second, how that divide encourages toleration and discourages fundamentalisms of various stripes. The institutional focus will lead us to consider the legal frames, i.e., the laws that govern the boundaries between religion and the polity.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program Seminars Program Seminars offer discipline-specific study within and an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating the knowledge. Enrollment is limited to 15. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**SOC 330(3300) Sociology of Sport (also NES/JWST 389) @ (SBA)**

Spring. 4 credits. T. Sorek.

For description, see NES 389.

**SOC 334(3340) Chinese Society in Transition (SBA)**

Fall. 2 credits. V. Nee and L. Rong.

Modern Chinese society is undergoing transformative change to a market society. To understand the trajectory of societal change, this course examines the causes and consequences of China's market transition. Why did China's political elite launch the economic reform and why does market transition theory predict the erosion of power of the communist political elite and the emergence of a new elite drawing on power and gains made in markets? The course focuses on studying the dynamics of China's transition to market society, in which entrepreneurs and professionals comprise the new elite and a growing urban middle class oriented to global cultural beliefs and economic forces increasingly shape popular culture and tastes. In turn, we examine the development of rational-legal institutions and law, the nature of Chinese entrepreneurial spirit, the “floating population” of rural migrants seeking jobs in cities, a deepening environmental crisis, expanding social inequalities, rise of popular unrest and local rebellion, and the dilemma faced by the communist elite in charting a course between reform and stability. Both political and economic agents are active in motivating,

facilitating and guiding far-reaching societal change, especially evident in economic and legal reforms. The course will seek to understand the complex relationships between political and economic actors in a transition society adapting to globalization by means of rapid economic growth and yet bound by the constraints of a communist political order.

**SOC 336(3360) Evolving Families: Challenges to Family Policy (also PAM 336) (SBA)**

Fall. 3 credits. S. Sassler.  
For description, see PAM 336.

**SOC 337(3370) Racial and Ethnic Differentiation (also PAM 337) (SBA)**

Spring. 3 credits. S. Sassler.  
For description, see PAM 337.

**SOC 341(3410) Modern European Society and Politics (also GOVT 341[3413]) (SBA)**

Spring. 4 credits. S. Van Morgan.  
For description, see GOVT 341.

**SOC 357(3570) Schooling, Racial Inequality, and Public Policy in America (SBA)**

Spring. 4 credits. Sophomore seminar. S. Morgan.  
After examining alternative explanations for why individuals obtain different amounts and types of educational training, the course focuses on how an individual's family background and race affect his or her trajectory through the educational system. The course covers the specific challenges that have confronted urban schooling in America since the 1960s, including the classic literature on the effects of school and community resources on student achievement and as well as the development and later evaluation of school desegregation policies. Also considers case studies of current policy debates in the United States, such as housing segregation and school resegregation, voucher programs for school choice, and the motivation for and consequences of the establishment of state-mandated testing requirements. Throughout the course, emphasis is placed upon the alternative modes of inquiry and writing which opposing scholars, policymakers, and journalists use to address these contentious topics.

This is a special seminar sponsored by the John S. Knight Institutes Sophomore Seminars Program Seminars Program Seminars offer discipline-specific study within and an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the disciplines outlook, discourse community, modes of knowledge, and ways of articulating the knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**SOC 362(3620) Inequality and the Workplace (SBA)**

Fall. 4 credits. E. Hirsh.  
The work people do is important for all aspects of their lives, including their earnings, social status, where they live, and opportunities for their children. This course examines the sources, extent, and consequences of workplace inequality across gender, racial, and ethnic lines. While traditional explanations of workplace inequality focus on how differences in workers' skills and qualifications lead to disparities in income, status, and other work-related rewards, this course emphasizes

how characteristics of the workplace—such as hiring practices, pay scales, workforce diversity, and legal context—produce variation in gender, race, and ethnic inequality. The course concludes with a discussion of how public policy can intervene in the perpetuation of workplace inequality.

**SOC 371(3710) Comparative Social Stratification (also D SOC 370[3700]) (SBA)**

Fall or spring. 3 credits. T. Lyson.  
For description, see D SOC 370.

**SOC 375(3750) Classical Theory # (SBA)**

Spring. 3 credits. R. Swedberg.  
Introduction to the classics in sociology, primarily works by Karl Marx, Max Weber, Emile Durkheim, and Georg Simmel. Students also study the works of Alexis de Tocqueville, Montesquieu, and Joseph Schumpeter. Special emphasis is put on the concepts, ideas, and modes of explanation that characterize the classics. Students also look at these writers' empirical material, and what may be termed the social construction of the classics. Course requirements include active class participation and three tests in class.

**SOC 395(3950) Advanced Economic Sociology (SBA)**

Fall. 4 credits. Next offered 2007-2008. R. Swedberg.  
Aims at reinforcing and adding to the insights presented in SOC 105 Introduction to Economic Sociology (taught by Professor Victor Nee in the fall). Begins with the theoretical foundation of economic sociology (classical and modern). The contributions by Max Weber, Joseph Schumpeter, Mark Granovetter, and others are presented. This segment is followed by lectures on different types of economic organization, from capitalism and the global economy to the firm and entrepreneurship. Topics such as politics and the economy, law and the economy, culture and the economy, and gender and the economy are then discussed. Normative aspects of economic sociology are also on the agenda.

### Advanced Courses

The following courses are intended for advanced undergraduates with substantial preparation, as well as for graduate students in sociology and related disciplines. The normal prerequisite for all 400-level courses is one introductory course plus 301 (or an equivalent statistics course). Students who are not sure whether their background is sufficient for a particular course should consult the professor.

**SOC 408(4080) Qualitative Methods (also SOC 508)**

Spring. 4 credits. M. Berezin.  
This course aims to acquaint students with the practice of non-quantitative research methods. It does not offer a laundry list of techniques, rather it asks students to think about how particular methods are more or less suited to the answering of particular types of research questions. The course is divided into four parts: (1) a general discussion of theory, methods and evidence in social science; (2) a series of readings and exercises on particular methods; (3) an analysis of full-length works to see how they were put together; (4) discussion of student projects.

**SOC 410(4100) Health and Survival Inequalities (also FGSS 410[4100]) (SBA)**

Fall. 4 credits. A. Basu.  
Reviews the ways of measuring such inequalities (life expectancy, age-specific death rates, cause specific mortality and morbidity, disability and so on) and some of the historical and contemporary socioeconomic markers of such inequalities, including region, class, race, gender and age. Then examines some of the determinants of these differences, paying particular attention to notions of biology, poverty, and politics. Also considers the role of medical advances in promoting or reducing health inequalities. Besides looking at macro-level determinants, the course covers some of the growing literature on individual and family behaviors that impinge on inequality in health and survival—both unintentional (e.g., through differences in lifestyle) as well as deliberate (e.g., through active discrimination against certain categories of individuals, girls in parts of Asia). Policy prescriptions arising from these studies are evaluated for feasibility and effectiveness and new innovative approaches proposed.

**SOC 421(4210) Theories of Reproduction (also FGSS/D SOC 421[4210]) (SBA)**

Spring. 4 credits. A. Basu.  
Examines the changing nature of the debate on what makes populations grow and what makes families have any, few, and many children. The course begins with theories of historical population growth and changing fertility and then moves on to consider the economic, social, cultural, political, and biological theories applied to fertility and changing fertility in contemporary populations. Demographic concepts and factors believed to account for the high fertility of many developing country populations and the extremely low fertility in many parts of the developed world are examined. Emphasis is given to "sociocultural" and "gender-based" explanations of reproductive behavior, which activist groups and organizations have used to push political and social agendas. The course pays particular attention to the role of the state in population growth and its place in women's lives.

**[SOC 430(4300) Cultural Sociology (also SOC 630) (SBA)]**

Fall. 4 credits. Next offered 2008-2009. M. Berezin.  
Cultural sociology is a flourishing subfield within sociology that incorporates a wide range of substantive areas (art, inequality, family, politics) and uses a wide range of methods from the ethnographic to the textual. This course proposes to explore some of the leading works and ideas in that field and to analyze how culture operates in social life. It begins by analyzing the different meanings that sociologists have ascribed to culture. Students begin by reading classics like Durkheim's *Elementary Forms of Religious Life* move on to contemporary theorists such as Geertz, Bourdieu, Alexander and Swidler. They then read a series of empirically grounded case studies that make culture the basis of the analysis (i.e., Lamont, *Money, Manners and Morals*). They analyze certain cultural objects such as films, art, etc., to put into practice some of the ideas from the readings.]

**SOC 453(4530) Knowledge and Society (also S&TS 453) (SBA)**

Fall. 4 credits. C. Leuenberger.  
For description, see S&TS 453.

**SOC 491(4910) Independent Study**

Fall or spring. 1–4 credits. For undergraduates who wish to obtain research experience or do extensive reading on a special topic. Prerequisite: acceptable prospectus and agreement of a faculty member to serve as supervisor for project throughout semester. Graduate students should enroll in 891–892.

**[SOC 492(4920) Economic Sociology of Entrepreneurship (SBA)]**

Fall. 4 credits. Next offered 2007–2008. V. Nee.

This course introduces the classical and contemporary writings on the rise of entrepreneurial capitalism in the West and the global diffusion of the modern entrepreneurship in its rational orientation to profit-making and innovative drive to apply new technologies and ideas to production. Contemporary approaches shift the emphasis away from the analysis of individual attributes and agency to focus on examining the role of social networks, organizational forms and institutional environment in facilitating the entrepreneurs and the firm. In the second part of the course, we will examine case studies of entrepreneurs, drawing selectively from novels, movies and autobiographies.]

**SOC 495(4950) Honors Research**

Fall or spring. 4 credits. Prerequisite: sociology seniors; permission of instructor.

**SOC 496(4960) Honors Thesis: Senior Year**

Fall or spring. 4 credits. Prerequisite: SOC 495.

**Graduate Core Courses**

These courses are primarily for graduate students in sociology but may be taken by other graduate students with permission of the instructor.

**SOC 501(5010) Basic Problems in Sociology I**

Fall. 4 credits. V. Nee.

Analysis of theory shaping current sociological research. Examination of several central problems in sociological inquiry provides an occasion for understanding tensions and continuities between classical and contemporary approaches, for indicating the prospects for unifying microsociological and macrosociological orientations, and for developing a critical appreciation of efforts to integrate theory and research.

**[SOC 502(5020) Basic Problems in Sociology II]**

Spring. 4 credits. Next offered 2007–2008. D. Heckathorn.

Continuation of SOC 501. Emphasis is on the logical analysis of theoretical perspectives, theories, and theoretical research programs shaping current sociological research. The course includes an introduction to basic concepts used in the logical analysis of theories and examines their application to specific theories and theoretical research programs. Theoretical perspectives include functionalism, social exchange, and interactionism.]

**SOC 506(5060) Research Methods II**

Spring. 4 credits. E. Hirsh.

Course on advanced linear regression analysis in theory and practice. After a review of classical bivariate regression and elementary

matrix algebra, the course progresses under the credible assumption that the most important fundamentals of data analysis techniques can be taught in the context of simple multivariate linear models. Accordingly, the course provides a relatively formal treatment of the identification and estimation of single equation OLS and GLS regression models, instrumental variable models, traditional path models, and multiple indicator models. Interspersed with this material, the course addresses complications of regression modeling for the practicing researcher including: missing data problems, measurement error, regression diagnostics, weighting, and inference for surveys. The course concludes with a brief introduction to nonlinear regression, counterfactual models of causality, Bayesian inference, and hierarchical models.

**Graduate Seminars**

These seminars are primarily for graduate students but may be taken by qualified advanced undergraduates who have permission of the instructor. The seminars offered in each semester are determined in part by the interests of students, but it is unlikely that any seminar will be offered more frequently than every other year. The list below indicates seminars that are likely to be offered, but others may be added and some may be deleted. Students should check with the department before each semester.

**SOC 510(5100) Seminar on Comparative Societal Analysis**

Spring 3 credits. Prerequisite: advanced graduate students throughout social sciences; permission of instructor. M. Berezin.

Intended for advanced graduate students interested in comparative methods and research in the social sciences. It is offered in conjunction with the Comparative Societal Analysis program in the Einaudi Center for International Studies. Students enrolled for credit write critiques of papers presented at the seminar by faculty members and other graduate students, and work on their own project. Some weeks are devoted to collective reading and analysis of background work. Students may enroll for more than one semester.

**[SOC 519(5190) Workshop on Social Inequality]**

Spring. 4 credits. Prerequisite: SOC 518; sociology Ph.D. students, or permission of instructor. Next offered 2007–2008. K. Weeden.

Provides a forum in which students and others can present, discuss, and receive instant feedback on their inequality-related research. Its primary goal is to help students advance their own research; its secondary goal is to introduce selected debates in the contemporary inequality literature in a more comprehensive fashion than is possible in the introductory graduate-level seminar on inequality.]

**SOC 526(5260) Social Policy**

Fall. 4 credits. S. Caldwell.

The dramatic growth of the policy research sector as an institutional and intellectual force signals the changing relationship of social science to social policy in the United States. With an eye on that relationship, this course examines the development of social policy in selected areas, among them welfare, poverty, housing, crime, and health. The policy

research sector itself—people, values, and institutions—is also surveyed.

**[SOC 528(5280) Conflict and the Nation-State]**

Fall. 4 credits. Next offered 2007–2008. D. Strang.

The nation-state developed out of conflict, through military competition within Europe and the rise of and response to colonial empires in the Americas, Asia, and Africa. Conflict is just as virulent today, as ethnic cleansing and movement toward American imperialism attest. This course examines these conflicts both in comparative historical terms and in terms of fundamental social processes, with an eye to what they tell us about contemporary issues. Questions include: when and why do groups seek to leave polities, through secession or decolonization? When and why do states become imperial powers? How are intra-state and inter-state conflict conditioned by the changing content of nationality and citizenship, global institutions, and inequalities of wealth and power.]

**SOC 540(5400) Organizational Research**

Fall. 4 credits. D. Strang.

Seminar focusing on contemporary sociological research on organizations. It centers theoretically on the interplay of institutional, ecological, and choice-theoretic accounts of organizational structure and action. Subjects include organizational founding and mortality; change in organizational practices over time; the relationship between organizations and their legal, social, and cultural environment; and stratification and mobility within organizations.

**SOC 580(5800) Identity and Interest in Collective Action**

Spring. 4 credits. Offered every other year. M. Macy.

This research seminar examines the problem of collective action from alternative theoretical perspectives: one centered on shared interests, the other on common identities. The former claims that groups are held together because the members are interdependent and thus benefit from mutual trust and cooperation in a common endeavor. Identity theorists contend that trust and cooperation may also depend on affective and normative ties among participants who share a salient demarcation (including a "shared fate"). We will explore this debate, and its possible resolution, through an examination of formal theoretical studies (including game theoretic, evolutionary, and agent-based models) as well as empirical research using experimentation and comparative case analysis. We will also examine research on informal social control (including reciprocity and reputation systems), social networks, and mobilizing strategies as mechanisms for reconciling the tension between individual self interest and collective obligations. The primary goal is to identify, formulate, and launch promising research projects, and to that end, seminar members will be expected to critically engage the literature each week and to write a final paper that advances original research (as a detailed prospectus or, where practical, as a publishable article).

**SOC 591(5910) Special Seminars in Sociology**

Fall and spring. 2–4 credits. Staff.

These graduate seminars are offered irregularly. Topics, credit, and instructors vary

from semester to semester. Students should look at the Sociology Department bulletin board at the beginning of each semester for current offerings.

**SOC 605(6050) Political Sociology**

Fall. 3 credits. S. Soule.

This seminar presents the basic approaches to political sociology, with emphasis on the political process in the United States (including the study of both conventional and unconventional politics). Students will learn about explanations for individual participation in both conventional and unconventional politics. Major theoretical and empirical works in this area will be studied.

**SOC 606-607(6060-6070) Sociology Colloquium**

Fall and spring. 0 credits. Requirement for sociology graduate students. Staff.

A series of talks representative of current research interests in sociology, given by distinguished visitors and faculty members.

**SOC 608(6080) Proseminar in Sociology**

Fall. 1 credit. Prerequisite: first-semester sociology graduate students. Staff.

Discussion of the current state of sociology and of the research interests of members of the graduate field; taught by all members of the field.

**SOC 609(6090) Special Topics in Methodology**

Spring. S. Morgan.

After considering alternative modes of explanation in the social sciences, this course offers an introduction to techniques and strategies for estimating causal effects from a counterfactual perspective. For problems where potential outcomes exist because they can be specified for well-defined causal states, alternative data analysis techniques will then be introduced and explained, including matching as stratification, propensity scores as weights in regression analysis, natural experiments as instrumental variable estimators of local average treatment effects, longitudinal data techniques from an interrupted time series perspective, and the front-door criterion for estimating causal effects via the exhaustive modeling of mechanisms. Because the course assumes some familiarity with advanced data analysis techniques, the course is not suitable for students who have not had some training in statistics and data analysis techniques at the graduate level. The course will meet weekly for the first seven weeks of the spring semester. Students who attend the lectures and participate in the discussion of the readings for the first seven weeks should enroll in the pass-fail 2-credit version of the course. Students who wish to carry on in the remaining weeks of the semester to write a term paper using the techniques should enroll in the graded 4-credit version of the course.

**SOC 632(6320) Inside Technology: The Social Construction of Technology (also S&TS 632[6321])**

Fall. 4 credits. T. Pinch.

For description, see S&TS 632.

**SOC 660(6600) States and Social Movements (also GOVT 660[6603])**

Spring. 4 credits. S. Tarrow.

For description, see GOVT 660.

**SOC 680(6800) Workshop on Transnational Contention (also GOVT 681[6817])**

Spring. 4 credits. S. Tarrow.

For description, see GOVT 681.

**SOC 682(6820) Experimental Sociology Workshop**

Fall and spring. 1 credit. S. Correll.

This course is a workshop where students develop original research projects using experimental research methods. Students take turns presenting their projects, as work-in-progress. Students will receive feedback from the instructor and from their fellow classmates. The goal is to turn student research projects into published journal articles.

**SOC 685(6850) Research Practicum on Gender**

Fall. 4 credits. S. Correll.

This course is an advanced graduate seminar designed to help Ph.D. students learn to conduct publishable research in the sociology of gender/sexuality. The goal will be to develop projects that are both empirically sound and reflect an understanding and appreciation of gender as a social phenomenon. In the second week of class, students will give a short presentation of a research project on gender that they began in a previous course. We will then read and discuss current debates on topics such as feminist methods and the application and penetration of gender theories in sociological research. Students will apply these readings as they critique and improve their own projects. Students will also be exposed to the review process and gain practice reviewing each others papers following the guidelines provided by the journal *Gender & Society*. We will conclude the class with short presentations of students' final projects.

**SOC 691(6910) Independent Study**

Fall or spring. 2-4 credits. Prerequisite: graduate status and permission of faculty member willing to supervise project. Staff.

For graduates who wish to obtain research experience or to do extensive reading on a special topic. Permission to enroll for independent study is granted only to students who present an acceptable prospectus and secure the agreement of a faculty member to serve as supervisor for the project throughout the semester.

**SOC 778(7780) Solidarity in Groups (also ILROB 778[7780])**

Fall. 3 credits. E. Lawler.

For description, see ILROB 778.

**SOC 891-892(8910-8920) Graduate Research**

891, fall; 892, spring. Variable to 4 credits each semester. Prerequisite: graduate standing and permission of faculty member willing to supervise project.

**SOC 895-896(8950-8960) Thesis Research**

895, fall; 896, spring. Variable to 6 credits each semester. Prerequisite: permission of thesis supervisor.

## SOUTH ASIA PROGRAM

A. Basu, director; A. Banerjee, K. Basu, A. Blackburn, D. Bor, D. Boucher, I. Dadi, L. Derry, S. Feldman, D. Gold, D. Ghosh, M. Hatch, R. Herring, D. Holmberg, R. Kanbur, M. Katzenstein, K. A. R. Kennedy, N. Kudva, S. Kuruvilla, M. Latham, W. Liyanage, B. Lust, B. MacDougall, M. Majumdar, K. March, K. McGowan, S. Mohanty, S. Mukherjee, V. Munasinghe, A. Nussbaum, S. Oja, P. Olpadwala, B. Perlus, T. Poleman, J. Rigi, N. Sethi, S. Singh, D. Sisler, S. Toorawa, R. Travers, N. Uphoff, M. Walter, M. Weiss, A. Willford.

The South Asia Program coordinates research, teaching, and special campus events relating to Bangladesh, India, Pakistan, Nepal, and Sri Lanka. The program faculty include members from a variety of disciplines, including agricultural economics, agricultural engineering, anthropology, architecture, art, city and regional planning, comparative religion, development sociology, ecology and systematics, economics, English, geology, government, history, history of art, human ecology, industrial and labor relations, international agriculture, linguistics, and literature. Undergraduates with a special interest in the region may major in Asian Studies with a South Asian concentration, or complete a South Asia concentration with any other major. Graduate students may pursue the M.A. degree in Asian Studies with a concentration in South Asia.

Languages offered are Bengali, Hindi, Nepali, Sinhala, Sanskrit, and Urdu. Foreign Language and Area Studies scholarships are available to graduate students who are U.S. citizens or permanent residents. Cornell is a member of the American Institutes of Bangladesh, Indian, Pakistan, and Sri Lankan studies. For details on the major, see the Department of Asian Studies listing in this volume. For courses available in South Asian studies, or for further information on research opportunities, direct questions to the South Asia Program Office, 170 Uris Hall, 255-8493. [www.einaudi.cornell.edu/SouthAsia](http://www.einaudi.cornell.edu/SouthAsia).

## SOUTHEAST ASIA PROGRAM

T. Chaloeitirana, director (180 Uris Hall); I. Azis, W. Bailey, A. Blackburn, A. Cohn, M. Fiskejo, M. Hatch, S. Kuruvilla, F. Logevall, T. Loos, K. McGowan, L. Paterson, J. Siegel, E. Tagliacozzo, K. Taylor, A. Willford, L. Williams, Emeritus: B. Anderson, R. Barker, R. Jones, S. O'Connor, E. Thorbecke, J. Wolff, D. Wyatt, Lecturers: J. Pandin, H. Phan, N. Jagacinski, T. Savella, T. Tranviet, S. Tun

Southeast Asia studies at Cornell is within the framework of the Department of Asian Studies and affiliates with the Einaudi Center for International Studies. Seventeen core faculty members in the colleges of Arts and Sciences, Business and the Johnson Graduate School of Management, the School of Industrial and Labor Relations, and Agriculture and Life Sciences participate in an interdisciplinary program of teaching and research on the history, culture, and societies of the region stretching from Burma through the Philippines. Courses are offered in such fields as anthropology, Asian studies, economics, finance, government, history, history of art, labor relations, linguistics, music, and development sociology. Instruction is also

offered in a wide variety of Southeast Asian languages: Burmese, Cambodian (Khmer), Indonesian, Tagalog, Thai, and Vietnamese. In addition, faculty from other disciplines provide area instruction on Southeast Asia. The formal program of study is enriched by a diverse range of extracurricular activities, including an informal weekly brown bag seminar, art exhibits at the Johnson Museum, and concerts of the Gamelan Ensemble. The George McT. Kahin Center for Advanced Research on Southeast Asia is also the site for public lectures as well as publication and outreach activities related to this area. The John M. Echols Collection on Southeast Asia, in Kroch Library, is the most comprehensive collection on Southeast Asia in the United States.

Undergraduates may major in Asian Studies with a focus on Southeast Asia and its languages, or they may elect to take a concentration in Southeast Asian studies with any other major by completing 18 credits of course work. Graduate students may work toward an M.A. degree in Southeast Asian studies or pursue a Master of Professional Studies in another school with a concentration in Southeast Asian studies. Ph.D. students specializing in Southeast Asia receive a doctorate in a discipline such as history, history of art, anthropology, government, music, economics, or city and regional planning. Academic Year and Summer Foreign Language and Area Studies scholarships are available to graduate students who are U.S. citizens or permanent residents.

For courses available in Southeast Asian studies and details on the major, see the Department of Asian Studies listing in this volume. Additional information is available at [www.einaudi.cornell.edu/southeastasia](http://www.einaudi.cornell.edu/southeastasia). Inquiries for further information should be directed to the program office, 180 Uris Hall, 255-2378 or [SEAP@cornell.edu](mailto:SEAP@cornell.edu).

## SPANISH

See "Department of Romance Studies."

## STATISTICAL SCIENCE DEPARTMENT

The university-wide Department of Statistical Science coordinates undergraduate and graduate study in statistics and probability. A list of suitable courses can be found under "Interdisciplinary Centers, Programs, and Studies" in the front of this catalog.

## SWAHILI

See "Africana Studies and Research Center."

## SWEDISH

See "Department of German Studies."

## TAGALOG

See "Department of Asian Studies."

## THAI

See "Department of Asian Studies."

## THEATRE, FILM, AND DANCE

K. Goetz, chair; R. Archer, D. Bathrick, S. Bernstein, S. Brookhouse, J. Chu, S. Cole, W. Cross, D. Feldshuh (on leave spring 2007), A. Fogelsanger (director of undergraduate program in dance); D. Fredericksen (director of undergraduate program in film); J. E. Gainor (on leave 2006-2007) (director of graduate studies); S. Haenni, D. Hall, E. Intemann, J. Kovar, B. Levitt, P. Lillard, R. MacPike, B. Milles, J. Morgenroth (on leave fall 2006), M. Rivchin, N. Salvato, J. Self, B. Suber, A. Van Dyke (director of undergraduate studies), A. Villarejo, S. Warner

Through its courses and production laboratories, the department provides students with a wide range of opportunities in theatre, film, and dance. It also offers bachelor of arts degrees in each of those areas. These majors educate students in accordance with the general liberal arts ethic of the college. The department invites and encourages academic and studio participation by students from all disciplines.

### Theatre Arts Major

R. Archer, D. Bathrick, S. Bernstein, S. Brookhouse, S. Cole, W. Cross, D. Feldshuh, J. E. Gainor (on leave 2006-2007); K. Goetz, chair; D. Hall, E. Intemann, B. Levitt, P. Lillard, R. MacPike, B. Milles, N. Salvato, A. Van Dyke (director of undergraduate studies), S. Warner

The theatre major offers studies in the history of theatre, dramatic theory and criticism, playwriting, acting, directing, design/technology, and stage management. Students interested in the theatre arts major should consult with Alison Van Dyke (director of undergraduate studies).

Theatre major requirements	Credits
1. <b>THETR 240 and 241, and 242</b> (three-semester Introduction to World Theatre)	12
<b>THETR 250</b> Introduction to Theatre Design and Technology	4
<b>THETR 280</b> Introduction to Acting	3
2. Four laboratory courses distributed as follows:	
<b>THETR 151</b> Production Lab I	1-3
<b>THETR 153, 253, or 353</b> Stage Management Lab I, II, or III	1-3
<b>THETR 155</b> Rehearsal and Performance or <b>THETR 151</b> in a different area	1-3
<b>THETR 251 or 351</b> Production Lab II or III	1-4
3. Three courses in the area of <b>theatre studies</b> (see "Theatre Studies" section of theatre courses) chosen in the following manner:	
one course must be at 300 level	
one course must be at 400 level	
one additional course at the 300 or above level	

one of the three courses must be pre-20th century.

- Three courses (at least 9 credits) in other theatre courses chosen in consultation with the faculty advisor. Course taken to qualify for admission to the Advanced Undergraduate Theatre Program (described below) may also be used to fulfill this requirement.
- Courses in which a student receives a grade below C cannot be used to fulfill the requirements for a Theatre major.

### Honors

The theatre honors program is for majors who have demonstrated exceptional ability in the major and who seek an opportunity to explore branches of their subject not represented in the regular curriculum or to gain experience in original research. To be part of the honors program the student must maintain a GPA of 3.5 in classes for the theatre major and an average of 3.0 in all courses. Students must consult with their advisors in the spring of their junior year to enroll in the honors programs.

### The Advanced Undergraduate Theatre Program

The department offers advanced study in directing, playwriting, design/technology, and stage management to students who qualify on the basis of outstanding achievement in course work. Admission to the AUTP is by invitation of the area faculty supervisor and the completion of a recommended "track" of courses or equivalent experience. (For recommended courses of study see listing of courses at end of departmental listings.) Approval process includes a portfolio review and/or interview. The program provides students with intensive study in theatre as well as the opportunity to collaborate with professional faculty and guest artists.

### Independent Study, Internships and Honors

#### THETR 300(3000) Independent Study

Fall, spring, or summer. 1-4 credits. Independent study in theatre allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course, must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study, which is available in 225 Schwartz Center.

#### THETR 485(4850) Undergraduate Internship

Fall, spring, or summer. 1-3 credits. Prerequisite: majors or concentrators in the department.

Students are responsible for arranging their own internships in consultation with the faculty in their area of choice before preregistration for the semester in which the\* internship is planned to take place. To receive credit for this course, the internship must be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

#### THETR 495(4950) Honors Research Tutorial

Fall, spring. 4 credits. Prerequisite: honors students in theatre.



First of a two-semester sequence (the second is THETR 496) for seniors engaged in an honors project.

**THETR 496(4960) Honors Research Tutorial**

Fall or spring. 4 credits. Prerequisite: honors students in theatre.

Second of a two-semester sequence (the first is THETR 495) for students engaged in an honors project.

**First-Year Writing Seminars**

Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

**Theatre Studies**

**THETR 223(2230) The Comic Theater (also CLASS 223[2641]) # (LA)**

Spring. 3 credits. J. Rusten.

For description, see CLASS 223.

**THETR 277(2770) Shakespeare (also ENGL 227[2270]) # (LA)**

Fall. 4 credits. B. Correll.

For description, see ENGL 227

**THETR 236(2360) Public Voice and Civic Gesture (also DANCE 236[2450], VISST 236[2360])**

Fall. 1 credit. B. Suber and B. Milles.

This course combines acting and movement techniques encouraging process-oriented work. Focusing on performance in civic spaces, the class works to examine the politics of status and the social role of bodily (including vocal) expression of both performer and audience. Working within the specific context of urban public spaces, the class will question the function of monument and the character of urbanism in relation to individual bodies while understanding how these bodies combine to create a body politic. The class will consider traditional tools of political and social satire, including *Commedia dell'Arte*. Fundamental in *commedia* is the exploration of status, the gradations of power and influence and role-playing. Students will create their own texts and movement as well as draw from other textual and visual sources. The class will conclude with a public performance.

**THETR 240(2400) Introduction to World Theatre I—Antiquity to 1500 # (LA)**

Fall. 4 credits. S. Warner.

A survey of practices, literatures, and themes of theatrical performance in Africa, America, Asia, and Europe from antiquity to around 1500. Examines case studies from ancient Egypt, Greece, Rome, the Near East, and India; and medieval and feudal Indonesia, China, Japan, and England; continuing up to the age of European colonialism. Looks at issues of masking and identity, storytelling and ritual, stage and society, tradition and modernity. Lectures are combined with periodic student projects.

**[THETR 241(2410) Introduction to World Theatre II—Early Modernity # (LA)]**

\* Spring. 4 credits. Next offered 2007–2008. Staff.

Survey of world theatrical performance from around 1500 to 1800. Examines the development of European and Asian vernacular and national theatrical traditions; recent ethnic and popular performance traditions of Europe, Asia, Africa, and meso-America; recurring issues of realism and theatricalism, innovation and nostalgia, and colonial expansion and marginalization.

Lectures are combined with periodic student projects.]

**THETR 242(2420) Introduction to World Theatre III—1800 to the Present (LA)**

Spring. 4 credits. Staff.

Traces the emergence of theatrical modernity as a global phenomenon. In Europe and North America, traces the progression from romanticism through realism and the modernist avant-gardes, to post-modernism and beyond. Traces the emergence of recent performance traditions in Asia and Africa in response to local and global forces, and the emergence of an increasingly global and intercultural economy of world theatre. Lectures are combined with periodic student projects.

**THETR 273(2730) Opera (also MUSIC 274[2241]) # (LA)**

Spring. 3 credits. R. Harris-Warrick.

For description, see MUSIC 274.

**THETR 278(2780) Desire (also ENGL/COM L/FGSS 276[2760]) (LA)**

Spring. 4 credits. E. Hanson.

For description, see ENGL 276.

**[THETR 319(3190) Music, Dance, and Light (also DANCE 319[3590]) (LA)]**

Fall. 3 credits. Attendance at dance concerts and music concerts required. Next offered 2007–2008. A. Fogelsanger and E. Intemann.

Artistic values, parameters, and concerns of music (sound design), dance, and lighting design are compared and contrasted, and the combination of design elements is analyzed in contemporary dance. Includes writing in response to readings, audio and video recordings, and performances. Some classes devoted to creating sound, movement, and lighting.]

**THETR 326(3260) Queer Performance (also FGSS 325[3250]) (LA)**

Spring. 3 credits. Limited to 15 students. S. Warner.

What constitutes queer performance? Is queer who you are or what you do? Is sexuality all we mean by queer? Has queer performance enhanced or eclipsed gay and lesbian theater? This course investigates the polymorphously perverse relationship between queer theory and performance. Integral to our theoretical discussions are questions of practice and production: Where is queer performance staged and how is it received? How is it produced, for whom, by whom, and with what funds? What is the relationship between politics and performance? Students are expected to attend at least one performance outside of class and to collaborate on an in-class performance.

**THETR 335(3350) Modern Western Drama, Modern Western Theatre: Theory and Practice (also COM L/ VISST 335[3735], ENGL 335[3350]) (LA)**

Fall. 4 credits. N. Salvato.

This course investigates drama and the cultural contexts of its performance from the mid-19th century to the mid-20th century in Europe and the United States. We will consider such artistic movements as expressionism, symbolism, naturalism, futurism, constructivism, surrealism, and dadaism. The course will conclude with an emphasis on Brecht's epic theater, Artaud's theater of cruelty, and a few of their more contemporary descendants.

**THETR 336 American Drama and Theatre (also AM ST 334)**

Fall. 4 credits. Prerequisite: permission of instructor. Limited to 25 students. S. Warner.

This course explores major American playwrights from 1900 to 1960, introducing students to American theater as a significant part of modern American cultural history. Our focus will be to consider the ways in which theater has contributed to the construction and deconstruction of a national identity. We will pay special attention to the social, political, and aesthetic contexts of the time period and discuss the shifting popularity of dramatic forms, including melodrama, realism, expressionism, absurdism, and the folk play, in the American theater canon. Authors include: O'Neill, Glaspell, Odets, Rice, Hellman, Hughes, Hurston, Hansberry, Miller, Williams, and Albee, among others.

**[THETR 337(3370) Contemporary American Theatre (also ENGL 337[3370]) (LA)]**

Fall. 3 credits. Limited to 15 students. Next offered 2007–2008. Staff.

How has theatre helped shape our notion of what it means to be an American in the second half of the 20th century? What role has politics played in recent theatrical experimentation? How has performance been used as a platform for constructing and deconstructing conceptions of identity, community, and nationality? In this course we will examine major trends in American drama from 1960 to the present. Readings for the class focus on theatre that responds directly to or intervenes in moments of social crisis, including: the Vietnam War, the Civil Rights Movement, the Women's Movement, the Gay and Lesbian Liberation Movement, and AIDS.]

**THETR 345(3450) The Tragic Theatre (also CLASS 345[3645], COM L 344[3440]) # (LA)**

Fall. 4 credits. Limited to 40 students. F. Ahl.

For description, see CLASS 345.

**[THETR 372(3720) Medieval and Renaissance Drama (also ENGL 372/677[3720/6770]) # (LA)]**

Spring. 4 credits. Next offered 2007–2008. M. Raskolnikov.]

**THETR 375(3750) Studies in Drama and Theatre: "Enemies, A 'Love' Story?" (also ENGL 375[3750]) (LA)**

Fall. 4 credits. P. Lorenz.

For description, see ENGL 375.

**[THETR 403(4030) Ritual, Play, Spectacle, Act: Performing Culture (also THETR 603[6030]) (LA)]**

Spring. 4 credits. Next offered 2008–2009. S. Warner.

Takes a broad-spectrum approach to performance. Includes anthropological texts on ritual and play, sociological texts on performances in everyday life, literary studies texts on "performatives" in speech and writing, folklore studies on parades and reenactments, psychological and philosophical studies on the role of performance in the formation of identity, as well as standard texts of the theater. Considers the distinctions between play, ritual, spectacle, festival, theater, and the "visual" arts. Explores the differences between spectating and witnessing and examine studies on audience behavior. At the base of the inquiry is the broad issue of the role of representational practices

within culture and among cultures. If, as Barbara Meyerhoff has written, we understand ourselves by showing ourselves to ourselves, what role does "showing" have in construction of the selves we seek to understand? Why is postmodern culture often called the "society of the spectacle" (Debord)? If, as Aristotle claimed, we are mimetic creatures at base, which comes first—representation or reality? Looking closely at the notion of "live" art, students weigh theorists who claim that performance is ephemeral and disappearing against those who claim that performance, such as oral history, is resilient and enduring. Students have the opportunity to do fieldwork, create performative works, and engage in scholarly study.]

**[THETR 404(4040) Mythology and Postmodern Performance (also THETR 604[6040]) (LA)]**

Spring. 4 credits. Limited to 15 students. Next offered 2007–2008.

Why has mythology flourished in performance projects despite the rather marginal position it has occupied in the academy in the past few decades? Does a survey of postmodern performances, especially by so called "marginal" or "minority" groups, suggest a shift toward a postsecular society? Bringing a variety of divergent discourses into dialogue, this course investigates the critical potentiality mythology holds for both performance theory and social activism. Specifically, it looks to mythology to provide a fresh perspective on cultural performances: sanctioned and unsanctioned forms of transgression; ritualized behavior; initiation and incarceration; and artistic projects aimed at consciousness raising and social change. In what ways does mythology provide an interesting alternative to mimesis as a discursive and performative strategy? How efficacious is it in representing concepts or situations that cannot adequately be conceived of in language or under the law?]

**[THETR 426(4260) Adaptation: Text/Theatricality (also VISST 426[4260]) (LA)]**

Spring. 4 credits. Prerequisite: permission of instructor. Next offered 2007–2008. B. Milles.

Mounting a script into a show is a process of adaptation from page to stage. But dramas have also been translations of other media. Sondheim's *Sunday in the Park with George* "adapted" a painting by Seurat. Stringberg's *Ghost Sonata* "translated" a symphony by Beethoven. Plays can even be adapted into other plays: Césaire's *A Tempest*, Paula Vogel's *Desdemona: A Play about a Handkerchief*, Heiner Müller's *Hamletmachine*. In performance art (where there is often no script) examples abound as well: Can you imagine reenacting Edward Manet's *Olympia* while someone builds a frame around you? And there are lots of exciting possibilities that arise in adapting across cultures—such as a Kathakali *Lear* or a Shakespearean *Mahabharata*. This course challenges the boundaries of text to discover the possibilities of performance. Asks: How do we translate inspiration into tangible (or intangible) theatrical imagery? Working in workshop format as actors and writers, students explore the process of developing theatre pieces based on a variety of sources.]

**[THETR 431(4310) Theory of the Theatre and Drama # (LA)]**

Fall. 4 credits. Next offered 2007–2008. D. Bathrick.

Surveys dramatic theory and theories of theatrical representation from Aristotle to the present. Although covering a span of over two thousand years, the point is to focus the analysis on a smaller number of key representative texts from the European, American, and postcolonial traditions. In so doing the goal is to develop a close reading of each text, while at the same time exploring both their reception within the context in which they emerged as well as their importance in the ever-evolving process of the institutions of theatre and drama over greater periods of time. Participants are expected to read carefully the primary and background texts assigned for each session and come to class prepared to raise and answer questions about the material at hand.]

**[THETR 436(4360) The Female Dramatic Tradition (also FGSS 433[4330]) (LA)]**

Spring. 4 credits. Next offered 2007–2008. Staff.

Is there a "female dramaturgy?" What is the female tradition in the theatre? This course explores these questions through an investigation of texts by women dramatists, including Hrotsvitha, Aphra Behn, and Caryl Churchill, as well as theory by such critics as Sue Ellen Case and Jill Dolan.]

**[THETR 440(4400) Romantic Drama (also THETR 644[6440], ENGL 440/644[4440/6440]) (LA)]**

Fall. 4 credits. R. Parker. For description, see ENGL 440.]

**THETR 445(4450) Text Analysis for Production: How to Get from the Text onto the Stage (also VISST 445[4455], ENGL 444[4440])**

Fall. 4 credits. Limited to 15 students. Prerequisite: THETR 281 or 250 or 398, or permission of instructor. B. Levitt.

Examines the play as the central, essential source for production decisions made by the actor, the director, the designer, and the dramaturg. Students "present" their conclusions about the performance of studied texts through project work as either an actor, director, designer, or dramaturg, as well as through two to three papers.

**THETR 446(4460) Shakespeare in (Con)text (also ENGL 445[4450]) # (LA)]**

Spring. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. B. Levitt.

Examines how collaboration among stage directors, designers, and actors leads to differing interpretations of plays. The course focuses on how the texts themselves are blueprints for productions with particular emphasis on the choices available to the actor inherent in the text.

This is a special seminar sponsored by the John S. Knight Institute's Sophomore Seminars Program. Seminars offer discipline-intensive study within an interdisciplinary context. While not restricted to sophomores, the seminars aim at initiating students into the discipline's outlook, discourse community, modes of knowledge, and ways of articulating that knowledge. Limited to 15 students. Special emphasis is given to strong thinking and writing and to personalized instruction with top university professors.

**[THETR 447(4470) Hamlet: The Seminar # (LA)]**

Spring. 4 credits. Limited to 15 students. Prerequisites: THETR 240, 241, 242 or equivalent and permission of instructor. B. Levitt.

The most studied and written about work in Western Literature outside the Bible, *Hamlet*, according to Harold Bloom, is our secular savior and our ambassador to death. This course centers on a close reading of the play. Through research and assigned readings the course tests theoretical viewpoints about the play against the text itself by reading the theory in relationship to the production history.]

**[THETR 483(4830) Seminar in Comparative 20th-Century Anglophone Drama (also ENGL 483[4601]) (LA)]**

Fall. 4 credits. Recommended: some knowledge of classical and avant-garde theories of drama and theatre. B. Jeyifo. For description, see ENGL 483.]

**[THETR 580(5800) Problems in Asian Art: Dancing the Stone: Body, Memory, and Architecture (also ART H 580[5850])]**

Spring. 4 credits. Next offered 2007–2008. K. McGowan.]

**THETR 600(6000) Proseminar in Theatre Studies**

Spring. 4 credits. Prerequisite: graduate standing.

An introduction to the theory and methods involved in the study of the theatre. Attention focuses on pedagogy and the profession in Part I. Part II explores current scholarly trends.

**THETR 627(6270) Studies in Shakespeare: Shakespeare and Marlowe (also ENGL 627[6270])**

Fall. 4 credits. B. Correll.

For description, see ENGL 627.

**THETR 638(6380) Digital Bodies, Virtual Identities (also ENGL 638)**

Fall. 4 credits. Prerequisite: permission of instructor. T. Murray.

For description, see ENGL 638.

**[THETR 648(6480) East and West German Drama: Post-1945 (also THETR 438[4380])]**

3 credits. Next offered 2007–2008. D. Bathrick.]

**[THETR 679(6790) Bertolt Brecht in Context (also COM L 679[6790])]**

4 credits. Next offered 2007–2008. D. Bathrick.

Requirements: seminar paper that forms the basis for an oral presentation for class discussion. For description, see GERST 679.]

**[THETR 680(6800) Brecht, Müller, and Avant-Garde]**

Fall. 4 credits. Next offered 2007–2008. D. Bathrick.]

**[THETR 703(7030) Theorizing Film]**

Fall. 4 credits. Next offered 2007–2008. T. Murray.]

**THETR 710(7100) The Pedagogy of Theatre**

Fall. 4 credits. Corequisite: relevant undergraduate class and permission of instructor. Staff.

Provides graduate students in the field of theatre an opportunity to work directly with a faculty member to explore pedagogical theory

and practice for undergraduate theatre classes in all areas of the curriculum.

## Acting

### THETR 155(1550) Rehearsal and Performance

Fall or spring. 1-2 credits; 1 credit per production experience per semester up to 2 credits per semester. Students must register for course in semester in which credit is earned. Prerequisite: students who are assigned roles after tryouts at department's scheduled auditions. Students should add this course only after they have been assigned roles. S-U grades only.

The study, development, and performance of roles in departmental theatre or dance productions or the study and practice of directing as experienced in assisting faculty and guest directors.

### THETR 205(2050) Rehearsal Workshop

Fall or spring. 2 credits. Limited to 30 students. Prerequisites: participation in a particular department production and permission of instructor. Staff.

Enables students participating in a particular production to gain expertise and/or knowledge to contribute to that production. The focus of the course depends on the needs of a particular production (e.g., history, choreography, textwork, dramaturgy).

### THETR 280(2800) Introduction to Acting (LA)

Fall or spring. 3 credits. Limited to 16 students per sec. Preregistration and registration only through roster in department office, 225 Schwartz Center. No online registration. Staff.

An introduction to the actor's technique and performance skills, exploring the elements necessary to begin training as an actor, i.e., observation, concentration, and imagination. Focus is on physical and vocal exercises, improvisation, and text and character. There is required play reading, play attendance, and some scene study.

### THETR 281(2810) Acting I (LA)

Fall or spring. 3 credits. Limited to 14 students per sec. Prerequisites: sophomore standing and above; THETR 280 and audition. Registration only through roster in department office, 225 Schwartz Center. Practical exploration of the actor's craft through exercises in physical and psychological action, improvisation and scene study.

### [THETR 282(2820) Standard American Stage Speech (LA)]

Fall. 3 credits. Limited to 10 students. Prerequisites: THETR 280 and permission of instructor. Next offered 2007-2008. A. Van Dyke.

Introduction to Standard American Stage Speech. Study of various regional American accents and Standard American Stage Speech using the International Phonetic Alphabet (IPA) as a way to designate the vowel, diphthong, and consonant sounds of spoken English. The goal of this course is to learn speech for use in performing Shakespeare, Shaw, Chekhov, Moliere, etc.]

### THETR 284(2840) Speech and Dialects for Performance (LA)

Fall. 3 credits. Limited to 10 students. Primarily for department majors. Prerequisites: THETR 281 and permission of instructor. A. Van Dyke.

Development of speech and dialects in dramatic text.

### THETR 380(3800) Acting II (LA)

Fall. 3 credits. Limited to 12 students. Prerequisite: THETR 281 and audition. S. Cole.

Continuation of Acting I. Special consideration is given to a physical approach to characterization.

### THETR 381(3810) Acting III: Advanced Scene Study (LA)

Spring. 3 credits. Limited to 10 students. Prerequisite: audition. Strong preference given to those who have taken THETR 446. B. Levitt.

Focuses on advanced problems for the stage. Monologues and scenes are drawn from Shakespeare and classical sources.

### THETR 384(3840) Commedia: A Contemporization of Physical Acting Styles and the Comic Approach (also VISST 385(3850)) (LA)

Fall. 3 credits. Limited to 10 students. Prerequisite: THETR 281 and permission of instructor. B. Milles.

A wholly physical acting course based in the practices of Commedia dell'arte—stock characters, physical lazzi, improvisation, street theatre—using improvisation, some mask work, clown and viewpoint training. An exploration of how to use the body to illuminate text, and how to mine text to maximize comedy.

### THETR 385(3850) Advanced Studies in Acting Techniques (LA)

Fall. 3 credits; may be repeated for credit. Limited to 8 students. Prerequisites: THETR 281, audition, and permission of instructor. Fall: Alternative Shakespeare. B. Levitt; spring: Acting with an accent. A. Van Dyke.

Topic for fall: Shakespeare's plays were a popular entertainment in the Elizabethan period. The course will explore combining Shakespeare's language—from plays and sonnets, and explore combining that work with popular forms of entertainment today such as Beat Boxing and Hip Hop. The course will lead to the construction of a theatre piece to be rehearsed and performed in January. Course work will consist of text work, research on themes and structural organization of the piece, some dance instruction, some musical and singing instruction and the evolution of the text for Beat Box Bard. Guests will be brought in to teach aspects of this type of work.

## Directing

### THETR 177(1770) Student Laboratory Theatre Company

Spring. 1-2 credits. The Student Laboratory Theatre Company (SLTC) is a group of student-actors who earn credit by acting in three scenes directed by students taking THETR 498. Students enrolling in SLTC for credit earn 1 credit for two projects and 2 credits for three projects. SLTC also meets with directors once a week.

### THETR 398(3980) Fundamentals of Directing I (also VISST 398[3798]) (LA)

Fall. 3 credits. Limited to 9 students. Prerequisite: permission of instructor. Special consideration given to students who have completed THETR 280 or are intending to continue in area of stage or screen directing. Students should see instructor one year in advance to sign up for course. D. Feldshuh.

Focused, practical exercises teach the student fundamental staging techniques that bring written text to theatrical life. A core objective is to increase the student's awareness of why and how certain stage events communicate effectively to an audience. Each student directs a number of exercises as well as a short scene.

### THETR 498(4980) Fundamentals of Directing II (LA)

Spring. 4 credits. Limited enrollment. Prerequisite: THETR 280 and 398, and permission of instructor. Recommended: THETR 250 and 281. B. Milles.

Builds on the staging techniques learned in Fundamentals of Directing I. In this course each student directs actors from the Student Laboratory Theatre Company in a series of projects and public presentations focusing on specific directorial challenges.

### THETR 499(4990) Practicum in Directing

Fall or spring. 1-4 credits. Prerequisites: THETR 240, 250, 280, 398, 498, and permission of instructor. D. Feldshuh. Allows the student who has completed the appropriate prerequisites the opportunity to direct a full presentation of theatre in conjunction with a faculty mentor. May also involve an internship with a prominent director on campus or the opportunity to assistant direct a faculty or guest director.

## Playwriting

### [THETR 348(3480) Playwriting (LA)]

Fall. 4 credits. Limited to 12 students. Prerequisite: permission of instructor. Next offered 2007-2008. Staff. Various approaches and techniques are examined as the student is introduced to the art and craft of dramatic writing. The student is required to read dramatic texts, observe theatre productions and rehearsals, and write. The semester culminates in the completion of a 20- to 30-minute one-act play.]

### THETR 349(3490) Advanced Playwriting (LA)

Fall. 4 credits. Prerequisite: THETR 348 or permission of instructor. B. Milles. Continuation of THETR 348. An intensive writing class. Students are encouraged to explore a rich creative landscape culminating in the completion of a full length play. Focus is on the clarification of dramatic action with emphasis on conflict, theatrical language and refining the visual impulse.

### [THETR 497(4970) Seminar in Playwriting

1-4 credits. Prerequisite: THETR 348 and 349 and permission of instructor. Next offered 2008-2009. Staff. Extension of THETR 348 and 349. Students formulate a process for developing a full-length play, which they develop over the course of the semester. The class meetings are made up of discussions about the students'

process and creative tactics, and reading of material generated by the playwrights.]

## Design, Technology, and Stage Management

### Design

#### **THETR 250(2500) Fundamentals of Theatre Design and Technology (LA)**

Fall and spring. 4 credits. Limited to 12 students. Not open to first-semester freshmen. Registration only through department roster in 225 Schwartz Center. Highly recommended: concurrent enrollment in 1 credit of Production Lab (THETR 151 or 251). Students required to purchase materials that instructors specify (approx. cost \$50). K. Goetz, W. Cross, E. Intemann, and S. Bernstein.

Lectures, discussion, and project work introduce the principles of designing scenery, costumes, lighting and sound, and the technical process of realizing designs on stage.

#### **[THETR 254(2540) Theatrical Makeup Studio]**

Spring. 3 credits. Limited to 10 students. Prerequisite: permission of instructor. Registration only through department roster in 225 Schwartz Center. Students are required to purchase makeup kits that instructor provides (approx. cost \$50). It is expected that any interested student will have taken courses within the department in any of the areas of: design, acting, dance, or film, or will have completed rehearsal and performance (THETR 155) credit.

Basic technique of makeup design and application for the stage including corrective, old age, likeness, and animals; use of some three-dimensional makeup and false facial hair.]

#### **[THETR 319(3190) Music, Dance, and Light (also DANCE 319[3590]) (LA)]**

Fall. 3 credits. Attendance at dance concerts and music concerts required. Next offered 2007–2008. E. Intemann and A. Fogelsanger.

Artistic values, parameters, and concerns of music (sound design), dance, and lighting design are compared and contrasted, and the combination of design elements is analyzed in contemporary dance. Includes writing in response to readings, audio and video recordings, and performances. Some classes devoted to creating sound, movement, and lighting.]

#### **THETR 341(3410) CAD Studio for Theatre Design**

Fall and/or Spring. 3 credits. Prerequisite: THETR 250 and 340 and permission of instructor. Registration only through department roster in 225 Schwartz Center. Experience in theatre production and graphic communication helpful but not essential. Staff.

Students will utilize commercially available computer assisted design software to explore the process of designing scenery, costume and lighting for the live theatre. AutoCad, Vectorworks and Photoshop are some of the applications utilized.

#### **[THETR 343(3430) Costume History: From Fig Leaf to Vanity # (LA)]**

Fall. 3 credits. Limited to 20 students. Next offered 2007–2008. S. Bernstein.

Offers an overview of the history of clothing from the first signs of clothing to the early 20th century. It investigates social, political, economic, technological, geographic, ecological, and artistic influences on costume.]

#### **THETR 362(3620) Lighting Design Studio I (also DANCE 362[3660], VISST 362[3662]) (LA)**

Fall. 4 credits. Limited to 6 students. E. Intemann.

The theory and practice of lighting design as a medium for artistic expression. This course explores the aesthetic and mechanical aspects of light and their application in a variety of disciplines. Emphasis is on understanding lighting's function in an environment and manipulating light effectively. Artistic style and viewpoint are also covered.

#### **THETR 364(3640) Scenic Design Studio (LA)**

Fall. 3 credits. Limited to 10 students. Prerequisite: THETR 250 and 340 or permission of instructor. Recommended: experience in theatre production and graphic skills. Students are required to purchase materials that instructor will specify (approx. cost \$50). K. Goetz.

An exploration of the process of designing scenery for the live theatre. Projects employ various media to explore dramatic use of architecture, the scenic space, and elements of interior design.

#### **THETR 365(3650) Automated Lighting and Control Systems**

Fall. 3 credits. Limited to 8 students. Prerequisite: permission of instructor. Highly recommended: at least 1 credit of THETR 151 or 251. E. Intemann and F. Sellers.

Covers the understanding and application of light control technologies, including electrical systems, color, optics, dimming protocols, and console programming. Students complete a series of projects culminating in the programming and use of moving fixtures and lighting visualization software.

#### **THETR 366(3660) Costume Design Studio (LA)**

Spring. 3 credits; may be repeated for credit Limited to 10 students. Students are required to purchase materials that instructor will specify (approx. cost \$70). S. Bernstein.

Design of costumes for the theatre, concentrating on script and character analysis, period research, design elements, figure drawing and rendering skills, and an understanding of production style.

#### **THETR 368(3680) Sound Design and Digital Audio (also DANCE 368[3680], MUSIC 355[3431]) (LA)**

Fall. 4 credits. Prerequisite: permission of instructor. Recommended: some experience with audio/video recording or editing; previous enrollment in one of the following: FILM 377, FILM 391, MUSIC 120, MUSIC 320, or THETR 250.

Basics of digital audio, psychoacoustics, and sound design as they apply to theatre, film, and music production. Weekly projects require time spent in the studio outside of class. Students create soundtracks for text and moving image, with final projects in 5.1 surround sound, using Pro Tools and Digital Performer.

#### **THETR 369(3690) Digital Performance (also DANCE 369[3560], MUSIC 356[3441]) (LA)**

Fall. 4 credits. Prerequisite: permission of instructors. Laptop computer and MAX/MSP software required, see [www.cycling74.com](http://www.cycling74.com) for student software pricing. Lab performance at end of semester. Recommended: previous enrollment in one of the following: COM S 100, DANCE 210, DANCE/THETR 368, VISST 211. W. Cross and A. Fogelsanger.

Introduction to the multimedia programming language MAX/MSP and its application to computer-interactive dance. Intended to bring together programmers and dancers. Each student will create movement and software patches, and collaborate with others on a final project focusing on the input, manipulation, and output of sound, video, graphics, and lighting in live performance. Topics include digital audio/video processing, MIDI control, sensor use, electroacoustic music, history and current state of computer technology and dance, and aesthetics. Includes 3-hour Wednesday night lab.

#### **[THETR 371(3710) Costume Design Studio II (LA)]**

Fall. 3 credits. Limited to 10 students. Prerequisite: THETR 366, or THETR 250 with permission of instructor. Students are required to purchase materials that instructor will specify (approx. cost \$50). Next offered 2007–2008. S. Bernstein.

Explores unconventional costume designs for theatre and dance. Deals with the special considerations found in many plays and performance pieces, such as the theatricalization of nonhuman subjects (e.g., animals, plants, machines, magical creatures), the visualization of music, or the support or enhancement of movement. Also covers alternative (some non-Western) ways to create character through costume, make-up, masks, and wearable forms of puppetry.]

#### **THETR 462(4620) Lighting Design Studio II (also DANCE 462[4660]) (LA)**

Spring. 4 credits. Limited to 6 students. Prerequisite: THETR 250 or 362 or permission of instructor. E. Intemann.

Concentrates on designing lighting for different genres of performance in various venues. Emphasis is placed on developing both the visual sophistication and the technical artistry of the lighting designer. Commitment, personal style, and professional presentation are stressed.

#### **THETR 464(4640) Scene Design Studio II (LA)**

Spring. 3 credits. Prerequisite: THETR 364 or permission of instructor. Students are required to purchase materials that instructor will specify (approx. cost \$50). K. Goetz.

Projects and activities are tailored to the creative and developmental needs of the individual student with emphasis on developing professional standards and practices that would prepare the student for a major design assignment in the department production season.

### Technology

#### **THETR 252(2520) Technical Production Studio I**

Fall. 3 credits. Limited to 6 students. D. Hall and F. Sellers.

Stage Lighting and Sound Technology: the practical aspects of lighting and sound technology including equipment setup, engineering, electrics, organization, recording techniques, and production paperwork are explored through projects, lectures, and class discussions. In addition to twice-weekly class meetings the course requires a laboratory commitment of 50 hours for the semester.

**THETR 256(2560) Technical Production Studio II**

Spring. 3 credits. Limited to 6 students. Students are required to purchase materials that instructor will specify (approx. cost \$15). Prerequisite: THETR 250 or permission of instructor. Additional hands-on time in prop and paint shops required, to be discussed. C. Seakatz and T. Ostrander.

**Scene Painting:** introduction to the basic techniques of painting scenery, including but not limited to the layout and painting of bricks, marble, stone, and wood grain for the theatre. Individual projects in scene painting and participation on paint crew for productions are included.

**Stage Properties:** introduction to the processes of propmaking, including furniture construction and upholstery techniques, use of shop tools and materials, period research, and painting and finishing.

**THETR 340(3400) Theatrical Drafting and Technical Drawing Studio**

Fall. 3 credits. Limited to 5 students. Prerequisite: permission of instructor. S. Brookhouse.

Implementation of the fundamentals of drafting and technical drawing. Introduction of the concept of an individual style in the approach to drafting for the theatre. Involves a series of projects to familiarize students with the convention and process of visualization and drafting, using both mechanical drafting techniques and AUTOCAD.

**THETR 352(3520) Themed Entertainment: The Technical Perspective**

Fall. 3 credits. Limited to 12 students. R. Archer.

Exploration into the integration of art and science in today's theme parks and interactive entertainment attractions. Papers, projects, and discussions deal with planning and development aspects of large-scale entertainment projects including architecture, engineering, construction, and attraction installation. Focus is on the specialized entertainment technologies that make these attractions work: audio and lighting design, ride and show control systems, and special effects.

**THETR 354(3540) Stagecraft Studio**

Fall. 3 credits. Prerequisite: THETR 250 or permission of instructor. Highly recommended: concurrent enrollment in at least 1 credit of THETR 151 or 251. R. Archer.

Exploration of the techniques and practice of theatre operation, scenic construction, stage mechanics, rigging, painting, and model building.

**THETR 356(3560) Costume Construction Studio**

Spring. 3 credits. Highly recommended: concurrent enrollment in at least 1 credit of THETR 151 or 251. Lab fee: \$100 (paid in class). R. MacPike.

Project/lecture/discussion class in costume research, patterning, cutting, construction, and fitting.

**THETR 360(3600) Costumes: Special Projects**

Fall. 3 credits; may be repeated for credit. Prerequisite: permission of instructor. Lab fee: \$150 (paid in class). R. MacPike.

Designed for students who have completed a basic construction class (in THETR or TXA, or another department). Each fall, this project-oriented course focuses on one of the following areas of costume crafts: millinery, fabric modification, or mask making. Students should check with the instructor to find out each fall which topic is being offered.

**Stage Management**

**THETR 153(1530) Stage Management Production Laboratory I (also DANCE 153[1630])**

Fall and spring. 1-2 credits; may be repeated for credit. Before registering, students must attend orientation meeting at 7:30 P.M. in Kiplinger Theatre at Schwartz Center on first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.

Practical experience in theatrical production as assistant stage manager for a dance theatre concert or as a stage manager for readings, Black Box lab productions, or SLTC under the supervision of the faculty production manager. THETR 370 complements this course.

**THETR 253(2530) Stage Management Laboratory II (also DANCE 253[2630])**

Fall and spring. 1-5 credits; may be repeated for credit. Before registering, students must attend orientation meeting at 7:30 P.M. in Kiplinger Theatre at Schwartz Center on first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.

Practical experience in theatrical production as assistant stage manager for a season production under the supervision of the faculty production manager. THETR 370 complements this course.

**THETR 353(3530) Stage Management Laboratory III**

Fall and spring. 1-4 credits; may be repeated for credit. Before registering, students must attend orientation meeting at 7:30 P.M. in Kiplinger Theatre at Schwartz Center on first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.

Practical experience in theatrical production as stage manager for a dance theatre concert or an AUP production under the supervision of the faculty production manager. THETR 370 complements this course.

**THETR 370(3700) Stage Management Studio**

Fall. 2 credits. Prerequisite: THETR 250 or 280 or permission of instructor. Students are required to purchase materials that instructor will specify (approx. cost \$10). P. Lillard.

Introduction to the concepts and techniques of stage management as they relate to specific areas of production. Development of relevant communication skills and an understanding of the production process as experienced by a working stage manager or assistant stage manager. THETR 153, 253, and 353 complement this course.

**THETR 453(4530) Stage Management Laboratory IV**

Fall and spring. 1-5 credits; may be repeated for credit. Prerequisite: admission to Advanced Undergraduate Theatre Program. P. Lillard.

Practical experience in theatrical production as stage manager for a season production under the supervision of the faculty production manager.

**Production Laboratories**

**THETR 151(1510) Production Laboratory I (also DANCE 151[1610])**

Fall and spring. 1-3 credits; may be repeated for credit. No prerequisites or experience required. Orientation meeting at 7:30 P.M. first Tuesday of classes each semester in Kiplinger Theatre at Schwartz Center. P. Lillard, S. Brookhouse, and F. Sellers.

Provides practical experiences in theatrical production. Students can work on scenery, costumes, properties, lighting, or stage crew.

**THETR 251(2510) Production Laboratory II (also DANCE 251[2610])**

Fall and spring. 1-3 credits; may be repeated for credit. Prerequisite: permission of instructor. Orientation meeting at 7:30 P.M. on first Tuesday of classes each semester in Kiplinger Theatre at Schwartz Center. P. Lillard, D. Hall, F. Sellers, and R. MacPike.

Practical experience in theatrical production, as a light board operator, sound board operator, sound technician, head dresser or scenery/props special project.

**THETR 351(3510) Production Laboratory III**

Fall and spring. 1-3 credits; may be repeated for credit. Prerequisite: permission of instructor. P. Lillard, R. Archer, S. Brookhouse, K. Goetz, D. Hall, E. Intemann, and F. Sellers.

Practical experience in theatrical production as a master electrician, assistant technical director, assistant costume shop manager, or assistant to a faculty or guest director or designer.

**THETR 451(4510) Production Laboratory IV**

Fall and spring. 1-4 credits; may be repeated for credit. Prerequisite: admission to Advanced Undergraduate Theatre Program. P. Lillard, R. Archer, S. Brookhouse, K. Goetz, D. Hall, and E. Intemann.

Practical experience in theatrical production, in the position of designer, shop manager, technical director, or sound engineer.

**Independent Study, Internships, and Honors**

**THETR 300(3000) Independent Study**

Summer, fall, or spring. 1-4 credits. Independent study in the theatre allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course, must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study, which is available in 225 Schwartz Center.



**THETR 485(4850) Undergraduate Internship**

Fall, spring, or summer. 1–3 credits. To be eligible to enroll and receive credit for an internship, students must either be majors or be concentrators in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice *before* preregistration for the semester in which the internship is planned to take place. To receive credit within this course, the internship must be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

**THETR 495(4950) Honors Research Tutorial**

Fall or spring. 4 credits. Prerequisite: honors students in theatre. First of a two-semester sequence (the second is THETR 496) for seniors engaged in an honors project.

**THETR 496(4960) Honors Research Tutorial**

Fall or spring. 4 credits. Prerequisite: honors students in theatre. Second of a two-semester sequence (the first is THETR 495) for students engaged in an honors project.

**Film**

D. Bathrick, D. Fredericksen (director of undergraduate studies in film), S. Haenni, M. Rivchin, A. Villarejo

The study of film began in this department in the 1930s and continues to be based here. In the intervening years, however, it has also spread into a significant number of other departments in the College: Africana studies, anthropology, Asian studies, comparative literature, English, German studies, government, history, psychology, Romance studies, and women's studies. This proliferation of courses has been accompanied by a comparable proliferation of perspectives and faculty concerns, e.g., the relationship of national cinemas to national literatures and specific cultures, film's relationships to myth and ideology, the use of film as historical evidence, film's efficacy as a rhetorical medium, and film's contribution to perennial issues in aesthetics, the history of the arts, and studies in cognition. The foundational courses in film production and in the history, theory, and criticism of film as an art are centered in this department.

This richness of courses and perspectives is matched by the ways in which students may make film the focus of their undergraduate studies. The three ways currently being used are: (1) majoring in film within the Department of Theatre, Film, and Dance; (2) constructing an individually tailored Independent Major in film (including the possibility of placing film in tandem with another medium or discipline); and (3) focusing on film as a College Scholar. Students interested in options 2 or 3 should consult Don Fredericksen (director of undergraduate studies in film) and the director of the College Scholar Program or the director of the Independent Major program. Students interested in the first option should consult Don Fredericksen (director of undergraduate studies in film). In addition, students should be aware that the college has recently approved a five-course concentration in visual

studies, which can be taken independently of, or in conjunction with, a major in film. Students interested in the visual studies concentration should contact its director.

**Film Major Requirements**

The department's film major requires a total of 50 credits in film and related courses. Students should note that a number of film courses—including two required "core" courses: (FILM 375 and 376)—are offered in alternating years. This means that *students cannot fulfill the requirements for the major in less than two years* and that they should plan accordingly, in consultation with their major advisor. In particular, students must plan to be in residence at Cornell during the fall semesters of both their junior and senior years to take FILM 375 and 376. Within the "core" required courses, FILM 274, Introduction to Film Analysis, is to be taken during the sophomore year. **Note: Prospective majors must earn a grade of B (not B-) or higher in FILM 274 to be accepted into the major. Students may not enter the major until they have completed FILM 274 in the fall semester of their sophomore year.**

Majors wishing to use the production courses in a substantial manner must plan carefully and work within certain limits. These courses are FILM 324, 377, 383, 422, 477, 478, 493. *Enrollment in each of these courses is limited by the nature of the work and by facilities.* Enrollment in FILM 477, 478, and 493 depends on the quality of previous work in FILM 377 and/or 383; enrollment is not guaranteed. Majors *without* a strong interest in production can complete the production requirement with one course: FILM 377, after they have taken FILM 274 in their sophomore year. The total credits in production courses cannot exceed 20 hours; this limit is strictly enforced.

1. A core of *four* film courses:

**FILM 274** Introduction to Film Analysis (offered every fall semester) 4

**FILM 375** History and Theory of Commercial Narrative Film (offered alternate fall semesters; next offered fall 2006 (prerequisite for film majors: FILM 274)) 4

**FILM 376** History and Theory of Documentary and Experimental Film (offered alternate fall semesters; offered fall 2007) (prerequisite for Film majors: FILM 274) 4

**FILM 377** Introduction to 16mm and Digital Filmmaking (offered fall 2006 and 2007 and spring 2008) 4

2. *One* of the following theatre courses:

**THETR 250** Fundamentals of Theatre Design/Technology (offered every semester) 4

**THETR 280** Introduction to Acting (offered every semester) 3

**THETR 398** Directing I (prerequisite: permission) (offered every fall semester) 3

3. *Four* courses (15–16 credits) in film offered by Theatre, Film and Dance as below, or (with permission of advisor) by other departments:

**FILM 265** Studies in Film Analysis: Hitchcock's Films (offered fall 2006) 4

**[FILM 276** Survey of American Film (next offered fall 2007)] 4

**FILM 329** Political Theory and Cinema (next offered spring 2007)

**[FILM 344** American Film Melodrama (next offered spring 2008)] 4

**FILM 346** Film Noir (offered occasionally; next offered spring 2007) 4

**FILM 369** Fast-Talking Dames and Sad Ladies: 1940s and Now (offered yearly; offered spring 2007) 4

**[FILM 378** Soviet Film of 20s and French Film of 60s (offered occasionally; next offered spring 2009)] 4

**[FILM 379** Modern Documentary Film (offered alternate spring semesters; next offered spring 2008)] 4

**FILM 383** Screenwriting (next offered spring 2007) 4

**[FILM 386** Cinema and Social Change (offered occasionally; next offered 2008–2009)] 4

**FILM 391** Media Arts Studio I (offered occasionally; TBA fall 2006) 3

**[FILM 393** International Film of the 1970s (next offered fall 2007)] 4

**FILM 395** Video: Art, Theory, Politics (offered occasionally; next offered 2006–2007) 4

**[FILM 396** German Film (offered occasionally; next offered 2007–2008)] 4

**FILM 422** Cinematography (offered spring 2007) 3

**[AS&RC 435** African Cinema (offered alternate years; next offered 2007–2008)] 4

**[FILM 450** Rescreening the Holocaust (offered occasionally; next offered 2008–2009)] 4

**FILM 455** History of Modern Polish Cinema (offered alternate years; offered fall 2006) 4

**FILM 473** Film and Spiritual Questions (offered alternate spring semesters; next offered spring 2007) 4

**[FILM 474** Jung, Film, and the Process of Self-Knowledge (offered alternate years; next offered spring 2008)] 4

**[FILM 475** Seminar in the Cinema I (offered most years; topic varies; may be repeated for credit) 4

**[FILM 476** Seminar in the Cinema II (offered occasionally; topic varies; may be repeated for credit) 4

**[FILM 477** Intermediate Film and Video Projects: Documentary and Experimental Workshop (offered alternate years; offered fall 2007)] 4

**FILM 478** Intermediate Film and Video Projects: Narrative Workshop (offered alternate years; next offered fall 2006) 4

**FILM 493** Advanced Film and Video Projects (offered spring 2007) 4

4. 15 credits of related course work inside or outside the Department of Theatre, Film and Dance (as approved by the major advisor). The courses chosen to fulfill this requirement should reinforce

a major's particular interest in film and will not necessarily be film courses *per se*. For example, a student interested in the psychology of film, or in ethnographic film, or in film *vis-à-vis* intellectual or social history, or in film and social change will be encouraged to choose related course work in those areas.

- Students must earn at least a B (not B-) in FILM 274 to enter the major. In all subsequent courses used for the major a grade of C (not C-) must be achieved. Courses in which these minimums are not achieved must be repeated if the student is to receive credit in the major.
- Course work in production cannot exceed 20 credit hours.

## Honors

Students who have maintained a GPA of 3.5 in their film major courses, and an average of 3.0 in all courses, may elect to work for honors in film during their senior year. They must consult with their advisor in the spring of their junior year about the honors program in film. Honors projects are possible in filmmaking and film analysis (history, criticism, theory). Projects in filmmaking require an analytical component related to the creative work.

## The Advanced Undergraduate Filmmaking Program

The department offers advanced study in filmmaking to students who qualify on the basis of outstanding achievement in film studies and film production courses. Acceptance to the AUFPP and admission to the advanced film production course (FILM 493) will be determined by a committee of film faculty in December of each year, based on applications from students who have a proposal (script or treatment) for a film or video project.

## Film Study Abroad

The College of Arts and Sciences, through this department and in concert with a number of other American colleges and universities, offers up to a full year of study at the Paris Center for Critical Studies and, through the center, at the University of Paris III. The center's film program is theoretical, critical, and historical. It is most useful to students whose major interest is in the academic study of film and serves as a complement to Cornell's film courses. Fluency in French is required. FILM 274 and 375 are prerequisites. Inquiries should be addressed to Professor Fredericksen, Cornell's liaison with the center.

## Computing in the Arts Undergraduate Concentration

A concentration in Computing in the Arts with an emphasis on film is available both to film majors and to students majoring in other subjects. For more information, see "Computing in the Arts Undergraduate Concentration" under "Departments, Programs and Courses" in the "College of Arts and Sciences," or contact the Director of Undergraduate Studies in Film, dlf10@cornell.edu.

## FILM 265(2650) Studies in Film Analysis: Hitchcock's Films (also ENGL/FGSS 263[2630]) (LA)

Fall. 4 credits. L. Bogel.  
For description, see ENGL 263.

## FILM 274(2740) Introduction to Film Analysis: Meaning and Value (also FILM 674[6740], VISST 274/674[2174/6740]) (LA)

Fall. 4 credits. Limited to 40 students.  
Graduate students must enroll in FILM 674.  
D. Fredericksen.

Intensive consideration of the ways films generate meaning and of the ways we attribute meaning and value to films. Discussion ranges over commercial narrative, documentary, and personal film modes. Prospective film majors should enroll in their sophomore year.

## [FILM 276(2760) Survey of American Film (also AM ST 230[2760], VISST 230[2300]) (LA)

Fall. 4 credits. Required film screenings; disc once a week. Offered alternate years; next offered 2007-2008. S. Haenni.  
For description, see AM ST 230.]

## FILM 293(2930) SSP: Middle Eastern Cinema (also NES 293[2793], COM L 293[2930], JWST 291[2793], VISST 293[2193]) @ (LA)

Fall. 4 credits. D. Starr.  
For description, see NES 293.

## [FILM 324(3240) Animation Workshop: Experimental and Traditional Methods (LA)

Summer. 3 credits. Cost for equipment: \$200. L. Tomlinson.  
The art of animation involves many dimensions, including time and motion. This course introduces students to the fundamentals of traditional animation and the mechanics used to capture the illusion of movement. By modeling the projects on the work of artists who have pushed the potential of animation in new directions, students investigate innovative ways of animating sequential images and objects. Emphasizing tactile processes—drawing, sculpting, and painting—and recording the images we create to capture movement and expression, students explore a variety of experimental and fine-arts approaches used in modern-day animation.]

## FILM 325(3250) Animation History & Practice (LA)

Summer. 3 credits. Limited to 12 students.  
Equipment fee: \$75. M. Tomlinson.  
Beginning with the pre-history of animation, optical toys and magic lantern projections, and continuing through a century of animation history to contemporary work, this course investigates the history of animation from around the world, through a variety of hands-on production projects, as well as lectures, discussions, research, and screenings. Combining tactile and digital methods, students create weekly collaborative and individual animated films, incorporating lessons from the historical work studied.

## [FILM 341(3410) French Film (also FRLIT 336[3360]) (LA)

Fall. 4 credits. Offered occasionally; next offered 2007-2008. T. Murray.]

## [FILM 344(3440) American Film Melodrama (also AM ST 338, ENGL 344, VISST 345) (LA)

Spring. 4 credits. Recommended: some background in film analysis. Next offered 2007-2008. S. Haenni.

Understanding melodrama as a 'mode of excess' which powerfully affects film audiences, this course focuses on melodramatic style and themes (paranoia, trauma) in different historical moments

(World War II, postwar suburban America, the contemporary moment).]

## FILM 346(3460) Film Noir (also AM ST 348[3480], VISST 348[3480]) (LA)

Spring. 4 credits. Recommended: some course work in film. S. Haenni.  
At the close of World War II, the French coined the term "film noir" to describe a new, "dark," and "gloomy" set of Hollywood films that were populated by femmes fatales, criminal gangs, private eyes, and lovers on the run, and which centered on issues of violence, crime, paranoia, betrayal, pessimism, and self-doubt. Derived from hard-boiled detective fiction and influenced by German expressionist cinema, *film noir* has become one of the most acclaimed genres in Hollywood film. This course explores both the stylistic characteristics and thematic and cultural contexts of *film noir*. Examines the history and function of "noir" as a critical term; the influence of hard-boiled fiction; and the evolution of noir style and *noir* narratives. Investigates how *film noir* articulates anxieties about postwar masculinity and the sexual and social roles of women; how it popularizes psychology; how it portrays the city as an "urban jungle"; and how it represents a response to fears about communism and the atomic bomb. Screenings include major studio features such as *Double Indemnity* and *Laura*, B-pictures such as *Detour* and *Gun Crazy*, and "neo-noirs" such as *Chinatown* and *Devil in a Blue Dress*. Discussion of films is guided by readings in film criticism and history.

## FILM 369(3690) Fast-Talking Dames and Sad Ladies: 1940s and Now (also ENGL/FGSS 369[3690]) (LA)

Spring. 4 credits. L. Bogel.  
For description, see ENGL 369.

## FILM 375(3750) History and Theory of the Commercial Narrative Film (also VISST 375[3175]) (LA)

Fall. 4 credits. Fee for screening expenses: \$10 (paid in class). Prerequisite: for film majors FILM 274. Offered alternate years; next offered 2006-2007. S. Haenni.  
Consideration of the broad patterns of narration in the history of the commercial narrative film. Emphases are placed on the early articulation of a cinematic means of narration, realism as an artistic style, the nature and functions of popular film, and the modes of modernist and post-modernist "art cinema" narration.

## [FILM 376(3760) History and Theory of Documentary and Experimental Film (also VISST 376[3176]) (LA)

Fall. 4 credits. Fee for screening expenses: \$10 (paid in class). Highly recommended: FILM 274. Offered alternate years; next offered 2007-2008. D. Fredericksen.  
Analyzes canonical works in documentary film up to the end of World War II, including Vertov, Flaherty, Grierson, Hurwitz, Grierson, Wright, Capra, Riefenstahl, and the connection between documentary film and modernism(s) in the 1920s and 1930s. Also includes analysis of canonical works in the avant-garde/experimental/personal film tradition(s) in Europe and the United States from the 1920s to the 1980s, including French impressionism, surrealism, the New Realism, graphic cinema, and the several patterns of the American personal film during its heyday (1940s to the late 1970s).]

**FILM 377(3770) Introduction to 16mm and Digital Filmmaking (LA)**

Fall and spring. 4 credits. Limited to 12 students. Intended for juniors and seniors (who may need to sign up a year or more in advance) with priority given to film majors. Prerequisite: FILM 274 (or higher-level film studies course) and permission of instructor. Equipment fee: \$150 (paid in class). Average cost to each student for materials and processing is \$500.

M. Rivchin.

Creative, hands-on production course in filmmaking, emphasizing the development of original ideas and the acquisition of basic technical skills in both 16mm and miniDV formats: cinematography, lighting, sound recording and editing, and film and non-linear digital editing. Students complete several exercises and two short projects; the final project may be narrative, documentary, experimental, or animation and is shown in a public screening at the end of the semester on campus.

**[FILM 378(3780) Soviet Film of the 1920s and French Film of the 1960s (LA)]**

Spring. 4 credits. Fee for screening expenses: \$10 (paid in class). Highly recommended: FILM 375. Offered occasionally; next offered 2008–2009.

D. Fredericksen.

Intensive treatment of two distinct periods of radical innovation in film theory and history. Emphasis is on the animated relationship between theory and filmmaking during these two decades.]

**[FILM 379(3790) Modern Documentary Film (LA)]**

Spring. 4 credits. Highly recommended: FILM 375. Fee for screening expenses: \$10 (paid in class). Offered alternate spring semesters; next offered 2007–2008.

D. Fredericksen.

An intensive consideration of canonical documentary films from 1945 to the present. Emphases are on the documentary film as an artistic form with a distinct history and set of theoretical questions, as a sociopolitical force, as an ethnographic medium within and without a filmmaker's culture, and as a televised medium of persuasion and expression.]

**FILM 383(3830) Screenwriting: Bringing Your Vision to the Page (LA)**

Spring. 4 credits. Limited to 12 students. Prerequisite: completed application, writing sample, and permission of instructor.

Students must go to 225 CT to apply. Staff.

This course explores the fundamentals of traditional Hollywood and independent screenplays.

**[FILM 386(3860) Cinema and Social Change (was Third Cinema) (LA)]**

Spring. 4 credits. Next offered 2008–2009.

A. Villarejo.

Explores the role of cinema in social and political change that address processes of decolonization as well as issues of labor, health-care, gender and racial equity, globalization, war, and imperialism.]

**FILM 391(3910) Media Arts Studio I (also ART/MUSIC/VISST 391[3791]) (LA)**

Fall. 3 credits. Prerequisite: permission of instructor and junior standing, minimum FILM 377 or 277, or dance studio courses. Equipment fee: \$50 (paid in class). Participating faculty include M. Rivchin, film; J. Zissevici, arch.; B. Suber, dance.

Collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects to investigate and produce interactive work in public spaces on campus.

**[FILM 393(3930) International Film of the 1970s (also AM ST/VISST 393[3930]) (LA)]**

Fall. 4 credits. Recommended: some background in film analysis. Offered occasionally; next offered 2007–2008.

S. Haenni.

Considers how the social, political and cultural upheavals of the late '60s (Watergate, Vietnam, terrorism, etc.) affected film aesthetics, narrative, and style; emphases on 'new' Hollywood, European art cinema, black independent and blaxploitation films, etc.]

**[FILM 395(3950) Video: Art, Theory, Politics (also ENGL 395[3950])]**

Fall. 4 credits. Offered occasionally; next offered 2007–2008. T. Murray.]

**[FILM 396(3960) German Film (also GERST 396[3960]) (LA)]**

Fall. 4 credits. Offered occasionally; next offered 2007–2008. D. Bathrick.

Explores German film from the Weimar and Nazi periods to the present in relation to the cultural and sociopolitical content of which it was a part.]

**FILM 422(4220) Cinematography (LA)**

Spring. 4 credits. Limited to 8 students.

Pre- or corequisite to FILM 493.

Prerequisite: permission of instructor. Letter grades only. Equipment fee: \$150.

Advanced camera and lighting techniques, designed for students who have taken at least FILM 377 and/or advanced photography courses or computer animation courses. M. Rivchin.

Students work on a series of tests, short exercises, and scene projects using sync and non-sync 16mm cameras, digital video cameras, camera movement apparatus, lighting instruments, a range of lighting instruments, filters, and gels and digital video cameras to expand their knowledge of the technical and aesthetic aspects of cinematography.]

**FILM 430(4300) Topics in American Studies: The Cinema and the American City (also AM ST 430.10, VISST 430[4630]) (CA)**

Fall. 4 credits. Weekly screenings TBA.

The Cinema and the American City. The emergence of the cinema in the late-19th century coincided with the emergence of a new kind of metropolis, characterized, among other things, by new traffic systems (elevated train, subway, automobile), new racial, ethnic, and sexual regimes, and new urban planning. The cinema was inevitably affected by the ways in which the city developed, while at the same time it also made the city legible. In this course, we will examine how American cities and towns have been represented in film in different ways, as, for instance, musical symphonies, mysteries to be deciphered, or post-apocalyptic wastelands. We will explore how gender, racial, ethnic, class and sexual identities are negotiated in the modern, cinematic city. Screenings will range from silent and early sound films, such as *The Crowd* and 1930s musicals, to contemporary cinema, such as *Do the Right Thing* and *Blade Runner*; our viewings will be guided by readings in film and urban theory and history.

**[FILM 450(4500) Rescreening the Holocaust (also COM L 453[4530], GERST 449[4490], RELST 450[4500]) (LA)]**

Fall. 4 credits. Offered occasionally; next offered 2008–2009. D. Bathrick.

A survey of the major films dealing with the Holocaust. The course focuses on the possibilities and limits of representing the Holocaust cinematically, as well as questions more specifically concerning commercialization, fictionalization, trivialization, documentation, visualization, and narrativization in the making and distributing of films about this event.]

**FILM 455(4550) History of Modern Polish Film (LA)**

Fall. 4 credits. Prerequisite: some film analysis course work. D. Fredericksen.

Analysis of Polish film from 1945 to the present, within the context of Poland's postwar history. Topics include the period of socialist realism, the so-called "Polish School" (1956–1962), the cinema of moral anxiety, Solidarity cinema, and the Polish documentary tradition. Key directors considered include Ford, Wajda, Munk, Polanski, Skolimowski, Zanussi, Falk, Piwowski, Bugajski, Krzystek, Kijowski, Zaorski, Kieslowski, and Lozinski. Some attention is given to the development of Polish film theory. The extra-filmic context is set by such works as Norman Davies' *Heart of Europe*, Czeslaw Milosz' *The Captive Mind*, and Eva Hoffman's *Exit into History*.

**FILM 473(4730) Film and Spiritual Questions (LA)**

Spring. 4 credits. Limited to 20 students. Offered alternate years. D. Fredericksen.

The use of film as a medium for the expression of spiritual questions has a long and rich history, although little attention is given to this fact in contemporary film studies. This seminar examines films and writings by filmmakers who are so inclined, including Baillie, Gardner, Bergman, Dreyer, Bresson, Godard, Scorsese, Brakhage, Belson, Whitney, Rouquier, Newby, Kubrick, and Bae Yong-Kyun. Special attention is given to the work of Andrei Tarkovsky, the Russian film director and theorist. Readings include Tarkovsky's *Sculpting in Time*, Smith's *Why Religion Matters*, Eliade's *The Sacred and the Profane*, Edinger's *The Christian Archetype*, Schrader's *Transcendental Style in Film*, and Warren and Locke's *Women and the Sacred in Film*.

**[FILM 474(4740) Jung, Film, and the Process of Self-Knowledge (LA)]**

Spring. 4 credits. Limited to 20 students. Offered alternate years; next offered 2007–2008. D. Fredericksen.

"Know thyself" is one of the oldest and most enduring imperatives of the human spirit, and the *raison d'être* for liberal studies. This seminar traces in some detail the Jungian approach to this imperative and then tests its critical capacities with respect to films.]

**[FILM 475(4750) Seminar in Cinema I (also AM ST 475[4750]) (LA)]**

Fall. 4 credits. Next offered 2007–2008.]

**[FILM 476(4760) Seminar in the Cinema II (LA)]**

Fall or spring. 4 credits. Offered occasionally; next offered 2007–2008.]

**[FILM 477(4770) Intermediate Film and Video Projects: Documentary and Experimental Workshop (also VISST 477(4770)) (LA)]**

Fall. 4 credits. Limited to 8 students. Prerequisites: FILM 377 as minimum production; priority given to those who have taken FILM 376, 379, or 386 and permission of instructor based on project proposals. Equipment fee: \$150 (paid in class). Film projects costs: \$300-\$1,500; video: \$100-\$400. Next offered 2007-2008. M. Rivchin.

Intensive course in 16mm filmmaking and digital video in which each student develops a significant documentary or experimental project both critically and creatively. Readings, discussions, and exercises are designed to increase the student's knowledge and practice of: cinematography, lighting, sync-sound filming, and editing techniques; working with labs; digital video camera; and nonlinear (Final Cut Pro and AVID) digital editing.]

**FILM 478(4780) Intermediate Film and Video Projects: Narrative Workshop (LA)**

Fall. 4 credits. Limited to 8 students. Prerequisites: FILM 377 as minimum production; priority given to those who have taken FILM 375 or 383; THETR 398 or 413, and permission of instructor based on proposals. Equipment fee: \$150 (paid in class). Film projects costs: \$500-\$1,500; video: \$100-\$200. M. Rivchin.

Intensive course in 16mm filmmaking and digital video in which each student develops a significant, original narrative script project that he or she then directs, shoots in crews, and edits. Student may opt for narrative documentary or experimental work as well. Readings, discussions, and exercises are designed to increase the student's knowledge and practice of directing; cinematography, lighting, sync-sound filming, and editing techniques; working with labs and sound houses; digital video camera; and digital (Final Cut Pro, AVID, and ProTools) editing.

**FILM 485(4850) Undergraduate Internship**

Fall, spring, or summer. 1-3 credits. To be eligible to enroll and receive credit for an internship, students must either be majors or concentrators in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice before preregistration for the semester in which the internship is planned to take place. To receive credit within the course, the internship must be unpaid. Students must follow the rules and procedures stated on the departmental internship form.

**FILM 493(4930) Advanced Film and Video Projects (LA)**

Spring. 4 credits. Limited to 6-8 students. Permission only. Prerequisite: minimum FILM 377, priority given to those who have taken 477, 478, or 324. Recommended: FILM 383 and THETR 398. Equipment fee: \$150. Project costs: \$500-\$2,000. M. Rivchin.

Intensive filmmaking course in which students focus on developing and producing a single, already-proposed (15-30 min.) 16mm film or digital video project over the semester. Students direct and edit their own (or collaborative) projects working in crews for sync-sound dialog narrative films or documentaries and in small groups for technical exercises and assisting in non-sync projects. Readings, discussions, and exercises are designed to increase the student's

knowledge and practice of script revision; directing; scene breakdowns, auditions, and casting; cinematography, lighting, sync-sound filming, and editing techniques; working with labs and sound houses; digital video camera; and digital (Final Cut Pro, AVID, and ProTools) editing.

**FILM 674(6740) Introduction to Film Analysis: Meaning and Value**

Fall. 4 credits. Limited to 10 graduate students. D. Fredericksen.

Intensive consideration of the ways films generate meaning and of the ways we attribute meaning and value to films. Discussion ranges over commercial narrative, documentary, and personal film modes. Graduate students who intend to teach film at the undergraduate level are especially welcome. In addition to full participation in the work of FILM 274, graduate students read and discuss in tutorials primary sources in film theory.

**FILM 722(7220) Independent Study in Film for Graduate Students**

Fall or spring. Staff.

**Dance**

Faculty: J. Chu, A. Fogelsanger (director of undergraduate studies in dance), E. Intemann, J. Kovar, J. Morgenroth (on leave fall 2006), J. Self, B. Suber.

The dance program offers courses in dance technique, improvisation, composition, performance, anatomical analysis of movement, dance technology, music for dance, and the history, theory, and criticism of dance. Technique courses include introductory dance technique, modern dance at three levels, and Western classical dance at three levels. (Other dance forms, such as Indian dance, and Javanese dance, are offered periodically. A variety of courses in other dance idioms, taken through the Physical Education program, supplement these offerings.) Technique courses develop strength, flexibility, coordination, and the ability to perceive and reproduce phrases of dance movement with clarity of rhythm, body design, and expression. The more advanced courses require the ability to perform complex phrases in various styles. Students may earn up to 16 academic credits (2 each semester) in technique courses. Students may also satisfy the physical education requirement by taking dance technique courses or other movement courses in the dance program. Students taking technique for academic credit must also register through their own colleges. The schedule for all dance technique courses is available in the main office of the Sheila W. and Richard J. Schwartz Center for the Performing Arts.

The faculty offer rehearsal and performance workshops in which they choreograph and rehearse original dances, performed in public concert. Admission to rehearsal and performance courses is by permission. Students may receive one academic credit per semester (S-U grades only) when performing in student-faculty concerts by registering for DANCE 155.

**Dance Major Requirements**

A revised dance major has been approved for implementation in Fall 2006. Students accepted into the major through Spring semester 2006 may choose to meet either the old requirements or the new. Students

accepted beginning in Fall semester 2006 must satisfy the new requirements below. Copies of the previous requirements may be obtained from the director of undergraduate studies in dance through Spring 2008.

Prerequisites: 2 credits in category I below and one course in category II below.

Prerequisites count towards the 40 credits fulfilling the major.

The major: 40 credits (towards which the prerequisites for the major count) are required of all students majoring in dance as follows:

- I. 6 credits: six 1-credit movement courses chosen from Dance Technique (DANCE 122, 231, 232, 303, 304, 306, 308, 309), Explorations (DANCE 233, 234), Improvisation (DANCE 201), Indian Dance (307, 317), and other courses approved by the dance faculty. The 6 credits must include at least 2 from Dance Technique courses, and at least 2 from Explorations and Improvisation courses. Any two of these courses taken to satisfy the university's Physical Education requirement may be counted towards the major, thus decreasing the number of academic credits possibly to as low as 38. Movement courses taken for 0 academic credits do not count towards the major.
- II. 14 credits: Dance composition (DANCE 210, 310) and history/theory (DANCE 313, 418).
- III. 2 credits: 1 credit of performance (DANCE 155) and 1 credit of production (DANCE 151, 153, 251, or 253).
- IV. 18 credits: selected from Dance and related fields, including: at most 2 additional 1-credit movement courses; at most 4 additional credits in DANCE 151, 153, 155, 251, 253, and 316; and at most two courses outside of Dance, which may include courses on sound, music, light, non-western movement forms, design, performance and visual studies, and must be approved by the dance faculty.

In all courses used for the dance major, a grade of C (not C-) must be achieved. Courses in which this minimum is not achieved must be repeated if the student is to receive credit in the major.

A partial list of courses from outside Dance which may be used to satisfy part IV of the major requirements includes MUSIC 103, 104, 105, 107, and 108; and THETR 250.

**Honors**

Students who have maintained a GPA of 3.5 in classes for the dance major and an average of 3.0 in all courses may elect to work for honors in dance during their senior year. They must consult with their advisor in the spring of their junior year about the honors program in dance.

**Computing in the Arts Undergraduate Concentration**

A concentration in Computing in the Arts with an emphasis on dance is available both to dance majors and to students majoring in other subjects. For more information, see "Computing in the Arts Undergraduate Concentration" under "Departments, Programs and Courses" in the "College of Arts and Sciences," or contact the Director of Undergraduate Studies in Dance, [danceprogram@cornell.edu](mailto:danceprogram@cornell.edu).



**Dance Technique**

Students may register for any Western dance technique course (DANCE 122, 231, 232, 303, 304, 306, 308, and 309) for 0 or 1 academic credit, with a limit of 2 credits per semester and 16 credits total. That is, in a single semester students may take at most two 1-credit dance technique courses; all additional dance technique courses must be taken for 0 credit. All these courses may be repeated for credit, and students will usually be placed in a given course for at least two semesters.

Dance Improvisation (DANCE 201), Explorations in Movement and Performance (DANCE 233), and Indian Dance (DANCE 307) may be taken for 0 or 1 academic credit, which does not count as part of the 2 credit per semester and 16 credits total limit above.

Students also have the option to receive physical education (PE) credit for all the courses above to satisfy the university's physical education requirement. Students may not get Dance and PE credit simultaneously for the same course.

The courses Dance Technique I (DANCE 122), Dance Improvisation (DANCE 201), Explorations in Movement and Performance (DANCE 233), and Indian Dance (DANCE 307) are introductory courses open to all students. Students registering in Dance may pre-enroll, enroll online, or sign up with the Department of Theatre, Film, and Dance registrar in 225 Schwartz before the end of the add period; they will need a drop/add slip. Students registering in PE may pre-enroll, or add during the one- or two-day PE registration before the first day of classes; afterward, registration is not allowed.

The non-introductory dance technique courses (DANCE 231, 232, 303, 304, 306, 308, and 309) will now allow online pre-enrollment and online enrollment, but the instructor will ultimately use his or her own discretion to determine the right classes for a student to attend. All students, and new students in particular, should be prepared for the possibility of being asked to switch courses during the first few weeks of the semester.

The advanced dance technique courses (DANCE 303, 304, 306, 308, and 309) may be taken with an additional 1-credit academic component, Writing Dance Criticism (DANCE 316). Students may also receive credit for performing in two ways, by being cast in a faculty-choreographed dance (DANCE 155), and by dancing in student-choreographed works made for composition courses (DANCE 156). Any two 1-credit dance courses except DANCE 212 may be aggregated to count as one-half course for the purpose of satisfying the College of Arts and Sciences 34-course requirement. They do not satisfy a distribution requirement.

**DANCE 122(1200) Dance Technique I (also PE 160[1180])**

Fall and spring. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. Fall: J. Kovar; spring: J. Chu.

Entry-level class. Covers the fundamentals of elementary dance training. Movement sequences focusing on rhythm, placement, and vitality of performance through an anatomically sound dance technique.

**DANCE 155(1250) Rehearsal and Performance**

Fall and spring. 1 credit. Students must register for course in semester in which credit is earned; requests for retroactive credit are not honored. Prerequisite: students cast in faculty-choreographed dances. Students may add this course only after they have been assigned roles. S-U grades only.

Includes the study, development, and performance of roles in departmental dance productions.

**DANCE 156(1500) Dance Performance Workshop**

Fall and spring. 1 credit. Attendance at dance concerts is required. May be repeated. S-U grades only. Fall: J. Chu and J. Self. Spring: J. Self.

Students learn and perform dances choreographed by Dance Composition students. Course work includes: rehearsing an average of two hours a week with student choreographers, attending dance composition class (faculty led) once a week for 90 minutes, and possibly performing in departmental dance productions or mid or end of semester class showings. Students in this course will receive feedback on their performance from the faculty member teaching the Composition course and from the composition students within class discussion periods, to help them refine their skills as performers (including dynamics, focus, phrasing, rhythm, dramatic presence, etc.) in both classroom and public showing of student work. They will sometimes participate in class discussion of the student compositions, gaining insight into the compositional process. This type of participation will be an introduction to dance composition for students interested in pursuing the composition curriculum.

**DANCE 201(2480) Dance Improvisation**

Spring. 1 credit. Limited to 12 students. Attendance at dance concerts required. S-U grades only. J. Morgenroth.

When the body knows when, where, and how to move without prior direction, we call that improvisation. This course coaxes inspiration, seeking to make it reliable and to keep it surprising. It offers the possibility of "training" one's movement instincts to respond relevantly and with spontaneity. Solo and group forms are covered. Live musical accompaniment.

**DANCE 231(2210) Dance Technique II/Classical (also PE 1180)**

Spring. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. B. Suber.

Introductory Western classical technique intended for students with some dance training. Includes basic barre and centre work focusing on presence and presentation.

**DANCE 232(2220) Dance Technique II/Modern (also PE 161[1181])**

Fall and spring. 0 to 1 credit; may be repeated. S-U grades only. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. Fall, B. Suber; spring, J. Kovar.

Introductory modern technique intended for students with some dance training. Material covered includes specific spinal and center work with attention to rhythm, design, and movement expression.

**DANCE 233(2410) Explorations in Movement and Performance (also PE 162[1181], VISST 233[2533])**

Spring. 0 or 1 credit. Limited to 16 students. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. J. Self.

A physically demanding exploration into various movement realms. Specific subjects covered are genderized movement, erotic power, spiritual power, ritual, and performance. Techniques include extensive use of breath, animal movement, improvisation, and group games. This course requires an eagerness to investigate the nature of performance and explore unfamiliar territory in movement.

**[DANCE 234(3410) Masculine, Feminine, or Neutral: Explorations in Movement and Performance II]**

Spring. 0 or 1 credit. Limited to 16 students. Prerequisite: DANCE 201, 233, or permission of instructor. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. Next offered 2007–2008. J. Self.

Continues themes from Explorations in Movement and Performance (DANCE 233), with special emphasis on the differences and similarities between "masculine" or "feminine" expressions in movement and performance.]

**DANCE 235(2430) Hip-Hop, Hollywood, and Home Movies: Exploring Movement and Media (also PE 161[1181], VISST 235[2430])**

Fall. 3 credits. Permission of instructor. Letter grades. Requirements include attendance at performances with written responses, selected readings, and home-movie production.

This course is a laboratory for generating and exploring contemporary dance forms. Monday sessions are devoted to viewing media and discussion. We will be looking at early B-boy films, recent dance-battle documentaries, classic dance clips from Hollywood films, and other related pieces (Black Dance, Show Dance, Art Dance). Wednesday is a laboratory for trying out movements and creating simple dance/music videos (home-movies). This course will be of special value for choreographers using popular dance forms and those interested in the history of popular culture. Everyone must be willing and able to improvise dance moves, teach classmates and exchange movement ideas.

**DANCE 236(2450) Public Voice and Civic Gesture (also THETR 236[2360], VISST 236[2360])**

Fall. 1 credit. B. Suber and B. Milles.

This course combines acting and movement techniques encouraging process-oriented work. Focusing on performance in civic spaces, the class works to examine the politics of status and the social role of bodily (including vocal) expression of both performer and audience. Working within the specific context of urban public spaces, the class will question the function of monument and the character of urbanism in relation to individual bodies while understanding how these bodies combine to create a body politic. The class will consider traditional tools of political and social satire, including *Commedia dell'Arte*. Fundamental in *commedia* is the exploration of status, the gradations of power and influence and role-playing. Students will create their own texts and movement as well as draw from other textual and visual



sources. The class will conclude with a public performance.

**DANCE 303(2240) Dance Technique Workshop (also PE 161[1181], VISST 303[3503])**

Spring. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. Requirements include attendance at performances with written responses. J. Self.

Primarily Parallel Universe. The course will explore working primarily in parallel position as a basic technique for strengthening the legs, posture and physical presence by blending movements from Modern Dance, Jazz, Hip Hop, Yoga and other related forms. Students must be willing to experiment with new concepts of constructing movement techniques.

**DANCE 304(3210) Dance Technique III/ Classical (also PE 161[1181])**

Fall. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. B. Suber.

Intermediate Western classical technique. Work is done on strengthening the body through a movement technique emphasizing presence and musicality based on harmonic muscular control.

**DANCE 306(3220) Dance Technique III/ Modern (also PE 161[1181])**

Fall and spring. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. Fall, J. Chu; spring, J. Morgenroth.

Intermediate modern technique focusing on rhythm, placement, and phrasing for students who are prepared to refine the skills of dancing. Students are challenged by complex phrases and musicality.

**DANCE 307(1320) Indian Dance I (also PE 163)**

Fall. 0 to 1 credits. Satisfies PE requirement if taken as PE. Satisfies @ if taken for 3 credits. D. Bor.

Designed to give students a working knowledge of Indian classical dance in both movement and theory. The movement section focuses on Odissi classical dance, the indigenous style of Orissa state, starting with basic exercises, to open and strengthen the body and prepare it for the structured form of Odissi. Basic exercises, steps, and a full choreographed piece are taught and performed at the end of the semester. The core material of this class can benefit all forms of dance. For 3-credit students, the theory section focuses on history and development of the main styles of South Asian classical dance, their role in society and distinguishing characteristics. This is done through lectures, videos, and reading assignments.

**DANCE 308(4220) Dance Technique IV/ Modern (also PE 161[1181], VISST 308[3508])**

Fall and spring. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. J. Chu.

Advanced and pre-professional Modern technique. A continuation of and supplement to DANCE 306.

**DANCE 309(4210) Dance Technique IV/ Classical (also PE 161[1181])**

Fall. 0 to 1 credit; may be repeated. Satisfies PE requirement if taken as PE. Attendance at dance concerts required. S-U grades only. B. Suber.

Advanced and pre-professional Western classical. A continuation of and supplement to DANCE 304.

**DANCE 316(3240) Writing Dance Criticism**

Fall and spring. 1 credit; may be repeated. Corequisite: DANCE 303, 304, 306, 308, or 309. Attendance at two or three concerts required. Fall: J. Chu and B. Suber. Spring: J. Chu, J. Morgenroth, and J. Self.

Dance criticism for incorporation with technique. Topics rotate depending on instructor, class focus, and relevance to guest dance companies. Attendance at two or three concerts required (same as for dance technique), additional readings and/or viewing of recorded performances as assigned by instructor, and three five- to seven- page analytic papers.

**DANCE 355(3250) Repertory**

Spring. 0 or 1 credit. Prerequisite: permission of instructor. Attendance at dance performances required. J. Chu.

Reconstructs a dance by an important modern dance choreographer. Through a close examination of the composition process, and with readings, the course studies the historical and aesthetic role of this work and its continued influence today.

**[DANCE 407(4399) Early Dance (also MUSIC 407[4511])**

Fall. 1 credit. Next offered 2007-2008. R. Harris-Warrick.

For description, see MUSIC 407.]

**Dance Composition**

**DANCE 210(2500) Beginning Dance Composition (also VISST 211[2711]) (LA)**

Fall and spring. 3 credits. Attendance at dance concerts required. Fall, J. Chu and J. Self. Spring, J. Self.

Special topic for section 1. Writing, Dancing, Drawing: Choreography and Performance Workshop. How do the visual, verbal and movement realms intersect? How do the disciplines of writing, drawing and choreography inform and shape our sense of reality and place. This course explores the use of "drawn" or "found" visual images, "written" choreography and other conceptions of time, space and narrative to create group and individual projects. Requirements include attendance at performances with written responses, notebook work and sketchbook work. Includes informal showing of work.

Section 2. Weekly assignments in basic elements of choreography. Students compose and present short studies that are discussed and reworked. Problems are defined and explored through class improvisations. Informal showing at end of semester. Includes informal showing of work.

**DANCE 310(3500) Intermediate Dance Composition I (LA)**

Fall and spring. 3 credits. Prerequisite: DANCE 210. Fall, J. Chu and J. Self; spring, J. Self.

Intermediate choreographic projects are critiqued in progress by faculty and peers. Consideration of design problems in

costuming and lighting. For full description, see DANCE 210.

**DANCE 311(3510) Intermediate Dance Composition II (LA)**

Fall and spring. 3 credits. Prerequisite: DANCE 310. Co- or prerequisite: DANCE 323 or 324. Attendance at dance concerts required. Fall, J. Chu and B. Suber; spring, J. Morgenroth and J. Self. Continuation of DANCE 310. For full description, see DANCE 210.

**DANCE 323(3520) Music Resources II**

Fall. 2 credits. Prerequisite: DANCE 212. Attendance at dance concerts and music concerts required. DANCE 212 and 323 together count as a course for purposes of graduation and for satisfying humanities or literature and arts distribution requirement. DANCE 323 not offered after fall 2006. A. Fogelsanger.

Intended to expand choreographers' conceptions of music and its uses for dance, including serving as a source for ideas of choreographic organization. A continuation of DANCE 212 in its survey of contemporary music for dance and the study of music and dance collaborations, but also includes examples from film and the plastic arts. Reading topics include criticism and aesthetics of dance, music, and the arts in general. Includes discussion of and writing about concerts, and audio and video recordings. May include rehearsing and performing music or dance. Concentrates especially on minimalism, improvisation, and polystylism in music, dance, the two considered together, and other arts singly and in combination. The DANCE 212-323 sequence is being replaced by DANCE 324. DANCE 323 will not begin meeting until September 25 and will thereafter meet simultaneously with DANCE 324. Contact instructor for details.

**DANCE 324(3530) Music and Choreography (also MUSIC 408[4512]) (LA)**

Spring. 3 credits. Attendance at dance concerts and music concerts required. A. Fogelsanger.

Intended to expose students to music they probably have not heard and are unlikely to seek out on their own, particularly contemporary "classical" music and music used in modern concert dance; to mark out the possible relationships between music and dance when combined in concert; and to pull apart the compositional construction of musical pieces to consider what musical structuring ideas might be profitably applied by choreographers to making dances. The course also considers examples from film and the plastic arts, provides students with some experience making sound and movement, and includes discussion of and writing about concerts, and audio and video recordings. Reading topics include criticism and aesthetics of dance, music, and the arts in general, in particular concentrating on counterpoint, minimalism, improvisation, and polystylism. DANCE 324 replaces the sequence DANCE 212-323.

**DANCE 410(4500) Advanced Dance Composition I (LA)**

Fall and spring. 3 credits. Prerequisite: DANCE 311. Attendance at dance concerts required. Fall, J. Chu and J. Self; spring, J. Self.

Students work on advanced choreographic problems, to be presented in performance.

Work in progress is critiqued by faculty members on a regular basis. For full description, see DANCE 210.

**DANCE 411(4510) Advanced Dance Composition II (LA)**

Fall and spring, 3 credits. Prerequisite: DANCE 410. Attendance at dance concerts required. Fall, J. Chu and J. Self; spring, J. Self.

Continuation of DANCE 410. For full description, see DANCE 210.

**DANCE 491(4010) Senior Project in Dance**

Fall and spring, 3 credits; students receive grade when DANCE 492 is completed. Prerequisite: DANCE 311; senior dance majors.

First of a two-semester sequence (the second is DANCE 492) for senior dance majors. Students create a project in choreography and performance, dance, film or video, dance pedagogy, or other appropriate area agreed on with their senior project advisor and committee. In addition, there is a 15-page paper that expands their work into a historical, theoretical, or aesthetic context. For guidelines see the director of undergraduate studies in dance.

**DANCE 492(4020) Senior Project in Dance II**

Fall or spring, 3 credits. Prerequisite: DANCE 491.

Second of a two-semester sequence (the first is DANCE 491) for senior dance majors.

**History, Criticism, and Theory**

**[DANCE 204(2080) SSP: Seminar in Dance Studies (also DANCE 418(4080)) (CA)]**

Fall, 4 credits. Limited to 15 students. Next offered 2007–2008. J. Morgenroth.]

**[DANCE 312(3120) The Moving Body: Form and Function (PBS supplementary list)]**

Fall, 3 credits. Next offered 2007–2008. J. Morgenroth.

Examines the bodily systems involved in human movement with particular attention to dance movement. Readings in texts on human anatomy, physiology, and kinesiology.]

**DANCE 313(3141) History: The Body in Performance (LA)**

Fall, 4 credits. Prerequisites: Readings, viewing of videos, and attendance at live performances. Letter grades only. J. Chu.

How does the social production of dance reflect its historical context? What is the meaning of the "beautiful" in dance? Beginning with 16th-century court dances, we will explore how aesthetics have been aligned both with and against politics in various periods and genres of the performing body, looking at dance as insiders' diplomacy and outsiders' rebellion. Is postmodern dance a discourse of its past? What is the contemporary relationship among African, European, and stubbornly American traditions? This course is designed to promote a critical appreciation of dance, its values and its ambitions, by developing an historical and cultural understanding.

**DANCE 418(4080) Seminar in Dance Studies (CA)**

Spring, 4 credits. Limited to 15 students. B. Suber

50s Movie Musicals and Modernism. Utilizing, as a point of departure, films such as *A Star*

*is Born* and *White Christmas*, this seminar will explore modernist spatialities, as defined through body movement and architecture. Rising tensions between popular entertainment and modernist impulses, and between stage, screen and television, will be examined. Camp as queer sensibility in non-musical films such as *All About Eve*, and semi-musicals such as *Beyond the Valley of the Dolls*, will be related to the movie musical, modern dance, modern architecture and modern art practices. Also, the class will look to the Hayes Code as arbiter of a surrealist aesthetic from films such as *An American in Paris* to television specials such as *Raquel*, featuring a futuristic, Barbarella-esque, Raquel Welch.

**DANCE 424(4089) Formalist Aesthetics of Modernism and Postmodernism in Music, Dance, and Painting**

Spring, 4 credits. Limited to 15 students.

A. Fogelsanger.

This seminar examines the formalist side of the aesthetics of modernism from the idea of absolute music and the rise of abstraction in painting, through atonality, modern dance, minimalism, and postmodernism. Includes readings of Sally Banes, Monroe Beardsley, Walter Benjamin, Hans Bertens, Peter Berger, Italo Calvino, Roger Copeland, Susanne Langer, David Michae Levin, Susan Manning, Leonard Meyer, Yvonne Rainer, Meyer Schapiro, Susan Sontag, and others.

**DANCE 490(4000) Senior Paper in Dance**

Fall and spring, 4 credits. Prerequisite: DANCE 418, senior standing. Attendance at dance concerts is required.

Under faculty direction, the students write a senior paper in dance history, criticism, or theory.

**Interdisciplinary Courses**

**DANCE 258(3550) Techno Soma Kinesics: Repositioning the Performing Body in Space through the Lenses of Digital Media (LA)**

Spring, 4 credits. B. Suber.

Works to expand the specific aesthetics of live performance (music, theatre, and dance) and traditional technological media presentation (sound, film, and video) through the use of emerging digital technologies. Included in the process is the analysis of built environments that both inspire and are designed to be inhabited by these disciplines. This studio course explores the resulting neo-performance forms being created within the range of digital media processing; such as gallery installations, multimedia dance-theatre, personal interactive media (games and digital art) and web projects. Computer-imaging and sound-production programs are examined and used in the class work (human form-animation software [Life Forms], vocal recording and digital editing [Protools and Hyperprism], digital-imaging tools [Photoshop, Final Cut Pro, Flash, Dreamweaver, and Director]. The new context of digital performance raises questions concerning the use of traditional lighting, set, costume, and sound-design techniques that are examined as they are repositioned by digital-translation tools with the goal of creating experimental and/or conceptual multimedia performance and/or installation work. Theoretical texts on dance and theatrical performance, film studies, the dynamic social body, architecture, and digital technology are also used to support conceptual creative work.

**[DANCE 319(3590) Music, Dance, and Light (also THETR 319(3190)) (LA)]**

Fall, 3 credits. Attendance at dance concerts and music concerts required. Next offered 2007–2008. E. Intemann and A. Fogelsanger.

Artistic values, parameters, and concerns of music (sound design), dance, and lighting design are compared and contrasted, and the combination of design elements is analyzed in contemporary dance.]

**DANCE 358(4550) Techno Soma Kinesics II: Repositioning the Performing Body in Space through the Lenses of Digital Media (LA)**

Spring, 4 credits. B. Suber.

Continuation of DANCE 258. DANCE 358 expands on principles using more complex and interactive software using MAX/MSP and Jitter, Director, DVD Studio Pro, and Dreamweaver.

**DANCE 369(3560) Digital Performance (also THETR 369(3690), MUSIC 356(3441)) (LA)**

Fall, 4 credits. Prerequisites: permission of instructors. Laptop computer and MAX/MSP software required, Jitter software encouraged, see [www.cycling74.com](http://www.cycling74.com) for student software pricing. Lab performance at end of semester. Recommended: previous enrollment in one of the following: COM S 100, DANCE 210, DANCE 368, MUSIC 120, MUSIC 355, THETR 368, VISST 211. W. Cross and A. Fogelsanger.

Introduction to the multimedia programming language MAX/MSP and its application to computer-interactive dance. Intended to bring together programmers and dancers. Each student will create software patches and pieces movement patches, and collaborate with others on a final project focusing on the input, manipulation, and output of movement sound, video, graphics, and lighting in live performance. Topics include digital audio/video processing, MIDI control, sensor use, electroacoustic music, history state of computer technology and dance up to the present, gestural/expression, choreography, composition, design, and aesthetics. Includes 3-hour Wednesday night lab.

**[DANCE 391(3570) Media Arts Studio I (also ART/MUSIC/FILM 391, ARCH 459(659)) (LA)]**

Fall or spring, 3 credits. Prerequisite: permission of instructor and junior standing, minimum FILM 377 or 277, or DANCE 258. Equipment fee: \$50 (paid in class). Next offered 2007–2008. Participating faculty include M. Rivchin, film; B. Suber, dance.

A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video.]

**Production**

**DANCE 151(1610) Dance Production Laboratory I (also THETR 151(1510))**

Fall and spring, 1–3 credits; may be repeated for credit. No prerequisites or experience required. Orientation meeting at 7:30 p.m. first Tuesday of classes each semester in Kiplinger Theatre at Schwartz Center. P. Lillard.

Provides practical experiences in running stage crew or dresser crew for dance.

**DANCE 153(1630) Dance Stage Management Production Laboratory I (also THETR 153(1530))**

Fall and spring. 1-2 credits; may be repeated for credit. Before registering, students must attend orientation meeting at 7:30 p.m. in Kiplinger Theatre at Schwartz Center on first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.

Practical experience in dance production as assistant stage manager for a dance theatre concert under the supervision of the faculty production manager. THETR 370 complements this course.

**DANCE 251(2610) Dance Production Laboratory II (also THETR 251(2510))**

Fall and spring. 1-3 credits; may be repeated for credit. Prerequisite: permission of instructor. Orientation meeting at 7:30 p.m. on first Tuesday of classes each semester in Kiplinger Theatre at Schwartz Center. P. Lillard, D. Hall, F. Sellers, and R. MacPike.

Practical experience in dance production, as a light board operator, sound board operator, video operator, or head dresser.

**DANCE 253(2630) Dance Stage Management Laboratory II (also THETR 253(2530))**

Fall and spring. 1-4 credits; may be repeated for credit. Before registering, students must attend orientation meeting at 7:30 p.m. in Kiplinger Theatre at Schwartz Center on first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.

Practical experience in theatrical production as assistant stage manager for the dance mainstage concert under the supervision of the faculty production manager. THETR 370 complements this course.

**DANCE 362(3660) Lighting Design Studio I (also THETR/VISST 362(3620)) (LA)**

For description, see THETR 362.

**DANCE 368(3680) Sound Design and Digital Audio (also THETR 368(3680), MUSIC 355(3431)) (LA)**

For description, see THETR 368.

**DANCE 462(4660) Lighting Design Studio II (also THETR 462(4620))**

For description, see THETR 462.

**Independent Study, Internships, and Honors**

**DANCE 300(3000) Independent Study**

Summer, fall, or spring. 1-4 credits. Independent study in the dance allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study, which is available in 225 Schwartz.

**DANCE 485(4850) Undergraduate Internship**

Fall, spring, or summer. 1-3 credits. To be eligible to enroll and receive credit for an internship, students must be majors in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice *before* preregistration for the semester in which the internship is planned to take place. To receive credit within this course, the internship must

be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

**DANCE 495(4050) Honors Research Tutorial**

Fall or spring. 4 credits. Prerequisite: honors students in dance.

First of a two-semester sequence (the second is DANCE 496) for seniors engaged in an honors project. For guidelines, see the director of undergraduate studies in dance.

**DANCE 496(4060) Honors Research Tutorial**

Fall or spring. 4 credits. Prerequisite: honors students in dance.

Second of a two-semester sequence (the first is DANCE 495) for students engaged in an honors project.

**Tracks toward admission into the advanced undergraduate theatre program**

**Design, Technology, and Stage Management**

Recommended for individuals interested in a Design, Technology, or Stage Management track:

THETR 250 Fundamentals of Theatre Design and Technology

THETR 151 and 251 Production Lab I and II (at least 1 credit of each)

Recommended for Scenic Design emphasis:

THETR 340 Theatrical Drafting and

Technical Drawing Studio

THETR 351 Production Lab III (as design assistant)

THETR 354 Stagecraft Studio

THETR 364 Scene Design Studio

Upon admission to the program:

THETR 451 Production Lab IV (at least 1 credit)

Recommended for costume design or costume shop management emphasis:

THETR 351 Production Lab III (as design assistant)

THETR 356 Costume Construction Studio

THETR 366 Costume Design Studio I

THETR 371 Costume Design Studio II

Upon admission to the program:

THETR 451 Production Lab IV (at least 1 credit)

Recommended for Lighting Design or costume shop management emphasis:

THETR 252 Technical Production Studio I

THETR 351 Production Lab III (as student electrician)

THETR 351 Production Lab III (as design assistant)

THETR 362 Lighting Design Studio I

Upon admission to the program:

THETR 451 Production Lab IV (at least 1 credit)

Recommended for Sound Design emphasis:

THETR 251 Production Lab II (as student sound technician)

THETR 252 Technical Production Studio I

THETR 351 Production Lab III (as design assistant)

THETR 368 Sound Design Studio

Upon admission to the program:

THETR 451 Production Lab IV (at least 1 credit)

Recommended for Technical Direction emphasis:

THETR 252 Technical Production Studio I

THETR 256 Technical Production Studio II

THETR 340 Theatrical Drafting and

Technical Drawing Studio

THETR 351 Production Lab III (as assistant technical director)

THETR 354 Stagecraft Studio

Upon admission to the program:

THETR 451 Production Lab IV (at least 1 credit)

Recommended for Stage Management emphasis:

THETR 253 or 353 Stage Management Lab II or III—two assignments

THETR 280 Introduction to Acting

THETR 370 Stage Management Studio

THETR 398 Fundamentals of Directing I

Upon admission to the program:

THETR 453 Stage Management Lab IV

**Directing**

Recommended for individuals interested in a directing track:

THETR 151 and THETR 251 Production Lab I and II (at least 2 combined credits)

THETR 240/THETR 241 Introduction to Western Theatre (one semester *only*)

THETR 250 Fundamentals of Design and Technology

THETR 280 Introduction to Acting

THETR 398 Directing I

THETR 498 Directing II

**Playwriting**

Recommended for individuals interested in a playwriting track:

THETR 240/241 Introduction to Western Theatre (one semester *only*)

THETR 250 Fundamentals of Design and Technology

THETR 280 Introduction to Acting

THETR 348 Playwriting

THETR 349 Advanced Playwriting  
Students in the advanced undergraduate theatre program may also elect to take FILM 485 (Undergraduate Internship) in addition to or in place of one production assignment.

**TURKISH**

See "Near Eastern Studies."

**TWI/AKAN**

See "Africana Studies and Research Center."

**UKRAINIAN**

See "Department of Russian."

**URDU**

See "Department of Asian Studies."

**VIETNAMESE**

See "Department of Asian Studies."

## VISUAL STUDIES UNDERGRADUATE CONCENTRATION

Visual studies is a concentration that provides students with an interdisciplinary approach to visual art, media (including digital works), performance, and perception. Faculty from departments throughout the college offer courses toward the concentration, drawing on such various disciplines as the history of art, film, literary studies, psychology, theatre, and others. Requirements for the concentration include the core course VISST 200 Introduction to Visual Studies, which introduces students to critical thinking about visual studies as well as close textual analysis in social and historical contexts. Responsibility for teaching the core course rotates among faculty affiliated with the concentration, and the course, as much as possible, entail interdepartmental collaboration in the form of team-teaching or visiting lectures. In addition to the core course, students must take one course within the Theory/Practice group plus three additional courses at the 300 level or above. No more than two courses from the concentration may be double-counted toward a student's major. All courses must be taken for a letter grade.

Students interested in pursuing the concentration should first discuss it with their current advisors, and then either download the form from the visual studies web site ([www.arts.cornell.edu/visualstudies/requirements.htm](http://www.arts.cornell.edu/visualstudies/requirements.htm)) or contact the visual studies undergraduate coordinator, Chris Capalongo. After completing the form, students should attach a copy of their transcript and submit it to Chris Capalongo, 409 White Hall. Students who have not been in contact with a visual studies advisor will have one selected for them from among the concentration's affiliated faculty.

### Interdisciplinary Graduate Concentration

In the spring of 2004, Cornell began plans for an interdisciplinary graduate concentration in visual studies that will take several years to institutionalize. The concentration in visual studies is not meant to substitute for disciplinary training, which will not be waived by the addition of interdisciplinary courses. The "Course List in Visual Studies for 2006–2007" alerts incoming students to courses that may be relevant to their interests, and aids them in discovering the network of professors working in visual studies, spanning multiple departments and schools at Cornell.

### Visual Studies Concentration Course List

#### VISST 101(1101) Visual Literacy and Interior Design (also DEA 101)

Fall. 3 credits. J. Elliott.  
For description, see DEA 101.

#### VISST 200(2000) Introduction to Visual Studies

Spring. 4 credits. Requirement for undergraduate concentrators. T. Murray. Provides a broad introduction of modes of vision and the historical impact of visual images, visual structures, and visual space on culture, communication, and politics. The question of "how we see" is discussed in terms of (1) procedures of sight (from optical machines to the psychology of vision and the

philosophy of aesthetics); (2) spaces of vision (from landscapes to maps to cities); (3) objects of vision (from sacred sites to illuminated books to digital art); and (4) performances of vision (race, sexualities, ethnicities, cultures). Of importance to the course is the practical and conceptual relation of 20th-century visual technologies (photography, cinema, video, and computing) to their historical corollaries in the arts. The course draws on the visual traditions of both Western and non-Western societies and study texts that have defined the premises and analytic vocabularies of the visual. Through viewings, screenings, collaborative writing, and art projects, students develop the critical skills necessary to appreciate how the approaches that define visual studies complicate traditional models of defining and analyzing art objects. Guest lecturers occasionally address the class. Requirements: two objective midterm exams; occasional listserve postings; two five-page papers.

#### VISST 203(2020) Introduction to Feminist Theory (also FGSS 202[2020])

Spring. 3 credits. D. Reese.  
For description, see FGSS 202.

#### VISST 211(2711) Beginning Dance Composition (also DANCE 210[2500])

Fall. 3 credits. Concurrent enrollment in DANCE 212 and a dance technique class at appropriate level. Attendance at dance concerts required. J. Self.

#### VISST 219(2190) Thinking Surrealisms (also ART H 219, COM L 220)

Spring. 3 credits. B. Maxwell.  
For description, see COM L 220.

#### VISST 230(2300) Survey of American Film (also FILM 230(2300), AM ST 230[2760])

Spring. 3 credits. S. Haenni.  
For description, see AM ST 230.

#### VISST 233(2533) Explorations in Movement (also DANCE 233[2410])

Fall. 0 to 1 credit. Limited to 16 students. Attendance at dance concerts required. J. Self.  
For description, see DANCE 233.

#### VISST 235(2430) Hip-Hop Hollywood (also DANCE 235[2430], PE 161[1181])

Fall. 3 credits. J. Self.  
For description, see DANCE 235.

#### VISST 236(2430) Public Voice and Civic Gesture (also DANCE 236, THETR 236)

Fall. 1 credit. P. Suber and B. Milles.  
For description, see THETR 236.

#### VISST 244(2744) Gamelan in Indonesian History and Cultures (also MUSIC 245[1341], ASIAN 245[2245])

Fall and spring. 3 credits. Prerequisite: permission of instructor. No previous knowledge of musical notation or performance experience required. M. Hatch.  
For description, see MUSIC 245.

#### VISST 245(2645) Renaissance and Baroque (also ART H 245[2400])

Fall. 4 credits. Each student must enroll in a sec. C. Lazzaro.  
For description, see ART H 245.

#### VISST 274(674)[2174/6174] Introduction to Film Analysis: Meaning and Value (also FILM 274/674[2740/6740])

Fall. 4 credits. Limited to 40 students. Graduate students should enroll in FILM 674. D. Fredericksen.  
For description, see FILM 274/674.

#### VISST 293(2193) SSP: Middle Eastern Cinema (also NES 293[2793], COM L FILM 293[2930], JWST 291[2793])

Fall. 4 credits. D. Starr.  
For description, see NES 293.

#### VISST 305(3305) Visual Perception (also PSYCH 305)

Fall. 4 credits. Limited to 20 students. Prerequisite: PSYCH 205 or permission of instructor. J. Cutting.  
For description, see PSYCH 305.

#### VISST 308(3508) Dance Technique IV/Modern (also DANCE 308[4220], PE 161[1181])

Fall. 1 credit. By placement only; no pre-enrollment. Attendance at dance concerts required. J. Chu.  
For description, see DANCE 308.

#### VISST 335(3735) Modern Western Drama, Modern Western Theatre: Theory and Practice (also THETR 335, COM L 335[3735], ENGL 335[3530])

Fall. 4 credits. N. Salvato.  
For description, see THETR 335.

#### VISST 342(3342) Human Perception: Application to Computer Graphics, Art, and Visual Display (also PSYCH/COGST 342[3420], PSYCH 642[6420])

Fall. 3 or 4 credits; 4-credit option involves term paper. Prerequisite: PSYCH 101 or permission of instructor. PSYCH 205 strongly recommended. D. Field.  
For description, see PSYCH 342.

#### VISST 348(3480) Film Noir (also AM ST 348, FILM 346)

Spring. 4 credits. S. Haenni.  
For description, see AM ST 348.

#### VISST 356(3560) Computing Cultures (also S&TS/COMM/INFO 356[3561])

Spring. 4 credits. P. Sengers.  
For description, see S&TS 356.

#### VISST 362(3620) Lighting Design Studio I (also THETR 362[3620], DANCE 362[3660])

Fall. 4 credits. E. Intemann.  
For description, see THETR 362.

#### VISST 375(3175) History and Theory of Commercial Narrative Film (also FILM 375[3750])

Fall. 4 credits. Fee for screening expenses: \$10 (paid in class). S. Haenni.  
For description, see FILM 375.

#### VISST 376(3176) History and Theory of Documentary and Experimental Film (also FILM 376[3760])

4 credits. Fee for screening expenses: \$10 (paid in class). A. Villarejo.  
For description, see FILM 376.

#### VISST 385(3850) Commedia: A Contemporization of Physical Acting Styles and the Comic Approach (also THETR 384[3840])

Fall. 4 credits. B. Milles.  
For description, see THETR 384.

**VISST 387(3870) Literature and Film of South Asia (also COM L 386[3860], ASIAN 387[3387])**

Spring. 4 credits. A. Banerjee.  
For description, see COM L 386.

**VISST 393(3930) International Film of the 1970s (also AM ST 393[3930], FILM 393[3930])**

Spring. 4 credits. S. Haenni.  
For description, see FILM 393.

**VISST 394(3655) The House and the World: Architecture of Asia (also ART H 395[3855])**

Spring. 4 credits. K. McGowan.  
For description, see ART H 395.

**VISST 398(3798) Fundamentals of Directing I (also THETR 398[3980])**

Fall. 3 credits. Limited to 10 students.  
Prerequisite: permission of instructor.  
Special consideration given to students who have completed THETR 280 or intend to continue in area of stage or screen directing. Students should see instructor one year in advance to sign up for course.  
D. Feldshuh.

For description, see THETR 398.

**VISST 400(4200) Proseminar (also ART H 400/600[4100/6100])**

Fall. 4 credits. Limited enrollment.  
Prerequisite: History of Art majors only.  
I. Dadi.

For description, see ART H 400.

**VISST 407(4607) The Museum and the Object (also ART H 407[4107])**

4 credits. Prerequisites: History of Art majors only. Not open to freshmen or sophomores without permission of instructor. All classes meet in Johnson Art Museum Study Gallery. A. Pan.

For description, see ART H 407.

**[VISST 412(4120) Science, Technology and Culture (also COM L 410[4100], S&TS 412[4101])**

Fall. 4 credits. Next offered 2007-2008.  
A. Banerjee.

For description, see COM L 410.]

**VISST 417(4170) Modern Art and Popular Culture (also ART H 417, S HUM 416)**

Fall. 4 credits. S. Evans.

For description, see S HUM 416.

**VISST 426(4260) Adaption: Text/Theatrically (also THETR 426[4260])**

Spring. 4 credits. B. Milles.

For description, see THETR 426.

**VISST 430(4630) Topics in American Studies: The Cinema and the American City**

Fall. 4 credits. S. Haenni.

For description, see AM ST 430.10.

**VISST 477(4770) Intermediate Film and Video Projects: Documentary and Experimental Workshop (also FILM 477[4770])**

Fall. 4 credits. M. Rivchin.

For description, see FILM 477.

**VISST 480(4800) Advanced Seminar in American Literature: Visual Culture in Women's Literature (also ENGL/FGSS 479[4790], ART H 479[4979])**

Fall. 4 credits. S. Samuels.

For description, see ENGL 479.

**VISST 619(6619) Translation in Theory (also ASIAN 619[6619])**

Spring. 4 credits. B. deBary.

For description, see ASIAN 619.

**VISST 634 (6340) Deleuze and Lyotard: Aesthetic Excess and Artistic Practice (also ENGL 629[6290], COM L 634[5340], FRLIT 672)**

Spring. 4 credits. T. Murray.

For description, see COM L 634.

**VISST 666(6466) Media Theory: Film and Photography (also FRLIT 676, GOVT 666[6665])**

Fall. 4 credits. D. Rubenstein.

For description, see GOVT 666.

**[VISST 670(6470) Modern Social Theory (also GERST 670[6700], GOVT 670[6705])**

Spring. 4 credits. S. Buck-Morss.]

**VISST 674(6174) Intro to Film Analysis (also FILM 274/674)**

Fall. 4 credits. D. Fredericksen.

For description, see FILM 274.

## WELSH

See "Department of Linguistics."

## WRITING PROGRAM

See "John S. Knight Institute for Writing in the Disciplines."

## YIDDISH

See "Department of Near Eastern Studies."

## ZULU

See "Africana Studies and Research Center."

## FACULTY ROSTER

For Arts and Sciences Biology faculty see "Biological Sciences."

Abel, Lynne S., Ph.D., Stanford U. Assoc. Prof., Classics

Abtams, Meyer H., Ph.D., Harvard U. Class of 1916 Professor of English Emeritus, English

Abruna, Hector D., Ph.D., U. of North Carolina, Chapel Hill. Emile M. Chamot Professor of Chemistry, Chemistry and Chemical Biology

Abusch, Dorit, Ph.D., U. of Massachusetts, Amherst. Assoc. Prof., Linguistics

Adams, Barry B., Ph.D., U. of North Carolina. Prof. Emeritus, English

Adams, James E., Ph.D., Cornell U. Assoc. Prof., English

Adelson, Leslie A., Ph.D., Washington U. Prof., German Studies

Ahl, Frederick M., Ph.D., U. of Texas, Austin. Prof., Classics/Comparative Literature

Alexander, James P., Ph.D., U. of Chicago. Prof., Physics/LEPP†

Alkire, Elbern H., Ph.D., Cornell U. Sr Lec., Romance Studies

Allmendinger, Richard W., Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences/INSTOC#

Allmon, Warren, Ph.D., Harvard U. Adjunct Assoc. Prof., Earth and Atmospheric Sciences

Almy, James, Ph.D., U. of California, Irvine. Lec., Chemistry

Altschuler, Glenn C., Ph.D., Cornell U. The Thomas and Dorothy Litwin Professor of American Studies, American Studies

Ambegaokar, Vinay, Ph.D., Carnegie Inst. of Technology. Goldwin Smith Professor of Physics, Physics/LASSP\*

Amigo-Silvestre, Silvia, M.A., U. of Oregon. Lec., Romance Studies

Anderson, Benedict R., Ph.D., Cornell U. Aaron L. Binenkorb Professor of International Studies Emeritus, Government

Anderson, Christopher J., Ph.D., Washington U. Prof., Government

Andronicos, Christopher L., Ph.D., Princeton U. Assoc. Prof., Earth and Atmospheric Sciences

Arcadi, Adam Clark, Ph.D., U. of Michigan. Asst. Prof., Anthropology

Archer, Richard J., M.A., U. of Missouri, Kansas City. Assoc. Prof., Theatre, Film, and Dance

Arias, Tomas A., Ph.D., Massachusetts Inst. of Technology. Prof., Physics/LASSP\*

Arms, William, Ph.D., U. of Sussex. Prof., Computer Science

Armstrong, James, M.M., Bowling Green State U. Lec., Music

Arnesen, Ingrid, M.A., U. of California, Davis; M.A. SUNY Stony Brook. Sr. Lec., English for Academic Purposes

Arroyo, Ciriaco M., Ph.D., U. of Munich (Germany). Emerson-Hinchliff Prof. Emeritus, Romance Studies/Comparative Literature

Ascher, Robert, Ph.D., U. of California, Los Angeles. Prof. Emeritus, Anthropology

Ashcroft, Neil W., Ph.D., Cambridge U. (England). Horace White Professor of Physics Emeritus, Physics/LASSP\*

Assié-Lumumba, N'Dri, Ph.D., U. of Chicago. Assoc. Prof., Africana Studies and Research Center

Back, Allen H., Ph.D., U. of California, Berkeley. Sr. Lec., Mathematics

Bailey, Graeme, Ph.D., U. of Birmingham. Prof., Computer Science

Baird, Barbara, Ph.D., Cornell U. Prof., Chemistry and Chemical Biology

Bala, Kavita, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science

Banerjee, Anindita, Ph.D., U. of California, Los Angeles. Asst. Prof., Comparative Literature

Baptist, Edward, Ph.D., U. of Pennsylvania. Assoc. Prof., History

Bar, Talia, Ph.D., Yale U. Asst. Prof., Economics

Baraldi, Michela, B.A. equivalent, U. of Bologna. Lec., Romance Studies

Barazangi, Muawia, Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences/INSTOC#

Barbasch, Dan, Ph.D., U. of Illinois. Prof., Mathematics

Barseghyan, Levon, Ph.D., Northwestern U. Asst. Prof., Economics

Bassett, William A., Ph.D., Columbia U. Prof. Emeritus, Earth and Atmospheric Sciences

Basu, Alaka, MSc, U. of London. Assoc. Prof., Sociology

Basu, Kaushik, Ph.D., London School of Economics (England). Carl Marks Prof. of International Studies, Economics

Bathrick, David, Ph.D., U. of Chicago. Prof., German Studies/Theatre, Film, and Dance

Bätting von Wittelsbach, Kora, M.A., U. of Zagreb (Croatia). Sr. Lec., Romance Studies

Bauer, Simon H., Ph.D., U. of Chicago. Prof. Emeritus, Chemistry and Chemical Biology



- Baugh, Daniel A., Ph.D., Cambridge U. (England). Prof. Emeritus, History
- Bean, Rachel E., Ph.D., Imperial College (England). Asst. Prof., Astronomy/CRSR†
- Begley, Tadhg P., Ph.D., California Inst. of Technology. Prof., Chemistry and Chemical Biology
- Bekerie, Ayele, Ph.D., Temple U. Asst. Prof., Africana Studies and Research Center
- Bell, James F., Ph.D., U. of Hawaii. Assoc. Prof., Astronomy/CRSR†
- Bem, Daryl J., Ph.D., U. of Michigan. Prof., Psychology
- Bem, Sandra L., Ph.D., U. of Michigan. Prof., Psychology/Feminist, Gender, & Sexuality Studies
- Beneria, Lourdes, Ph.D., Columbia U. Prof., City and Regional Planning/Feminist, Gender, & Sexuality Studies
- Bensel, Richard, Ph.D., Cornell U. Prof., Government
- Béreaud, Jacques, Doctorat d'Univ., U. of Lille (France). Prof. Emeritus, Romance Studies
- Berest, Yuri, Ph.D., U. of Montreal (Canada). Assoc. Prof., Mathematics
- Berezin, Mabel, Ph.D., Harvard U., Assoc. Prof., Sociology
- Berger, Anne, Ph.D., Paris VII (France). Prof., Romance Studies
- Berkelman, Karl, Ph.D., Cornell U. Goldwin Smith Professor of Physics Emeritus, Physics/LEPP¶
- Bernal, Martin G., Ph.D., Cambridge U. (England). Prof. Emeritus, Government/Near Eastern Studies
- Bernstein, Sarah E., M.F.A., Yale U. Sr. Lec., Theatre, Film, and Dance
- Bernstock, Judith, Ph.D., Columbia U. Assoc. Prof., History of Art
- Billera, Louis J., Ph.D., City U. of New York. Prof., Mathematics
- Bilson, Malcolm, D.M.A., U. of Illinois. Frederic J. Whiton Professor of Music Emeritus
- Bird, John M., Ph.D., Rensselaer Polytechnic Inst. Prof. Emeritus, Earth and Atmospheric Sciences
- Birman, Kenneth P., Ph.D., U. of California, Berkeley. Prof., Computer Science
- Bishop, Jonathan P., Ph.D., Harvard U. Prof. Emeritus, English
- Bjerken, Xak, D.M.A., Peabody Conservatory of Music. Assoc. Prof., Music
- Blackall, Jean F., Ph.D., Harvard U. Prof. Emerita, English
- Blackburn, Anne M., Ph.D., U. of Chicago. Assoc. Prof., Asian Studies
- Blacksher, Beverly, Ph.D., Cornell U. Sr. Lec., Africana Studies and Research Center
- Bloom, Arthur L., Ph.D., Yale U. Prof. Emeritus, Earth and Atmospheric Sciences
- Bloser, Tim, Ph.D., Stanford U. Lec., Philosophy
- Blume, Lawrence E., Ph.D., U. of California, Berkeley. Prof., Economics
- Blumin, Stuart M., Ph.D., U. of Pennsylvania. Prof., History
- Bock, David, Ph.D., SUNY Albany. Sr. Lec., Mathematics
- Bodenschatz, Eberhard, Ph.D., U. of Bayreuth (Germany). Adj. Prof., Physics/LASSP\*
- Boettcher, Bonna, D.M.A., U. of Iowa. Adj. Prof., Music
- Bogel, Fredric V., Ph.D., Yale U. Prof., English
- Bogel, Lynda Donelia, M.Phil., Yale U. Sr. Lec., English
- Bosteels, Bruno, Ph.D., U. of Pennsylvania. Assoc. Prof., Romance Studies
- Boucher, Daniel, Ph.D., U. of Pennsylvania. Assoc. Prof., Asian Studies, H. Stanley Krusen Professor of World Religions
- Bowers, John S., Ph.D., Massachusetts Inst. of Technology. Prof., Linguistics
- Boyd, Richard N., Ph.D., Massachusetts Inst. of Technology. Prof., Philosophy/Science and Technology Studies
- Boyer, Dominic, Ph.D., U. of Chicago. Assoc. Prof., Anthropology
- Brady, Mary Pat, Ph.D., U. of California, Los Angeles. Assoc. Prof., English
- Bramble, James H., Ph.D., U. of Maryland. Prof. Emeritus, Mathematics
- Brann, Ross, Ph.D., New York U., Milton R. Konvitz Professor of Judeo-Islamic Studies, Near Eastern Studies
- Brazell, Karen W., Ph.D., Columbia U. Prof. Emeritus, Japanese Literature, Asian Studies
- Briggs, Martijna Arts, M.A., O.M.O. Utrecht (The Netherlands). Sr. Lec., German Studies
- Brittain, Charles F., D. Phil., Oxford U. (England). Assoc. Prof., Classics/Philosophy
- Bronfenbrenner, Urie, Ph.D., U. of Michigan, Jacob Gould Schurman Professor Emeritus, Human Ecology/Psychology
- Brookhouse, Stephen Christopher, M.F.A., Virginia Tech. Sr. Lec., Theatre, Film, and Dance
- Brouwer, Piet, Ph.D., Leiden U. Assoc. Prof., Physics/LASSP\*
- Brown, Kenneth S., Ph.D., Massachusetts Inst. of Technology. Prof., Mathematics
- Brown, Larry D., Ph.D., Cornell U. Prof., Earth and Atmospheric Sciences/INSTOC#
- Brown, Laura, Ph.D., U. of California, Berkeley. Prof., English
- Browne, E. Wayles, Ph.D., U. of Zagreb (Croatia). Assoc. Prof., Linguistics
- Brumberg, Joan Jacobs, Ph.D., U. of Virginia. S. J. Weiss Presidential Fellow and Prof., Human Development/Feminist, Gender, & Sexuality Studies
- Buck-Morss, Susan F., Ph.D., Georgetown U. Prof., History of Art
- Buettner, Bonnie, Ph.D., Cornell U. Sr. Lec., German Studies
- Bunce, Valerie, Ph.D., U. of Michigan. Prof., Government
- Burlitch, James M., Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Chemistry and Chemical Biology
- Burns, Joseph A., Ph.D., Cornell U. Irving Porter Church Professor of Engineering, Astronomy/Theoretical and Applied Mechanics/CRSR†
- Caldwell, Steven B., Ph.D., Cornell U. Assoc. Prof., Sociology
- Campbell, Deborah, M.A., Indiana U., Bloomington. Sr. Lec., English for Academic Purposes
- Campbell, Donald B., Ph.D., Cornell U. Prof., Astronomy/NAIC‡
- Campbell, Timothy C., Ph.D., Columbia U. Assoc. Prof., Romance Studies
- Campos, Michelle, Ph.D., Stanford U. Asst. Prof., Near Eastern Studies
- Cao, Xiaodong, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Mathematics
- Caputi, Anthony F., Ph.D., Cornell U. Prof. Emeritus, English/Comparative Literature
- Carden, Patricia J., Ph.D., Columbia U. Prof., Russian
- Cardie, Claire, Ph.D., U. of Massachusetts. Assoc. Prof., Computer Science
- Carlacio, Jami, Ph.D., U. of Wisconsin. Lec., English
- Carlson, Allen, Ph.D., Yale U. Assoc. Prof., Government
- Carmichael, Calum M., LL.D., Glasgow U. (Scotland). Prof., Comparative Literature/Biblical Studies
- Caron, Vicki, Ph.D., Columbia U. Prof., Thomas and Diann Mann Chair in Modern Jewish Studies, History/Jewish Studies Program
- Carpenter, Barry K., Ph.D., U. Coll., London (England). Prof., Chemistry and Chemical Biology
- Carrillo, Loretta, Ph.D., Michigan State U. Sr. Lec., Romance Studies/Latino Studies
- Carroll, Noel, Ph.D., U. of Illinois. Assoc. Prof., Theatre Arts/Philosophy
- Caruana, Richard, Ph.D., Carnegie Mellon U. Asst. Prof., Computer Science
- Case, Holly, Ph.D., Stanford U. Asst. Prof., History
- Cassel, David G., Ph.D., Princeton U. Prof., Physics/LEPP¶
- Cassel, Edith Hertha, Ph.D., U. of Heidelberg. Sr. Lec., Physics
- Castillo, Debra, Ph.D., U. of Wisconsin, Milwaukee. Emerson-Hinchliff Prof., Romance Studies/Comparative Literature
- Cathles, Lawrence M., III, Ph.D., Princeton U. Prof., Earth and Atmospheric Sciences
- Cerione, Richard, Ph.D., Rutgers U. Prof., Chemistry and Chemical Biology
- Cervesi, Flaminia, M.A., Washington U. Sr. Lec., Romance Studies
- Chaloemtiarana, Thak, Ph.D., Cornell U. Assoc. Prof., Asian Studies
- Chan, Garnet Kin-Lic, Ph.D., Christ's Coll. Asst. Prof., Chemistry and Chemical Biology
- Chang, Derek, Ph.D., Duke U. Asst. Prof., History/Asian American Studies
- Chase, Cynthia, Ph.D., Yale U. Prof., English/Comparative Literature
- Chase, Stephen U., Ph.D., U. of Chicago. Prof., Mathematics
- Chen, Jian, Ph.D., South Illinois. Prof., The Michael J. Zak Chair of History for US-China Relations, History/China and Asia-Pacific Studies
- Chen, Peng, Ph.D., Stanford U. Asst. Prof., Chemistry and Chemical Biology
- Chen, Zhihong, Ph.D., U. of Cologne (Germany). Adj. Asst. Prof., History/Asian Studies
- Chernoff, David F., Ph.D., U. of California, Berkeley. Prof., Astronomy/CRSR†
- Chester, Geoffrey V., Ph.D. King's Coll. London (England). Prof. Emeritus, Physics/LASSP\*
- Cheyfitz, Eric, Ph.D., Johns Hopkins U. Prof., English
- Chignell, Andrew, Ph.D., Yale U. Asst. Prof., Philosophy
- Chirik, Paul J., Ph.D., California Inst. of Technology. Asst. Prof., Chemistry and Chemical Biology
- Christiansen, Morten, Ph.D., U. of Edinburgh (Scotland). Asst. Prof., Psychology
- Chu, Jumay Ruth, B.A., U. of California, Berkeley. Sr. Lec., Theatre, Film and Dance
- Cisne, John L., Ph.D., U. of Chicago. Prof., Earth and Atmospheric Sciences/INSTOC#
- Clinton, Kevin M., Ph.D., Johns Hopkins U. Prof., Classics
- Coate, Stephen, Ph.D., Northwestern U. Kiplinger Professor of Economic Policy, Economics
- Coates, Geoffrey, Ph.D., Stanford U. Prof., Chemistry and Chemical Biology
- Cohen, Itai, Ph.D., U. of Chicago. Asst. Prof., Physics/LASSP\*
- Cohen, Marshall M., Ph.D., U. of Michigan. Prof. Emeritus, Mathematics
- Cohen, Yurii, Ph.D., Cornell U. Lec., Philosophy
- Cohen, Walter I., Ph.D., U. of California, Berkeley. Prof., Comparative Literature

- Cohn, Abigail C., Ph.D., U. of California, Los Angeles. Assoc. Prof., Linguistics
- Colby-Hall, Alice M., Ph.D., Columbia U. Prof. Emerita, Romance Studies
- Cole, Stephen R., B.A., U. of Indiana. Assoc. Prof., Theatre, Film and Dance
- Coleman, John E., Ph.D., U. of Cincinnati. Prof., Classics
- Collum, David B., Ph.D., Columbia U. Prof., Chemistry and Chemical Biology
- Colucci, Stephen J., Ph.D., SUNY Albany. Prof., Earth and Atmospheric Sciences
- Connelly, Robert, Ph.D., U. of Michigan. Prof., Mathematics
- Constable, Robert L., Ph.D., U. of Wisconsin. Prof., Computer Science
- Cook, Kerry H., Ph.D., N. Carolina State U. Prof., Earth and Atmospheric Sciences
- Cooke, W. Donald, Ph.D., U. of Pennsylvania. Prof. Emeritus, Chemistry and Chemical Biology
- Cordes, James M., Ph.D., U. of California, San Diego. Prof., Astronomy/NAIC†
- Corpis, Duane J., Ph.D., New York U. Asst. Prof., History
- Correll, Barbara, Ph.D., U. of Wisconsin. Assoc. Prof., English
- Correll, Shelley, Ph.D., Stanford U. Asst. Prof., Sociology
- Corson, Dale R., Ph.D., U. of California, Berkeley. Prof. Emeritus, Physics
- Cotts, Robert M., Ph.D., U. of California, Berkeley. Prof. Emeritus, Physics/LASSP\*
- Cowden, Jonathan, Ph.D., Yale U. Asst. Prof., Government
- Craib, Raymond, Ph.D., Yale U. Assoc. Prof., History
- Crane, Brian R., Ph.D., Scripps Research Inst.. Asst. Prof., Chemistry and Chemical Biology
- Cross, Warren Dennis, B.A., SUNY Stony Brook. Lec., Theatre, Film, and Dance
- Csaki, Csaba, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Physics/LEPP†
- Culler, Jonathan D., D. of Phil., Oxford U. (England). Class of 1916 Professor, English/Comparative Literature
- Cutting, James E., Ph.D., Yale U. Prof., Psychology
- Dadi, Iftikhar, Ph.D., Cornell U. Asst. Prof., History of Art
- Dannhauser, Werner J., Ph.D., U. of Chicago. Prof. Emeritus, Government
- Darlington, Richard B., Ph.D., U. of Minnesota. Prof., Psychology
- Davis, H. Floyd, Ph.D., U. of California, Berkeley. Prof., Chemistry and Chemical Biology
- Davis, J. C. Seamus, Ph.D., U. of California, Berkeley. Prof., Physics/LASSP\*
- Davis, Stuart Arrowsmith, M.Phil., Yale U. Sr. Lec., English
- Davis, Tom E., Ph.D., Johns Hopkins U. Prof. Emeritus, Economics
- Dear, Peter, Ph.D., Princeton U. President Andrew D. White Professor of the History of Science
- DeGaetano, Arthur T., Ph.D., Rutgers U. Assoc. Prof., Earth and Atmospheric Science
- de Bary, Brett, Ph.D., Harvard U. Prof., Asian Studies/Comparative Literature
- Deinert, Herbert, Ph.D., Yale U. Prof. Emeritus, German Studies
- DeLoughrey, Elizabeth, Ph.D., U. of Maryland. Asst. Prof., English
- Dennis, R. Keith, Ph.D., Rice U. Prof., Mathematics
- Derry, Louis A., Ph.D., Harvard U. Assoc. Prof., Earth and Atmospheric Sciences
- DeVoogd, Timothy J., Ph.D., U. of Illinois. Prof., Psychology
- Diaz-Insensé, Natalie, Ph.D., Cornell U. Sr. Lec., Romance Studies
- Diesing, Molly, Ph.D., U. of Massachusetts, Amherst. Prof., Linguistics
- Diffloth, Hairhin, B.A., Ewha Women's U. (Korea). Sr. Lec., Asian Studies
- DiSalvo, Francis J. Jr., Ph.D., Stanford U. John A. Newman Professor of Physical Science, Chemistry and Chemical Biology
- Divo-Hoare, Stephanie Alison, Ph.D., Cornell U. Sr. Lec., Asian Studies
- Donaldson, Laura, Ph.D., Emory U. Prof., English
- Dozier, Eleanor, M.A., Cornell U. Sr. Lec., Romance Studies
- Dugan, Gerald F., Ph.D., Columbia U. Prof., Physics/LEPP†
- Dunning, David, Ph.D., Stanford U. Prof., Psychology
- Durrett, Richard T., Ph.D., Stanford U. Prof., Mathematics
- Dynkin, Eugene B., Dr. of Sci., Moscow U. (Russia). Abram R. Bullis Professor of Mathematics
- Ealick, Steven, Ph.D., U. of Oklahoma. Prof., Chemistry and Chemical Biology
- Earle, Clifford J., Ph.D., Harvard U. Prof. Emeritus, Mathematics
- Easley, David, Ph.D., Northwestern U. Henry Scarborough Prof. of Social Sciences, Economics
- Eberhard, Carolyn, Ph.D., Boston U. Sr. Lec., Plant Biology
- Eddy, Donald D., Ph.D., U. of Chicago. Prof. Emeritus, English
- Edelman, Shimon, Ph.D., Weizmann Inst. of Science (Israel). Prof., Psychology
- Edmondson, Locksley G., Ph.D., Queens U. (Canada). Prof., Africana Studies and Research Center
- Ehrenberg, Ronald, Ph.D., Northwestern U. Prof., Industrial and Labor Relations/Economics
- Eklund, Matti, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Philosophy
- Elber, Ron, Ph.D., Hebrew U. Professor, Computer Science
- Elias, Robert, Ph.D., U. of Pennsylvania. Goldwin Smith Professor of English Literature and American Studies, Emeritus, English
- Elser, Veit, Ph.D., U. of California, Berkeley. Prof., Physics/LASSP\*
- Ernste, Kevin, D.M.A., Eastman School of Music. Asst. Prof., Music
- Esman, Milton J., Ph.D., Princeton U. John S. Knight Professor of International Studies, Emeritus, Government
- Evangelista, Matthew, Ph.D., Cornell U. Prof., Government
- Ezra, Gregory S., Ph.D., Oxford U. (England). Prof., Chemistry and Chemical Biology
- Fajans, Jane, Ph.D., Stanford U. Assoc. Prof., Anthropology
- Fakundiny, Lydia E., B.Phil., B.Litt, Oxford U. (England). Sr. Lec., English
- Falk, Oren, Ph.D., U. of Toronto (Canada). Asst. Prof., History
- Falkson, Louis, M.A., Harvard U. Sr. Lec., Economics
- Fan, K-Y Daisy, Ph.D., Cornell U. Asst. Prof., Computer Science
- Farrell, Roger H., Ph.D., U. of Illinois. Prof. Emeritus, Mathematics
- Fay, Robert C., Ph.D., U. of Illinois. Prof., Chemistry and Chemical Biology
- Feldman, Richard L., M.A., U. of Illinois, Urbana-Champaign. Sr. Lec., Language Resource Center
- Feldshuh, David, Ph.D., U. of Minnesota. Prof., Theatre, Film and Dance
- Ferguson, Melissa, Ph.D., New York U. Asst. Prof., Psychology
- Fernández, María, Ph.D., Columbia U. Asst. Prof., History of Art
- Field, David J., Ph.D., U. of Pennsylvania. Assoc. Prof., Psychology
- Fine, Gail J., Ph.D., Harvard U. Prof., Philosophy/Classics
- Finlay, Barbara L., Ph.D., Massachusetts Inst. of Technology. William R. Kenan, Jr. Professor of Psychology/Neurobiology and Behavior
- Finley, Cheryl, Ph.D., Yale U. Asst. Prof., History of Art
- Fiskesjö, Magnus, Ph.D., U. of Chicago. Asst. Prof., Anthropology
- Fitchen, Douglas B., Ph.D., U. of Illinois. Prof., Physics/LASSP\*
- Flanagan, Eanna É., Ph.D., California Inst. of Technology. Prof., Physics/Astronomy/LEPP†
- Fogelsanger, Allen L., Ph.D., Cornell U. Sr. Lec., Theatre, Film and Dance
- Fontaine, Michael, Ph.D., Brown U. Asst. Prof., Classics
- Fortune, Joanne E., Ph.D., Cornell U. James Law Professor of Physiology/Feminist, Gender, & Sexuality Studies
- Francis, Paul, Ph.D., U. Coll. London (England). Assoc. Prof., Computer Science
- Franch, Carl P., Ph.D., Princeton U. Assoc. Prof., Physics/LASSP\*
- Frank, Jason, Ph.D., Johns Hopkins U. Asst. Prof., Government
- Fredericksen, Donald L., Ph.D., U. of Iowa. Prof., Theatre, Film and Dance
- Freed, Jack H., Ph.D., Columbia U. Prof., Chemistry and Chemical Biology
- Fried, Debra, Ph.D., Yale U. Assoc. Prof., English
- Fulbright, Robert, Ph.D., U. of Michigan. Sr. Lec., Physics
- Fulton, Alice, MFA, Cornell U. Prof., English
- Furman, Nelly, Ph.D., Columbia U. Prof. Emerita, Romance Studies
- Gainor, Ellen J., Ph.D., Princeton U. Prof., Theatre, Film, and Dance
- Gair, James W., Ph.D., Cornell U. Prof. Emeritus, Linguistics
- Galik, Richard S., Ph.D., Cornell U. Prof., Physics/LEPP†
- Galloway, Andrew, Ph.D., U. of California, Berkeley. Prof., English
- Ganem, Bruce, Ph.D., Columbia U. Franz and Elisabeth Roessler Professor of Chemistry and Chemical Biology
- Garcés, Maria Antonia, Ph.D., Johns Hopkins U. Assoc. Prof., Romance Studies
- Garcia, Maria Cristina, Ph.D., U. of Texas, Austin. Prof., History/Latino Studies
- Gehrke, Johannes, Ph.D., U. of Wisconsin. Madison. Assoc. Prof., Computer Science
- Ghosh, Durba, Ph.D., U. of California, Berkeley. Asst. Prof., History
- Giambattista, Alan G., M.S., Cornell U. Sr. Lec., Physics
- Gibbons, Lawrence K., Ph.D., U. of Chicago. Assoc. Prof., Physics/LEPP†
- Gibson, Eleanor J., Ph.D., Yale U. Susan Linn Sage Professor of Psychology Emeritus, Psychology
- Gierasch, Peter J., Ph.D., Harvard U. Prof., Astronomy/CRSR
- Gilbert, Roger S., Ph.D., Yale U. Prof., English
- Gilgen, Peter, Ph.D., Stanford U. Asst. Prof., German Studies
- Gilliland, Mary, M.A., Cornell U. Sr. Lec., Knight Institute for Writing in the Disciplines

- Gilovich, Thomas, Ph.D., Stanford U. Prof., Psychology
- Ginet, Carl A., Ph.D., Cornell U. Prof. Emeritus, Philosophy
- Ginsparg, Paul, Ph.D., Cornell U. Prof., Physics/CIS
- Giovannelli, Riccardo, Ph.D., Indiana U. Prof., Astronomy/NAIC†
- Gittelman, Bernard, Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Physics/LEPP¶
- Gleach, Frederic, Ph.D., Stanford U. Sr. Lec., Anthropology
- Goetz, Kent, M.F.A., U. of Wisconsin, Madison. Prof., Theatre, Film and Dance
- Gold, Daniel, Ph.D., U. of Chicago Divinity School. Prof., Asian Studies
- Goldsmith, Paul F., Ph.D., U. of California, Berkeley. Professor Emeritus, Astronomy/NAIC†
- Goldstein, Michael, Ph.D., Indiana U. Asst. Prof., Psychology
- Gottfried, Kurt, Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Physics/LEPP¶
- Gottschalk, Katherine Kiblinger, Ph.D., U. of Chicago. Sr. Lec., English and Knight Institute for Writing in the Disciplines
- Graubart, Karen, Ph.D., U. of Massachusetts, Amherst. Asst. Prof., History
- Greenberg, Donald P., Ph.D., Cornell U. Prof., Computer Science
- Greenberg, Mitchell, Ph.D., U. of California, Berkeley. Prof., Romance Studies
- Greene, Brian, Ph.D., Oxford U. Adj. Prof., Physics/LEPP¶
- Greene, Charles H., Ph.D., U. of Washington. Prof., Earth and Atmospheric Sciences/CFE
- Greene, Sandra E., Ph.D., Northwestern U. Prof., History
- Greenwood, Davydd J., Ph.D., U. of Pittsburgh. Goldwin Smith Professor of Anthropology
- Greisen, Kenneth I., Ph.D., Cornell U. Prof. Emeritus, Physics
- Gries, David, Ph.D., Dr. rer. nat. Munich Inst. of Technology (Germany). Prof., Computer Science
- Grimes, Joseph E., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
- Groos, Arthur, Ph.D., Cornell U. Prof., German Studies and Music
- Gross, Leonard, Ph.D., U. of Chicago. Prof., Mathematics
- Grossvogel, Anita V., Ph.D., Cornell U. Assoc. Prof. Emerita, Romance Studies
- Grossvogel, David I., Ph.D., Columbia U. Prof. Emeritus, Goldwin Smith Professor of Romance Studies and Comparative Literature
- Gruner, Sol M., Ph.D., Princeton U. Prof., Physics/LASSP\*
- Guckenheimer, John, Ph.D., U. of California, Berkeley. Prof., Mathematics
- Guerdjikova, Ani, Ph.D., U. of Heidelberg (Germany). Asst. Prof., Economics
- Gunn, Edward M., Jr., Ph.D., Columbia U. Prof., Asian Studies
- Haenni, Sabine, Ph.D., U. of Chicago. Asst. Prof., Theatre, Film and Dance/American Studies
- Hagfors, Tor, Ph.D., U. of Oslo (Norway). Prof. Emeritus, Astronomy/Engineering/NAIC†
- Haines-Eitzen, John, B.M., U. of Indiana. Sr. Lec., Music
- Haines-Eitzen, Kim, Ph.D., U. of North Carolina. Assoc. Prof., Near Eastern Studies/Religious Studies
- Hall, Daniel Crawford, M.F.A., U. of Iowa. Sr. Lec., Theatre, Film and Dance
- Halpern, Bruce P., Ph.D., Brown U. Susan Linn Sage Professor of Psychology, Psychology/Biological Sciences
- Halpern, Joseph Y., Ph.D., Harvard U. Prof., Computer Science
- Hammes, Gordon G., Ph.D., U. of Wisconsin. Horace White Prof. Emeritus, Chemistry and Chemical Biology
- Hand, Louis N., Ph.D., Stanford U. Prof., Physics/LEPP¶
- Hanson, Ellis, Ph.D., Princeton U. Assoc. Prof., English
- Harbert, Wayne E., Ph.D., U. of Illinois. Prof., Linguistics
- Harris, David, Ph.D., Northwestern U. Prof., Sociology
- Harris, Robert L., Ph.D., Northwestern U. Prof., Africana Studies and Research Center
- Harris-Warrick, Rebecca, D.M.A., Stanford U. Prof., Music
- Hartill, Donald L., Ph.D., California Inst. of Technology. Prof., Physics/LEPP¶
- Hartmanis, Juris, Ph.D., California Inst. of Technology. Walter R. Read Professor of Engineering Emeritus, Computer Science
- Harwit, Martin O., Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Astronomy/CRSR†
- Hassan, Salah M., Ph.D., U. of Pennsylvania. Assoc. Prof., Africana Studies and Research Center/Adj. Prof., History of Art
- Hatch, Martin, Ph.D., Cornell U. Assoc. Prof., Music
- Hatcher, Allen, Ph.D., Stanford U. Prof., Mathematics
- Hay, George A., Ph.D., Northwestern U. Prof., Economics/Edward Cornell Prof. of Law
- Hayes, Donald P., Ph.D., U. of Washington. Prof. Emeritus, Sociology
- Haynes, Martha P., Ph.D., Indiana U. Prof., Astronomy/NAIC†
- Heckathorn, Douglas D., Ph.D., U. of Kansas. Prof., Sociology
- Henderson, David W., Ph.D., U. of Wisconsin. Prof., Mathematics
- Henderson, John S., Ph.D., Yale U. Prof., Anthropology
- Hendrix, Burke, Ph.D., U. of Colorado. Asst. Prof., Government
- Henley, Christopher L., Ph.D., Harvard U. Prof., Physics/LASSP\*
- Herrin, W. Lamar, Ph.D., U. of Cincinnati. Prof., English
- Herring, Ronald, Ph.D., U. of Wisconsin, Madison. Prof., Government
- Herter, Terry L., Ph.D., U. of Rochester. Prof., Astronomy/CRSR†
- Hertz, Susan R., Ph.D., Cornell U. Adjunct Prof., Linguistics
- Hildebrand, George H., Ph.D., Cornell U. Maxwell M. Upson Professor of Economics and Industrial Relations Emeritus, Economics/Industrial and Labor Relations
- Hilgartner, Stephen, Ph.D., Cornell U. Assoc. Prof., Science and Technology Studies
- Hill, Thomas D., Ph.D., Cornell U. Prof., English/Medieval Studies
- Hines, Melissa A., Ph.D., Stanford U. Prof., Chemistry and Chemical Biology
- Hinrichs, T. J., Ph.D., Harvard U. Asst. Prof., History
- Hirano, Katsuya, Ph.D., Chicago U. Asst. Prof., History
- Hirsh, Elizabeth, Ph.D., U. of Washington. Asst. Prof., Sociology
- Hite, Molly, Ph.D., U. of Washington. Prof., English
- Hjortshoj, Keith Guy, Ph.D., Cornell U. Sr. Lec., Knight Institute for Writing in the Disciplines
- Hodes, Harold, Ph.D., Harvard U. Assoc. Prof., Philosophy
- Hoffmann, Roald, Ph.D., Harvard U. Frank H. T. Rhodes Professor of Humane Letters, Chemistry and Chemical Biology
- Hoffstaetter, Georg, Ph.D., Michigan State U. Assoc. Prof., Physics/LEPP¶
- Hohendahl, Peter U., Ph.D., Hamburg U. (Germany). Jacob Gould Schurman Professor of German Literature, German Studies/Comparative Literature
- Holcomb, Donald F., Ph.D., U. of Illinois. Prof. Emeritus, Physics/LASSP\*
- Holdheim, W. Wolfgang, Ph.D., Yale U. Frederic J. Whiton Professor of Liberal Studies, Emeritus, Comparative Literature/Romance Studies
- Holm, Tara, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Mathematics
- Holmberg, David H., Ph.D., Cornell U. Prof., Anthropology/Feminist, Gender, and Sexuality Studies
- Holquist, Peter, Ph.D., Columbia U. Assoc. Prof., History
- Holst-Warhaft, Gail, Ph.D., Cornell U. Adj. Prof., Comparative Literature
- Hong, Yongmiao, Ph.D., U. of California, San Diego. Assoc. Prof., Economics
- Hopcroft, John E., Ph.D., Stanford U. IBM Prof. of Engineering and Applied Mathematics, Computer Science
- Horne, Luz, Ph.D., Yale U. Asst. Prof., Romance Studies
- Houck, James R., Ph.D., Cornell U. Kenneth A. Wallace Professor of Astronomy/CRSR†
- Houston, Paul L., Ph.D., Massachusetts Inst. of Technology. Peter J. W. Debye Professor of Chemistry and Chemical Biology
- Howie, Cary S., Ph.D., Stanford U. Asst. Prof., Romance Studies
- Hsu, John T. H., D. Music, New England Conservatory of Music. Old Dominion Foundation Professor Emeritus of Humanities and Music
- Huang, Hong, M.A., City Coll. of New York. Lec., Asian Studies
- Hubbard, John H., Doctorat d'Etat, U. of Paris (France). Prof., Mathematics
- Hughes, Robert E., Ph.D., Cornell U. Prof. Emeritus, Chemistry and Chemical Biology
- Hull, Isabel V., Ph.D., Yale U. John Stambaugh Professor of History, History
- Husa, Karel, Diploma, Paris Conservatory (France). Kappa Alpha Professor Emeritus of Music
- Huttenlocher, Daniel P., Ph.D., Massachusetts Inst. of Technology. Prof., Computer Science/JGSM
- Hwang, J. T. Gene, Ph.D., Purdue U. Prof., Mathematics
- Hyams, Paul R., D. Phil., Oxford U. (England). Prof., History
- Hysell, David L., Ph.D., Cornell U. Assoc. Prof., Earth and Atmospheric Sciences
- Iguina, Zulma, B.A., Cornell U. Sr. Lec., Romance Studies
- Ilyashenko, Yuliji, Ph.D., Moscow State U. (Russia). Prof., Mathematics
- Intemann, Edward David, M.F.A., Cornell U. Sr. Lec., Theatre, Film, and Dance
- Irwin, Terence H., Ph.D., Princeton U. Susan Linn Sage Professor of Philosophy, Philosophy/Classics
- Isacks, Bryan L., Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences/INSTOC#
- Isard, Walter, Ph.D., Harvard U. Prof. Emeritus, Economics
- Isbell, Billie J., Ph.D., U. of Illinois. Prof., Anthropology Emeritus

- Isen, Alice M., Ph.D., Stanford U. Prof., Johnson Graduate School of Management/ Psychology
- Jagacinski, Ngampit, Ph.D., Ohio State U. Sr. Lec., Asian Studies
- Janowitz, Phyllis, M.F.A., U. of Massachusetts. Prof., English
- Jeyifo, Biodun, Ph.D., New York U. Prof., English
- Joachims, Thorsten, Ph.D., U. of Dortmund (Germany). Asst. Prof., Computer Science
- John, James J., Ph.D., U. of Notre Dame. Professor Emeritus, History
- Johnston, Robert E., Ph.D., Rockefeller U. Prof., Psychology
- Johnston Turner, Cynthia, D.M.A., Eastman School of Music. Asst. Prof., Music
- Jones, Robert B. Jr., Ph.D., U. of California, Berkeley. Prof. Emeritus, Modern Languages and Linguistics
- Jones, Wendy, Ph.D., Cornell U. Sr. Lec., English
- Jones-Correa, Michael, Ph.D., Princeton U. Assoc. Prof., Government
- Jordan, Kurt, Ph.D., Columbia U. Asst. Prof., Anthropology
- Jordan, Teresa E., Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences/INSTOC#
- Jorden, Eleanor H., Ph.D., Yale U. Mary Donlon Alger Professor of Linguistics Emerita, Modern Languages and Linguistics
- Kahn, Alfred E., Ph.D., Yale U. Robert Julius Thorne Professor of Political Economy Emeritus, Economics
- Kahn, Peter J., Ph.D., Princeton U. Prof., Mathematics
- Kalas, Rayna, Ph.D., U. of Pennsylvania. Asst. Prof., English
- Kammen, Carol K., B.A., George Washington U. Sr. Lec., History
- Kammen, Michael G., Ph.D., Harvard U. Newton C. Farr Professor of American History and Culture, History
- Kanbur, Ravi, Ph.D., Oxford U. (England) T. H. Lee Prof. of World Affairs, Economics
- Kaplan, Steven L., Ph.D., Yale U. Goldwin Smith Professor of History, History
- Karig, Daniel E., Ph.D., U. of California, San Diego. Prof. Emeritus, Earth and Atmospheric Sciences
- Kaske, Carol V., Ph.D., Johns Hopkins U. Prof. Emerita, English
- Kassabov, Martin, Ph.D., Yale U. Asst. Prof., Mathematics
- Katagiri, Yukiko, M.A., Nihon Joshi Daigaku (Japan). M.A., Cornell U. Sr. Lec., Asian Studies
- Katzenstein, Mary F., Ph.D., Massachusetts Inst. of Technology. Prof., Government/ Feminist, Gender & Sexuality Studies
- Katzenstein, Peter J., Ph.D., Harvard U. Walter S. Carpenter, Jr., Professor of International Studies, Government
- Kawasaki, Yuka, M.Ed., Vanderbilt U. Lec., Asian Studies
- Kay, Robert W., Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences/INSTOC#
- Kay, Suzanne Mahlburg, Ph.D., Brown U. Prof., Earth and Atmospheric Sciences/ INSTOC#
- Keich, Uri, Ph.D., Courant Inst. Asst. Prof., Computer Science
- Kelley, E. Wood, Ph.D., Indiana U. Assoc. Prof., Government
- Kelley, Michael C., Ph.D., U. of California, Berkeley. Prof., Earth and Atmospheric Sciences/Electrical and Computer Engineering
- Kellock, Judith, M.M., Boston U. Assoc. Prof., Music
- Kennedy, William J., Ph.D., Yale U. Prof., Comparative Literature
- Kesten, Harry, Ph.D., Cornell U. Prof. Emeritus, Mathematics
- Kiefer, Nicholas M., Ph.D., Princeton U. Ta-Chung Liu Prof. of Economics
- Kim, Chris Y., M.M., U. of Michigan (Ann Arbor). Asst. Prof., Music
- Kinoshita, Toichiro, Ph.D., Tokyo U. (Japan). Goldwin Smith Professor of Physics Emeritus/LEPP¶
- Kirkwood, Gordon M., Ph.D., Johns Hopkins U. Frederick J. Whiton Professor of Classics Emeritus
- Kirshner, Jonathan, Ph.D., Princeton U. Assoc. Prof., Government
- Klein, Richard J., Ph.D., Yale U. Prof., Romance Studies
- Kleinberg, Jon, Ph.D., Massachusetts Inst. of Technology. Prof., Computer Science
- Kleinberg, Robert, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science
- Kline, Ronald, Ph.D., U. of Wisconsin. Sue G. and Harry E. Bovay Jr. Professor of History and Ethics of Engineering, Science and Technology Studies
- Klonner, Stefan, Ph.D., Rupecht Karls U. (Germany). Asst. Prof., Economics
- Knapp, Warren W., Ph.D., U. of Wisconsin. Prof. Emeritus, Earth and Atmospheric Sciences
- Koch, Michael, M.F.A., Wichita State U. Sr. Lec., English
- Kohn, Eduardo, Ph.D., U. of Wisconsin. Asst. Prof., Anthropology
- Koschmann, J. Victor, Ph.D., U. of Chicago. Prof., History
- Kovar, Janice Sue, B.S., U. of Illinois. Sr. Lec., Theatre, Film and Dance
- Kozen, Dexter, Ph.D., Cornell U. Joseph N. Pew Professor of Engineering/Computer Science
- Kramnick, Isaac, Ph.D., Harvard U. Richard J. Schwarz Professor of Government
- Krasicky, Philip, Ph.D., Cornell U. Sr. Lec., Physics
- Krivitsky, Raissa, M.A., Odessa U. (Ukraine). Sr. Lec., Russian
- Krumhansl, Carol L., Ph.D., Stanford U. Prof., Psychology
- Kufner, Herbert L., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
- Kuniholm, Peter I., Ph.D., U. of Pennsylvania. Prof., Archaeology and Dendrochronology
- LaCapra, Dominic C., Ph.D., Harvard U. Bryce and Edith M. Bowman Professor in Humanistic Studies, History/Comparative Literature
- LaFeber, Walter F., Ph.D., U. of Wisconsin. Marie Underhill Noll Professor of American History Emeritus, History
- Lai, Clement, Ph.D., U. of California, Berkeley. Asst. Prof., Asian American Studies
- Lai, Dong, Ph.D., Cornell U. Assoc. Prof., Astronomy/CRSR†
- Lambert, Bernd, Ph.D., U. of California, Berkeley. Prof. Emeritus, Anthropology
- LaMarre, Thomas, Ph.D., U. of Chicago. Assoc. Prof., Asian Studies
- Langwick, Stacey, Ph.D., U. of North Carolina. Asst. Prof., Anthropology
- Larson, Naomi, M.A., Seikei U. (Japan). Sr. Lec., Asian Studies
- Law, Jane Marie, Ph.D., U. of Chicago. Assoc. Prof., Asian Studies
- Lawler, Edward J., Ph.D., U. of Wisconsin. Prof. Sociology/Industrial and Labor Relations
- Lawler, Gregory F., Ph.D., Princeton U. Prof., Mathematics
- Lawler, Margaret, M.A., San Jose State Coll. Assoc. Prof. Emerita, Theatre Arts
- Lawless, Cecelia Burke, Ph.D., Cornell U. Sr. Lec., Romance Studies
- Lazzaro, Claudia, Ph.D., Princeton U. Prof., History of Art
- Leavitt, Thomas W., Ph.D., Harvard U. Prof. Emeritus, History of Art
- LeClair, André R., Ph.D., Harvard U. Prof., Physics/LEPP¶
- Lee, David M., Ph.D., Yale U. James Gilbert White Distinguished Professor in the Physical Sciences, Physics/LASSP\*
- Lee, Lillian, Ph.D., Harvard U. Assoc. Prof., Computer Science
- Lee, Stephen, Ph.D., U. of Chicago. Prof., Chemistry and Chemical Biology
- Leed, Richard L., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
- Legate, Julie, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Linguistics
- LeGendre, Barbara A., Ph.D., Case Western Reserve U. Sr. Lec., Knight Institute for Writing in the Disciplines
- Lepage, G. Peter, Ph.D., Stanford U. Prof., Physics/LEPP¶
- Leuenberger, Christine A., Ph.D., U. of Konstanz (Germany). Sr. Lec., Science and Technology Studies
- Levitsky, David A., Ph.D., Rutgers U. Prof., Nutritional Sciences/Psychology
- Levitt, Bruce, Ph.D., U. of Michigan. Prof., Theatre, Film and Dance
- Lewenstein, Bruce V., Ph.D., U. of Pennsylvania. Assoc. Prof., Science and Technology Studies/Communication
- Lewis, Philip E., Ph.D., Yale U. Prof., Romance Studies
- Lillard, Pamela S., M.F.A., Virginia Tech. Sr. Lec., Theatre, Film and Dance
- Lin, Hening, Ph.D., Columbia U. Asst. Prof., Chemistry and Chemical Biology
- Lischke, Gunhild Iris, Zweites Staatsexamen, Ministry of Education, Hamburg (Germany). M.A. Cornell U. Sr. Lec., German Studies
- Littauer, Raphael M., Ph.D., Cambridge U. (England). Prof. Emeritus, Physics/LEPP¶
- Liu, Petrus, Ph.D., U. of California, Berkeley. Asst. Prof., Comparative Literature
- Livesay, G. Roger, Ph.D., U. of Illinois. Prof. Emeritus, Mathematics
- Lloyd, James P., Ph.D., U. of California, Berkeley. Asst. Prof., Astronomy/CRSR†
- LoBello, Susan, M.A., U. of Kansas. Sr. Lec., Romance Studies
- Logevall, Fredrik, Ph.D., Yale U. Prof., History
- Long, Kathleen P., Ph.D., Yale U. Prof., Romance Studies
- Loos, Tamara L., Ph.D., Cornell U. Assoc. Prof., History
- Lorenz, Philip, Ph.D., New York U. Asst. Prof., English
- Loring, Roger F., Ph.D., Stanford U. Prof., Chemistry and Chemical Biology
- Lovelace, Richard V. E., Ph.D., Cornell U. Prof., AEP/Astronomy/CRSR†
- Lowi, Theodore J., Ph.D., Yale U. John L. Senior Professor of American Institutions, Government
- Luks, Joanna G., Ed.M., Boston U. Sr. Lec., Romance Studies
- Lurie, Alison, A.B., Radcliffe Coll. Frederic J. Whiton Professor of American Literature Emerita, English
- Luster, Martin, LL.B., New York U. Government
- Lynch, Michael, Ph.D., U. of California, Irvine. Prof., Science and Technology Studies
- Lyons, Thomas, Ph.D., Cornell U. Prof., Economics

- Maas, James B., Ph.D., Cornell U. Prof., Stephen H. Weiss Presidential Fellow, Psychology
- MacDonald, Scott, Ph.D., Cornell U. Prof., Norma K. Regan Professor in Christian Studies, Philosophy
- Macpique, Richard E., M.F.A., Boston U. Lec., Theatre, Film and Dance
- Macy, Michael W., Ph.D., Harvard U. Prof., Sociology
- Majumdar, Mukul K., Ph.D., U. of California, Berkeley. H. T. Warshaw and Robert Irving Warshaw Professor of Economics
- Maldonado-Méndez, Nilsa, M.S., SUNY Albany. Sr. Lec., Romance Studies
- Mankin, David P., Ph.D., U. of Virginia. Assoc. Prof., Classics
- Manning, Sturt W., Ph.D. Cambridge U. Prof., Classics/Dendrochronology
- Mao, Douglas, Ph.D., Yale U. Assoc. Prof., English
- March, Kathryn S., Ph.D., Cornell U. Prof., Anthropology/Feminist, Gender and Sexuality Studies
- Marcus, Phillip L., Ph.D., Harvard U. Prof. Emeritus, English
- Margot, Jean-Luc, Ph.D., Cornell U. Asst. Prof., Astronomy/CRSR†/NAIC‡
- Marohn, John, Ph.D., California Inst. of Technology. Assoc. Prof., Chemistry and Chemical Biology
- Marschner, Steve, Ph.D., Cornell U. Asst. Prof., Computer Science
- Martin, Biddy, Ph.D., U. of Wisconsin, Madison. Prof., German Studies/Feminist, Gender, and Sexuality Studies
- Martin, Joseph A., M.A., Cornell U. Sr. Lec., Knight Institute for Writing in the Disciplines
- Martin, Sherry, Ph.D., U. of Michigan. Asst. Prof., Government/Feminist, Gender & Sexuality Studies
- Maschke, Ute, Ph.D., Brown U. Sr. Lec., German Studies
- Masson, Robert T., Ph.D., U. of California, Berkeley. Prof., Economics
- Matthews, Jeanna N., Ph.D., U. of California, Berkeley. Asst. Prof., Computer Science
- Maxwell, Barry Hamilton, Ph.D., Stanford U. Sr. Lec., Comparative Literature
- Mazrui, Ali A., Ph.D., Oxford U. (England). Sr. Scholar, Africana Studies and Research Center and A. D. White Professor-at-Large Emeritus
- McCall, Dan E., Ph.D., Columbia U. Prof. Emeritus, English
- McCarrick, Thomas Arthur, M.S., Brock U. Sr. Lec., Chemistry
- McClane, Kenneth A., M.F.A., Cornell U. W.E.B. DuBois Professor of Literature, English
- McClelland, Peter D., Ph.D., Harvard U. Prof. Emeritus, Economics
- McConkey, James R., Ph.D., State U. of Iowa. Prof. Emeritus, English
- McConnell-Ginet, Sally, Ph.D., U. of Rochester. Prof., Linguistics
- McCoy, William John Jr., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
- McCoy, Maureen, M.F.A., U. of Iowa. Assoc. Prof., English
- McCullough, M. Kate, Ph.D., U. of California, Berkeley. Assoc. Prof., English/Feminist, Gender, & Sexuality Studies
- McEuen, Paul L., Ph.D., Yale U. Prof., Physics, Physics/LASSP\*
- McGinnis, Robert, Ph.D., Northwestern U. Prof. Emeritus, Sociology
- McGowan, Kaja, Ph.D., Cornell U. Assoc. Prof., History of Art
- McLafferty, Fred W., Ph.D., Cornell U. Peter J. W. Debye Emeritus Professor of Chemistry and Chemical Biology
- McMillin, H. Scott, Ph.D., Stanford U. Prof., English
- McMurry, John E., Ph.D., Columbia U. Prof. Emeritus, Chemistry and Chemical Biology
- McNeal, Robin, Ph.D., U. of Washington. Asst. Prof., Asian Studies
- McNulty, Tracy, Ph.D., U. of California, Irvine. Assoc. Prof., Romance Studies
- McQuade, D. Tyler, Ph.D., U. of Wisconsin. Asst. Prof., Chemistry and Chemical Biology
- Mebane, Walter, Ph.D., Yale U. Assoc. Prof., Government
- Mehta, Yufen Lee, M.A., National Taiwan Normal U. M.A., Brigham Young U. Sr. Lec., Asian Studies
- Mei, Tsu-Lin, Ph.D., Yale U. Hu Shih Prof. Emeritus of Chinese Literature and Philology, Asian Studies
- Meinwald, Jerrold, Ph.D., Harvard U. Goldwin Smith Professor Emeritus of Chemistry and Chemical Biology
- Meixner, Laura L., Ph.D., Ohio State U. Assoc. Prof., History of Art
- Melas, Natalie A., Ph.D., U. of California, Berkeley. Assoc. Prof., Comparative Literature
- Melnikov, Oleg, Ph.D., Yale U. Asst. Prof., Economics
- Mermin, Dorothy M., Ph.D., Harvard U. Goldwin Smith Professor Emerita of English
- Mermin, N. David, Ph.D., Harvard U. Horace White Professor of Physics Emeritus, Physics/LASSP\*
- Merrill, Paul, M.M., Ithaca Coll. Lec., Music
- Michler, Gerhard, Ph.D., Frankfurt U. Adjunct Prof., Mathematics
- Migiel, Marilyn, Ph.D., Yale U. Prof., Romance Studies
- Miller, Amanda L., Ph.D., Ohio State U. Asst. Prof., Linguistics
- Mijler, Richard W., Ph.D., Harvard U. Prof., Philosophy/Science and Technology Studies
- Milles, Beth F., M.A., Harvard U. Asst. Prof., Theatre, Film and Dance
- Minkowski, Christopher, Ph.D., Harvard U. Prof., Asian Studies
- Mitra, Tapan, Ph.D., U. of Rochester. Prof., Economics
- Miyazaki, Hirokazu, Ph.D., Australian National U. Asst. Prof., Anthropology
- Moehler, Devra, Ph.D., U. of Michigan. Asst. Prof., Government
- Mohanty, Satya P., Ph.D., U. of Illinois. Prof., English
- Molinari, Francesca, Ph.D., Northwestern U. Asst. Prof., Economics
- Monosoff-Pancaldo, Sonya, Artists Diploma, Juilliard School of Music. Prof. Emeritus, Music
- Monroe, Chris, Ph.D., University of Michigan. Sr. Lec., Near Eastern Studies
- Monroe, Jonathan B., Ph.D., U. of Oregon. Prof., Comparative Literature
- Monroe, Lauren, Ph.D., New York U. Asst. Prof., Near Eastern Studies
- Moody-Adams, Michele, Ph.D., Harvard U. Wyn and William Y. Hutchinson Prof. of Ethics and Public Life/Prof., Philosophy
- Moore, R. Laurence, Ph.D., Yale U. Howard A. Newman Professor in American Studies, History
- Morató, Luis, B.A., U. San Simone; B.A., National Teachers Coll. of Suene. Sr. Lec., Romance Studies
- Morgan, Robert R., M.F.A., U. of North Carolina. Kappa Alpha Prof. of English
- Morgan, Stephen L., Ph.D., Harvard U. Assoc. Prof., Sociology
- Morgenroth, Joyce, M.A., Johns Hopkins U. Prof., Theatre, Film and Dance
- Morin, Pauline, Ph.D., Georgia Inst. of Technology. Lec., History of Art
- Morley, Michael D., Ph.D., U. of Chicago. Prof. Emeritus, Mathematics
- Morrison, George H., Ph.D., Princeton U. Prof. Emeritus, Chemistry and Chemical Biology
- Mueller, Erich, Ph.D., U. of Illinois, Urbana Champaign. Asst. Prof., Physics/LASSP\*
- Mukerjee, Sreemati, M.A., Jadavpur U. (India). Lec., Asian Studies
- Munasinghe, Viranjini P., Ph.D., Johns Hopkins U. Assoc. Prof., Anthropology/Asian American Studies
- Murray, Timothy, Ph.D., Johns Hopkins U. Prof., English/Comparative Literature
- Muscalu, Camil, Ph.D., Brown U. Asst. Prof., Mathematics
- Myers, Andrew, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
- Najemy, John M., Ph.D., Harvard U. Prof., History
- Nanji, Abdul, M.A., SUNY New Paltz. Sr. Lec., Africana Studies and Research Center
- Nee, Victor, Ph.D., Harvard U. Goldwin Smith Professor of Sociology
- Neisser, Ulric, Ph.D., Harvard U. Prof. Emeritus, Psychology
- Nerode, Anil, Ph.D., U. of Chicago. Goldwin Smith Professor of Mathematics
- Neubert, Matthias, Ph.D., Ruprecht-Karls-U., Heidelberg (Germany). Prof., Physics/LEPP†
- Ngaté, Jonathan, Ph.D., U. of Washington. Assoc. Prof., Romance Studies
- Nicholson, Philip, Ph.D., California Inst. of Technology. Prof., Astronomy/CRSR†
- Nielsen, Morten, Ph.D., U. of Aarhus (Denmark). Asst. Prof., Economics
- Njardarson, Jón, Ph.D., Yale U. Asst. Prof., Chemistry and Chemical Biology
- Norton, Mary Beth, Ph.D., Harvard U. Mary Donlon Alger Professor of American History, History
- Nussbaum, Alan, Ph.D., Harvard U. Prof., Classics/Linguistics
- Nussbaum, Michael, Dr. Sci., Academy of Sciences Berlin (Germany). Prof., Mathematics
- O'Connor, Stanley J., Ph.D., Cornell U. Prof. Emeritus, History of Art
- O'Donoghue, Ted, Ph.D., U. of California, Berkeley. Assoc. Prof., Economics
- Oja, Shambhu, M.A., Tribhubon U. (Nepal). Sr. Lec., Asian Studies
- Oliveira, Jurandir, Ph.D., U. of North Carolina, Chapel Hill. Sr. Lec., Romance Studies
- Oliver, Jack E., Ph.D., Columbia U. Prof. Emeritus, Earth and Atmospheric Sciences
- Orear, Jay, Ph.D., U. of Chicago. Prof. Emeritus, Physics/LEPP†
- Orlov, S., Ph.D., Cornell U. Sr. Lec., Knight Institute for Writing in the Disciplines
- Owen, David I., Ph.D., Brandeis U. Bernard and Jane Schapiro Professor of Assyriology, Ancient Near Eastern History and Archaeology, Near Eastern Studies
- Padamsee, Hasan, Ph.D., Northeastern U. Adj. Prof., Physics/LEPP†
- Palmer, Robert M., M.M., Eastman School of Music. Given Foundation Professor Emeritus of Music Composition, Music
- Pan, An-yi, Ph.D., U. of Kansas. Assoc. Prof., History of Art
- Paperno, Slava, M.A. equivalent, Leningrad State U. (Russia). M.A. equivalent, Cornell U. Sr. Lec., Russian
- Park, Jiwoong, Ph.D., U. of California, Berkeley. Asst. Prof., Chemistry and Chemical Biology



- Parker, A. Reeve, Ph.D., Harvard U. Prof., English
- Parmenter, Jon, Ph.D., U. of Michigan. Asst. Prof., History
- Parpia, Jeevak M., Ph.D., Cornell U. Prof., Physics/LASSP\*
- Parrish, Stephen M., Ph.D., Harvard U. Goldwin Smith Professor of English Emeritus
- Patel, David S., PhD, Stanford U. Asst. Prof., Government
- Paterson, Lorraine M., M.A., Cornell U. Instructor, Asian Studies
- Patterson, J. Ritchie, Ph.D., U. of Chicago. Prof., Physics/LEPP†
- Payne, Lawrence E., Ph.D., Iowa State U. Prof. Emeritus, Mathematics
- Paz-Soldán, José E., Ph.D., U. of California, Berkeley. Assoc. Prof., Romance Studies
- Peeva, Irena, Ph.D., Brandeis U. Asst. Prof., Mathematics
- Pelliccia, Hayden, Ph.D., Yale U. Assoc. Prof., Classics
- Peraino, Judith A., Ph.D., U. of California, Berkeley. Assoc. Prof., Music
- Perelstein, Maxim, Ph.D., U. of California, Los Angeles. Asst. Prof., Physics/LEPP†
- Pérez del Solar, Pedro, Ph.D., Princeton U. Lec., Romance Studies
- Pershing, Andrew J., Ph.D., Cornell U. Asst. Prof., Earth and Atmospheric Sciences
- Peterson, Charles A., Ph.D., U. of Washington. Prof. Emeritus, History
- Phipps Morgan, Jason, Ph.D., Brown U. Prof., Earth and Atmospheric Sciences
- Piedra, José, Ph.D., Yale U. Assoc. Prof., Romance Studies
- Pierpont, Judith, M.A., Teachers Coll., Columbia U. Sr. Lec., Knight Institute for Writing in the Disciplines
- Pinch, Trevor J., Ph.D., U. of Bath (England). Prof., Science and Technology Studies
- Pinet, Simone, Ph.D., Harvard U. Asst. Prof., Romance Studies
- Pintner, Walter M., Ph.D., Harvard U. Prof. Emeritus, History
- Pizaro, David A., Ph.D., Yale U. Asst. Prof., Psychology
- Plane, Robert A., Ph.D., U. of Chicago. Prof. Emeritus, Chemistry
- Pohl, Robert O., Doktor, U. of Erlangen (Germany). Prof. Emeritus, Physics/LASSP\*
- Polenberg, Richard, Ph.D., Columbia U. Goldwin Smith Professor of American History, History
- Pollak, Nancy, Ph.D., Yale U. Assoc. Prof., Russian
- Pond, Steven, Ph.D., U. of California, Berkeley. Assoc. Prof., Music
- Porte, Helene Sophrin, Ph.D., Harvard U. Sr. Lec., Psychology
- Porte, Joel, Ph.D., Harvard U. Ernest I. White Professor of American Studies and Humane Letters Emeritus, English
- Possen, Rhoda, Ph.D., Yale U., Sr. Lec., Romance Studies
- Possen, Uri M., Ph.D., Yale U. Prof., Economics
- Power, Alison G., Ph.D., U. of Washington. Prof., Science and Technology Studies/ Ecology and Evolutionary Biology
- Powers, David S., Ph.D., Princeton U. Prof., Near Eastern Studies
- Prentice, Rachel, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Science and Technology Studies
- Pritchard, Matthew, Ph.D., California Inst. of Technology. Asst. Prof., Earth and Atmospheric Sciences
- Proux-García, Karine, M.A., U. of Reims (France). Lec., Romance Studies
- Provine, William B., Ph.D., U. of Chicago. Prof., History/Biological Sciences
- Pucci, Pietro, Ph.D., U. of Pisa (Italy). Goldwin Smith Professor of Classics
- Puchner, Martin, Ph.D., Harvard U. Assoc. Prof., English
- Quinonez, Ernesto, M.F.A., CUNY. Asst. Prof., English
- Rabkin, Jeremy A., Ph.D., Harvard U. Assoc. Prof., Government
- Radzinowicz, Mary A., Ph.D., Columbia U. Jacob Gould Schurman Professor of English Emerita
- Ralph, Daniel C., Ph.D., Cornell U. Prof., Physics/LASSP\*
- Ralph, Michael, Ph.D., U. of Chicago. Asst. Prof., Anthropology
- Ramage, Andrew, Ph.D., Harvard U. Prof., History of Art
- Ramakrishna, Ravi, Ph.D., Princeton U. Assoc. Prof., Mathematics
- Raskolnikov, Masha, Ph.D., U. of California, Berkeley. Asst. Prof., English
- Rawlings III, Hunter R., Ph.D., Princeton U. Prof., Classics/History
- Razin, Assaf, Ph.D., U. of Chicago. Friedman Professor of International Economics, Economics
- Rebillard, Eric, Ph.D., U. of Paris (France). Assoc. Prof., Classics/History
- Redmond, Mary Kathryn, M.A.T., School for International Training, Brattleboro, Vt. Sr. Lec., Romance Studies
- Reese, Diana, Ph.D., Columbia U. Asst. Prof., German Studies/Feminist, Gender, & Sexuality Studies
- Regan, Dennis T., Ph.D., Stanford U. Assoc. Prof., Psychology
- Regan, Elizabeth Adkins, Ph.D., U. of Pennsylvania. Prof., Psychology/Biological Sciences
- Reppy, John D., Ph.D., Yale U. John L. Wetherill Professor Emeritus of Physics, Physics/LASSP\*
- Reppy, Judith, Ph.D., Cornell U. Prof., Science and Technology Studies
- Resina, Joan Ramon, Ph.D., U. of California, Berkeley. Prof., Romance Studies/Comparative Literature
- Rhodes, Frank H. T., Ph.D., U. of Birmingham (England). Prof. Emeritus/President Emeritus, Earth and Atmospheric Sciences
- Richards, Annette, Ph.D., Stanford U. Assoc. Prof., Music
- Richardson, Betty McCarthy, Ph.D., Duke U. Sr. Lec., Physics
- Richardson, Robert C., Ph.D., Duke U. F. R. Newman Professor of Physics/LASSP\*
- Rickard, Jolene, Ph.D., SUNY Buffalo. Asst. Prof., History of Art/Art
- Rigi, Jakob, Ph.D., U. of London (England). Asst. Prof., Anthropology
- Riha, Susan J., Ph.D., Washington State U. Prof., Earth and Atmospheric Sciences
- Riles, Annelise, Ph.D., Cambridge U. (England). Prof., Anthropology
- Rivchin, Marilyn, M.F.A., Cornell U. Sr. Lec., Theatre. Film and Dance
- Roberts, Kenneth, Ph.D., Stanford U. Prof., Government
- Robinson, Cynthia, Ph.D., U. of Pennsylvania. Asst. Prof., History of Art
- Rodríguez-García, José Maria, Ph.D., U. of Colorado. Asst. Prof., Romance Studies
- Roldan, Mary J., Ph.D., Harvard U. Assoc. Prof., History
- Rooth, Mats, Ph.D., U. of Massachusetts, Amherst. Prof., Linguistics
- Rosen, Bernard C., Ph.D., Cornell U. Prof. Emeritus, Sociology
- Rosen, Carol G., Ph.D., Harvard U. Prof., Linguistics
- Rosen, David, Ph.D., U. of California, Berkeley. Prof. Emeritus, Music
- Rosenberg, Alex, Ph.D., U. of Chicago. Prof. Emeritus, Mathematics
- Rosenberg, Edgar, Ph.D., Stanford U. Prof., Emeritus of English/Comparative Literature
- Rossiter, Margaret, Ph.D., Yale U. Marie Underhill Noll Professor of the History of Science, Science and Technology Studies
- Routier-Pucci, Jeannine Suzanne, D.E.A., École des Hautes Études (Paris, France). Sr. Lec., Romance Studies
- Rubenstein, Diane, Ph.D., Yale U. Visiting Assoc. Prof., Government
- Rubin, David L., Ph.D., U. of Michigan. Boyce D. McDaniel Prof. of Physics, Physics/LEPP†
- Rugina, Radu, Ph.D., U. of California, Santa Barbara. Asst. Prof., Computer Science
- Rush, Myron, Ph.D., U. of Chicago. Prof., Government
- Rusk, Bruce, Ph.D., U. of California, Los Angeles. Asst. Prof., Asian Studies
- Russell, Nerissa, Ph.D., U. of California, Berkeley. Assoc. Prof., Anthropology
- Russo, Steven Albert, Ph.D., Cornell U. Sr. Lec., Chemistry and Chemical Biology
- Rusten, Jeffrey S., Ph.D., Harvard U. Prof., Classics
- Ryd, Anders, Ph.D., U. of California, Santa Barbara. Asst. Prof., Physics/LEPP†
- Saccamano, Neil, Ph.D., Johns Hopkins U. Assoc. Prof., English/Comparative Literature
- Sachs, Aaron, Ph.D., Yale U. Asst. Prof., History
- Sakai, Naoki, Ph.D., U. of Chicago. Prof., Asian Studies/Comparative Literature
- Saloff-Coste, Laurent, Ph.D., U. of Paris VI (France). Prof., Mathematics
- Salpeter, Edwin E., Ph.D., Birmingham U. (England). James Gilbert White Distinguished Professor in the Physical Sciences Emeritus, Physics/LEPP†/Astronomy/CRSR†
- Salvato, Nicholas, Ph.D., Yale U. Asst. Prof., Theatre, Film, and Dance
- Salvatore, Nicholas, Ph.D., U. of California, Berkeley. Prof., Industrial and Labor Relations/American Studies
- Samuels, Shirley, Ph.D., U. of California, Berkeley. Prof., English/History of Art
- Sanchez-Blake, Elvira, Ph.D., Cornell U. Sr. Lec., Romance Studies
- Sanders, Elizabeth, Ph.D., Cornell U. Prof., Government
- Sangren, P. Steven, Ph.D., Stanford U. Prof., Anthropology
- Santiago-Irizarry, Vilma, Ph.D., New York U. Assoc. Prof., Anthropology and Latino Studies
- Savella, Maria T. C., M.A., U. of the Philippines-Diliman; M.A., Cornell U. Lec., Asian Studies
- Sawyer, Paul L., Ph.D., Columbia U. Prof., English
- Schaffzin, Sara, M.A., U. of Rochester. Sr. Lec., English for Academic Purposes
- Scharf, Nava, M.A., Levinsky Seminary, Tel Aviv (Israel). Sr. Lec., Near Eastern Studies
- Schatz, Alfred H., Ph.D., New York U. Prof., Mathematics
- Scheraga, Harold A., Ph.D., Duke U. George W. and Grace L. Todd Professor Emeritus of Chemistry and Chemical Biology
- Schneider, Fred B., Ph.D., SUNY Stony Brook. Prof., Computer Science
- Schoss, Johanna, Ph.D., U. of Chicago. Sr. Lec., Anthropology

- Schuler, Richard E., Ph.D., Brown U. Prof., Economics/Engineering
- Schwab, Keith, Ph.D., U. of California, Berkeley. Assoc. Prof., Physics/LASSP\*
- Schwartz, David, Ph.D., SUNY Buffalo. Sr. Lec., Computer Science
- Schwarz, Anette, Ph.D., Johns Hopkins U. Assoc. Prof., German Studies
- Schwarz, Daniel R., Ph.D., Brown U. Prof., English
- Segal, Harry, Ph.D., U. of Michigan. Sr. Lec., Psychology
- Selby, Katherine, Ph.D., U. of California, Berkeley. Sr. Lec., Physics
- Selden, Kyoko Iriye, Ph.D., Yale U. Sr. Lec., Asian Studies
- Self, James T., B.A., Cornell U. Sr. Lec., Theatre, Film, and Dance
- Selman, Bart, Ph.D., U. of Toronto (Canada). Prof., Computer Science
- Sen, Shankar, Ph.D., Harvard U. Prof., Mathematics
- Senderovich, Saveli, Ph.D., New York U. Prof., Russian
- Sengers, Phoebe, Ph.D., Carnegie-Mellon U. Asst. Prof., Science and Technology Studies/Computing and Information Science
- Seth, Suman, Ph.D., Princeton U. Asst. Prof., Science and Technology Studies
- Sethi, Neelam, Ph.D., U. of California, San Diego. Lec., Philosophy
- Sethna, James P., Ph.D., Princeton U. Prof., Physics/LASSP\*
- Seznec, Alain, D.E.S., U. of Paris-Sorbonne (France). Prof. Emeritus, Romance Studies
- Shapiro, Elliot Hart, Ph.D., U. of Rochester. Lec., Knight Institute for Writing in the Disciplines
- Shapiro, Gavriel, Ph.D., U. of Illinois, Urbana-Champaign. Prof., Russian
- Shaw, Harry E., Ph.D., U. of California, Berkeley. Prof., English
- Shefter, Martin A., Ph.D., Harvard U. Prof., Government
- Shell, Karl, Ph.D., Stanford U. Robert Julius Thorne Professor of Economics
- Shin, Michael, Ph.D., U. of Chicago. Asst. Prof., Asian Studies
- Shmoys, David B., Ph.D., U. of California, Berkeley. Prof., Computer Science
- Shoemaker, Sydney S., Ph.D., Cornell U. Professor Emeritus, Philosophy
- Shoer, Shalom, M.A., Cornell U. Sr. Lec., Near Eastern Studies
- Shore, Richard A., Ph.D., Massachusetts Inst. of Technology. Prof., Mathematics
- Shue, Henry, Ph.D., Princeton U. Wyn and William Y. Hutchinson Prof. of Ethics and Public Life
- Siegel, James T., Ph.D., U. of California, Berkeley. Prof., Anthropology
- Siegel, Sandra F., Ph.D., U. of Chicago. Prof., English
- Sierra, Roberto, M.M., London U. (England). Old Dominion Foundation Professor in the Humanities, Music
- Sievers, Albert J. III, Ph.D., U. of California, Berkeley. Edward L. Nichols Professor, Physics/LASSP\*
- Siggia, Eric, Ph.D., Harvard U. Adj. Prof., Physics/LASSP\*
- Silbey, Joel H., Ph.D., U. of Iowa. President White Professor of American History Emeritus, History
- Silins, Nicholas, Ph.D., Oxford U. Asst. Prof., Philosophy
- Silsbee, Robert H., Ph.D., Harvard U. Prof. Emeritus, Physics/LASSP\*
- Silverman, Albert, Ph.D., U. of California, Berkeley. Prof. Emeritus, Physics/LEPP¶
- Simpson, Audra, Ph.D., McGill U. (Canada). Asst. Prof., Anthropology
- Singh, Sujata, B.A., Kashi Vidyapeeth U. (India). Lec., Asian Studies
- Sirer, Emin Gun, Ph.D., U. of Washington. Asst. Prof., Computer Science
- Sjamaar, Reyer, Ph.D., Rijksuniversiteit te Utrecht (The Netherlands). Assoc. Prof., Mathematics
- Small, Meredith F., Ph.D., U. of California, Davis. Prof., Anthropology
- Smillie, John, Ph.D., U. of Chicago. Prof., Mathematics
- Smith, Anna Marie, Ph.D., U. of Essex (England). Assoc. Prof., Government
- Smith, Robert J., Ph.D., Cornell U. Goldwin Smith Professor of Anthropology Emeritus
- Sogah, Dotsevi Y., Ph.D., U. of California, Los Angeles. Prof., Chemistry and Chemical Biology
- Sogno, Cristiana, Ph.D., Yale U. Townsend Asst. Prof., Classics
- Sokol, Thomas A., M.A., George Peabody Coll. Prof. Emeritus, Music
- Solá, Donald F., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
- Somkin, Fred, Ph.D., Cornell U. Prof. Emeritus, History
- Soule, Sara, Ph.D., Cornell U. Prof., Sociology
- Sparfel, Christine, Mathématiques-Physique I and DEUG. Sr. Lec., Romance Studies
- Speh, Birgit, Ph.D., Massachusetts Inst. of Technology. Prof., Mathematics
- Spillers, Hortense, Ph.D., Brandeis U. Frederick J. Whiton Prof. of English
- Spivey, Michael, Ph.D., U. of Rochester. Assoc. Prof., Psychology
- Squyres, Steven W., Ph.D., Cornell U. Prof., Astronomy/CRSR†
- Stacey, Gordon J., Ph.D., Cornell U. Prof., Astronomy/CRSR†
- Staller, George J., Ph.D., Cornell U. Prof. Emeritus, Economics
- Starr, Deborah A., Ph.D., U. of Michigan. Asst. Prof., Near Eastern Studies
- Stein, Peter C., Ph.D., Massachusetts Inst. of Technology. Prof., Physics/LEPP¶
- Steinberg, Michael P., Ph.D., U. of Chicago. Prof., History
- Stern, Robert, Ph.D., Vanderbilt U. Prof., Sociology/Industrial and Labor Relations
- Stewart-Steinberg, Suzanne, Ph.D., Yale U. Adjunct Asst. Prof., Romance Studies
- Stillman, Michael E., Ph.D., Harvard U. Prof., Mathematics
- Stith, Marice W., M.A., Ohio State U. Prof. Emeritus, Music
- Strang, David, Ph.D., Stanford U. Prof., Sociology
- Stratakis, Tió, Amalía, M.S., Syracuse U. Sr. Lec., Romance Studies
- Strauss, Barry S., Ph.D., Yale U. Prof., History/Classics
- Strichartz, Robert S., Ph.D., Princeton U. Prof., Mathematics
- Strout, S. Cushing, Jr., Ph.D., Harvard U. Ernest I. White Professor of American Studies and Humane Letters, Emeritus, English
- Stucky, Steven, D.M.A., Cornell U. Given Foundation Professor of Music
- Sturgeon, Nicholas L., Ph.D., Princeton U. Prof., Philosophy
- Stycos, Joseph M., Ph.D., Columbia U. Prof., Rural Sociology/Sociology
- Suber, Paul Byron, B.A., Cornell U. Sr. Lec., Theatre, Film and Dance
- Suh, Jae Jung, Ph.D., U. of Pennsylvania. Asst. Prof., Government
- Sukle, Robert Joseph, M.A., Cornell U. Sr. Lec., Asian Studies
- Suñer, Margarita A., Ph.D., Indiana U. Prof. Emerita, Linguistics
- Swartz, Edward, Ph.D., U. of Maryland, College Park. Asst. Prof., Mathematics
- Swedberg, Richard, Ph.D., Boston Coll.. Prof., Sociology
- Sweedler, Moss E., Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Mathematics
- Swenson, Maria G., Ph.D., Cornell U. Sr. Lec., Romance Studies
- Szabó, Zoltán, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Philosophy
- Taavola, Kristin, Ph.D., Eastman School of Music. Asst. Prof., Music
- Tagliacozzo, Eric, Ph.D., Yale U. Assoc. Prof., History
- Talman, Richard M., Ph.D., California Inst. of Technology. Prof., Physics/LEPP¶
- Tardos, Evá, Ph.D., Eötvös U. (Hungary). Prof., Computer Science
- Tarrow, Susan, Ph.D., Cornell U. Adjunct Assoc. Prof., Romance Studies
- Tarrow, Sidney G., Ph.D., U. of California, Berkeley. Maxwell M. Upson Professor of Government
- Taylor, Keith W., Ph.D., U. of Michigan. Prof., Asian Studies
- Teitelbaum, Tim, Ph.D., Carnegie-Mellon U. Assoc. Prof., Computer Science
- Teng, Qiuyun, M.A., Cornell U. Sr. Lec., Asian Studies
- Terrell, Maria Shea, Ph.D., U. of Virginia. Sr. Lec., Mathematics
- Terrell, Robert, Ph.D., U. of Virginia. Sr. Lec., Mathematics
- Terzian, Yervant, Ph.D., Indiana U. David C. Duncan Professor in the Physical Sciences, Astronomy/NAIC‡
- Teukolsky, Saul A., Ph.D., California Inst. of Technology. Hans A. Bethe Professor of Physics and Astronomy, Physics/LEPP¶/Astronomy
- Teutli, Brisa, M.A., U. de las Américas-Puebla. Sr. Lec., Romance Studies
- Thom, Julia, Ph.D., U. of Hamburg (Germany). Asst. Prof., Physics/LEPP¶
- Thorbecke, Erik, Ph.D., U. of California, Berkeley. H. Edward Babcock Professor of Economics and Food Economics Emeritus, Nutritional Sciences/Economics
- Thorne, Robert E., Ph.D., U. of Illinois. Prof., Physics/LASSP\*
- Thurston, William P., Ph.D., U. of California, Berkeley. Prof., Mathematics
- Tierney, Brian, Ph.D., Pembroke Coll. of Cambridge U. (England).
- Bryce and Edith M. Bowman Professor in Humanistic Studies Emeritus, History
- Tigner, Maury, Ph.D., Cornell U. Hans Bethe Prof. of Physics, Emeritus, Physics/LEPP¶
- Tolbert, Pamela, Ph.D., U. of California, Los Angeles. Assoc. Prof., Sociology/Industrial and Labor Relations
- Toorawa, Shawkat, Ph.D., U. of Pennsylvania. Assoc. Prof., Near Eastern Studies
- Trancik, Lena Gerd Karin, M.A. equiv., U. of Stockholm (Sweden). Sr. Lec., German Studies
- Tranviet, Thuy D., M.A., U. of Michigan. Sr. Lec., Asian Studies
- Travers, T. Robert, Ph.D., Gonville and Caius Coll. Asst. Prof., History
- Tsimberov, Viktoria, M.S., Lensovet Leningrad Inst. of Chemical Technology (Russia). Sr. Lec., Russian
- Tu, Thuy, Ph.D., New York U. Asst. Prof., History of Art/Asian American Studies
- Tucker, Scott, M.M., New England Conservatory. Assoc. Prof., Music

- Tun, San San Hnin, M.A., Rangoon Arts and Sciences U. (Burma). M.A., Western Illinois U. Sr. Lec., Romance Studies/Asian Studies
- Turcotte, Donald L., Ph.D., California Inst. of Technology. Prof. Emeritus, Earth and Atmospheric Sciences
- Turner, James E., Ph.D., Union Graduate School at Antioch Coll. Prof., Africana Studies and Research Center
- Turner, Terrence, Ph.D., Harvard U. Prof., Anthropology
- Tye, Sze-hoi Henry, Ph.D., Massachusetts Inst. of Technology. Prof., Physics/LNSQ
- Umrigar, Cyrus, Ph.D., Northwestern U. Adj. Prof., Physics/LASSP\*
- Uphoff, Norman T., Ph.D., U. of California, Berkeley. Prof., Government
- Usher, David A., Ph.D., Cambridge U. (England). Assoc. Prof., Chemistry and Chemical Biology
- Vallois, Marie-Claire, Ph.D., U. of Nice (France). Assoc. Prof., Romance Studies
- Van Clief, Stefanon, Lyrae, M.F.A., Pennsylvania State. Asst. Prof., English
- Van de Walle, Nicolas, Ph.D., Princeton U. Prof., Government
- Van Dyke, Alison. Sr. Lec., Theatre, Film, and Dance
- Vanek, Jaroslav, Ph.D., Massachusetts Inst. of Technology. Carl Marks Professor of International Studies Emeritus, Economics
- Van Loan, Charles F., Ph.D., U. of Michigan. Joseph C. Ford Prof. of Engineering, Computer Science
- Vaughn, Stephanie, M.F.A., U. of Iowa. Prof., English
- Vavasis, Stephen, Ph.D., Stanford U. Prof., Computer Science
- Veverka, Joseph F., Ph.D., Harvard U. Prof., Astronomy/CRSR†
- Villarejo, Amy, Ph.D., U. of Pittsburgh. Assoc. Prof., Theatre, Film and Dance/Feminist, Gender, & Sexuality Studies
- Viramontes, Helena M., M.F.A., U. of California, Irvine. Assoc. Prof., English
- Vladimirovsky, Alexander, Ph.D., U. of California, Berkeley. Asst. Prof., Mathematics
- Vogel, Kathleen, Ph.D., Princeton U. Asst. Prof., Science and Technology Studies
- Vogtmann, Karen L., Ph.D., U. of California, Berkeley. Prof., Mathematics
- Volman, Thomas P., Ph.D., U. of Chicago. Assoc. Prof., Anthropology
- Wagner, Michael, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Linguistics
- Wahlbin, Lars B., Ph.D., U. of Göteborg (Sweden). Prof., Mathematics
- Waite, Geoffrey C. W., Ph.D., Princeton U. Assoc. Prof., German Studies
- Waldron, Colette Denise, M.A. equiv., Faculté De Lettres, Besancon (France). Sr. Lec., Romance Studies
- Waligora-Davis, Nicole, Ph.D., Duke U. Asst. Prof., English
- Wan, Henry Y., Jr., Ph.D., Massachusetts Inst. of Technology. Prof., Economics
- Wang, Michelle D., Ph.D., U. of Michigan. Assoc. Prof., Physics/LASSP\*
- Warner, Ding Xiang, Ph.D., U. of Washington. Asst. Prof., Asian Studies
- Warner, Sara, Ph.D., Rutgers U. Asst. Prof., Comparative Literature
- Washington, Margaret, Ph.D., U. of California, Davis. Prof., History
- Wasserman, Ira M., Ph.D., Harvard U. Prof., Astronomy/Physics/CRSR†
- Waugh, Linda R., Ph.D., Indiana U. Prof. Emerita, Romance Studies/Comparative Literature
- Way, Christopher, Ph.D., Stanford U. Asst. Prof., Government
- Weatherston, Brian, Ph.D., Manash U. (Australia). Asst. Prof., Philosophy
- Webster, James, Ph.D., Princeton U. Goldwin Smith Professor of Music
- Weeden, Kim, Ph.D., Stanford U. Asst. Prof., Sociology
- Weil, Rachel, Ph.D., Princeton U. Assoc. Prof., History
- Weiner, Robert, Ph.D., U. of California, Berkeley. Asst. Prof., Government
- Weiss, John H., Ph.D., Harvard U. Assoc. Prof., History
- Weiss, Michael, Ph.D., Cornell U. Assoc. Prof., Linguistics
- Welker, Marina, Ph.D., U. of Michigan. Asst. Prof., Anthropology
- West, James E., Ph.D., Louisiana State U. Prof., Mathematics
- Wetherbee, Winthrop, Ph.D., U. of California, Berkeley. Avalon Professor of English and Medieval Studies Emeritus, English/Medieval Studies
- Wethington, Elaine, Ph.D., U. of Michigan. Assoc. Prof., Sociology/Human Development
- White, William M., Ph.D., U. of Rhode Island. Prof., Earth and Atmospheric Sciences
- Whitman, John B., Ph.D., Harvard U. Prof., Linguistics
- Whitman, Yasuko Nakanishi, B.A., Tamagawa U. (Japan). Sr. Lec., Asian Studies
- Widom, Benjamin, Ph.D., Cornell U. Goldwin Smith Professor of Chemistry and Chemical Biology
- Wilcox, Charles F., Jr., Ph.D., U. of California, Los Angeles. Prof. Emeritus, Chemistry and Chemical Biology
- Wilks, Daniel S., Ph.D., Oregon State U. Prof., Earth and Atmospheric Sciences
- Willford, Andrew C., Ph.D., U. of California, San Diego. Assoc. Prof., Anthropology
- Williams, L. Pearce, Ph.D., Cornell U. John Stambaugh Professor of the History of Science Emeritus, Science and Technology Studies
- Williams, Robin M., Jr., Ph.D., Harvard U. Henry Scarborough Professor of Social Sciences Emeritus, Sociology
- Wissink, Jennifer Parker, Ph.D., U. of Pennsylvania. Sr. Lec., Economics
- Wittich, Peter, Ph.D., U. of Pennsylvania. Asst. Prof., Physics/LEPP‡
- Wolczanski, Peter T., Ph.D., California Inst. of Technology. George W. and Grace L. Todd Professor of Chemistry and Chemical Biology
- Wolff, John U., Ph.D., Yale U. Prof. Emeritus, Linguistics/Asian Studies
- Wong, Shelley, Ph.D., U. of California, Berkeley. Assoc. Prof., English/Asian American Studies
- Wyatt, David K., Ph.D., Cornell U. John Stambaugh Professor of History Emeritus, History
- Wysocki, Mark W., M.S., Cornell U. Sr. Lec., Earth and Atmospheric Sciences
- Yampolsky, Miryam, M.M., Peabody Conservatory of Music. Lec., Music
- Yan, Tung-Mow, Ph.D., Harvard U. Prof., Physics/LEPP‡
- Yearsley, David G., Ph.D., Stanford U. Assoc. Prof., Music
- York, James, Ph.D., N. Carolina State U. Prof., Physics/LEPP‡/Astronomy
- Younes, Munther A., Ph.D., U. of Texas, Austin. Sr. Lec., Near Eastern Studies
- Zabih, Raman, Ph.D., Stanford U. Assoc. Prof., Computer Science
- Zacher, Samantha, Ph.D., U. of Toronto (Canada). Asst. Prof., English
- Zaslaw, Neal A., Ph.D., Columbia U. Herbert Gussman Professor of Music
- Zax, David B., Ph.D., U. of California, Berkeley. Assoc. Prof., Chemistry and Chemical Biology
- Zec, Draga, Ph.D., Stanford U. Prof., Linguistics
- Zhu, Tao, Ph.D., Pennsylvania State U. Asst. Prof., Economics
- Zimmermann, Hubert, Ph.D., DAAD Prof., Government
- Zussman, Asaf, Ph.D., Stanford U. Asst. Prof., Economics

\*Laboratory of Atomic and Solid State Physics.

†Center for Radiophysics and Space Research

‡National Astronomy and Ionosphere Center

§Laboratory of Elementary Particle Physics

#Institute for the Study of the Continents

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- Admissions Office, Undergraduate** (also offices in each college and school) **C2**
- A. D. (Andrew Dickson) White House:** Society for the Humanities **C4-5**
- Africana Studies and Research Center:** facilities, library **C1**
- Alumni House:** alumni affairs, Cornell's Adult University **D3**
- Anabel Taylor Hall:** café; interfaith center **B6**
- Appel (Robert and Helen) Commons:** cafeteria, fitness center, student activities **E2**
- Bailey Hall** **D4**
- Baker Laboratory:** chemical biology, chemistry **CD3-4**
- Bard Hall:** materials-sciences engineering **C6**
- Barnes Hall:** auditorium, career and minority services, Public Service Center **C5**
- Bartels Hall:** climbing wall, fencing salle, Newman Arena, outdoor program, strength and conditioning center, ticket office **E5-6**
- Barton Hall:** gymnasium, Cornell Police, **RO**
- Beebe Hall:** human ecology offices **F4**
- Big Red Barn:** cafeteria; graduate-student center **D4**
- Biotechnology Building:** café, biochemistry, biotechnology and life-science technologies, genetics and development, molecular and cell biology, nanobiotechnology **DE5**
- Boyce Thompson Institute for Plant Research** **GH5**
- Bradfield Hall:** earth and atmospheric sciences **E5**
- Caldwell Hall:** Graduate School and other offices **DE4**
- Carpenter Hall:** engineering administration, engineering and computer-science library **C6**
- Center for Jewish Living:** 104 West! kosher cafeteria **B6**
- Clark Hall:** physical sciences, library **D4**
- College Avenue:** 409 (Employee Assistance Program, student health insurance); 312 (Cornell News Service, University Photography, Web Communications); 301 (Cornell Information Science) **BC7**
- Computing and Communications Center:** CIT, telecommunications, university counsel and Board of Trustees offices **D4**
- Comstock Hall:** biological sciences, entomology, library **D5**
- Cornell Store:** retail and service departments; credit union **C5**
- Cornell University Press—ILR Press (Sage House)** **A7**
- Corson (Dale R.) Hall:** ecology and evolutionary biology **DE5**
- Dairy Bar/Store (Cornell):** in Stocking Hall **FG5**
- Day Hall:** School of Continuing Education and Summer Sessions offices, Information and Referral Center, university administration offices **C5**
- Duffield (David A.) Hall:** café; advanced materials and nanoscience, Cornell NanoScale Facility, Knight Laboratory **C6**
- Emerson Hall:** crop and soil sciences **E4-5**
- Fernow Hall:** natural resources **E4**
- Food Science Laboratory** **G5**
- Friedman (Stephen and Barbara) Wrestling Center** **EF5-6**
- Fuertes Observatory** **EF3**
- Gannett Health Services** **B5-6**
- Goldwin Smith Hall:** coffeehouse; arts and sciences administration and facilities **C4**
- Grumman Hall:** aerospace engineering **C6**
- Grumman Squash Courts** **D6**
- Helen Newman Hall:** fitness center, intramural-sports office, physical education **E3**
- Hollister Hall:** civil and environmental engineering **C6**
- Housing, Student:**  
Akwe:kon **D1** • Alice H. Cook House: cafeteria; Carl L. Becker House: cafeteria; South Baker Group; Mennen-Lyon-McFaddin complex; Hans Bethe House: cafeteria **AB4-5** • Balch Hall: Campus Life offices, Carol Tatkon Center: café **D2-3** • Cascadilla Hall **B7** • Comstock (Anna) Hall (Latino Living Center) **C2** • Bauer Hall, Court Hall, Mews Hall **DE2** • Dickson (Clara) Hall **D2** • Donlon (Mary) Hall **DE2** • Hasbrouck Apartments **FG1-2** • High Rise 5; Holland (Jerome H.) International Living Center; Jameson (George) Hall; Just About Music (JAM); Low Rises 6, 7; Ujamaa **E1-2** • Hughes (Charles Evans) Hall: cafeteria **B6** • Hurlburt House (Ecology House) **C1** • Maplewood Park **EF7** • 112 Edgemoor **A6** • Risley (Prudence) Hall: cafeteria, theatre **CD2-3** • Schuyler House **A7** • Sheldon Court **B7** • Thurston Court Apartments **B2** • Townhouse Community **DE1** • University Class Halls: fitness center (Class of '26 Hall) **AB4-5**
- Humphreys Service Building** **E6-7**
- ILR Conference Center, ILR Extension Building, and ILR Research Building:** conference facilities, industrial and labor relations; post office **D5**
- Ives Hall:** distance learning, industrial and labor relations, library **CD5**
- Johnson (Herbert E.) Museum of Art:** café; exhibits, galleries **B3-4**
- Kahin (George McT.) Center for Advanced Research on Southeast Asia** **A5**
- Kennedy (W. Keith) Hall:** cafeteria; communication, education; post office **D4-5**
- Kimball Hall:** materials-processing engineering **C6**
- Kinzelberg (Harvey) Hall:** nutritional sciences **D4**
- Knight (Lester B.) Laboratory:** in Duffield Hall **C6**
- Kroch (Carl A.) Library (access through Olin Library):** Asia, rare, and manuscript collections; University Archives **C4-5**
- Lincoln Hall:** music, music-and-dance library **C4**
- Livestock Pavilion** **G5**
- Lynah Rink:** hockey, ice-skating **E5-6**
- McGraw Hall:** anthropology, government, history, Knight Institute for Writing **B4**
- McGraw (Jennie) Tower (on Uris Library):** chimes, chimes museum **BC5**
- Malott Hall:** mathematics, statistics, library **D4-5**
- Mann Library Building:** café (courtyard); agriculture, life-sciences, and human-ecology library; Bailey (L. H.) Hortorium **E4**
- Martha Van Rensselaer Hall:** cafeteria; human ecology **DE4**
- Morrill Hall:** linguistics, Romance studies, Russian **B4**
- Morrison Hall:** animal science **G5**
- Mudd (Seeley G.) Hall:** neurobiology and behavior **D5**
- Myron Taylor Hall:** law, library **B6**
- Newman (Floyd R.) Laboratory/Annex:** elementary-particle physics **D4**
- Noyes Community Center [closes Jan. 2007]:** cafeteria, student activities and services **A5**
- Noyes Community Recreation Center [opens Jan. 2007]:** student gym/recreation facilities **B5**
- Noyes Lodge:** language laboratory **D3**
- Olin (Spencer T.) Chemistry Research Laboratory** **D3-4**
- Olin Hall of Chemical Engineering** **C5-6**
- Olin Library:** café; graduate/research library, access to Kroch Library **C5**
- Parking Garage** **D6**
- Performing Arts, Schwartz (Sheila W. and Richard J.) Center for the** **B7**
- Phillips Hall:** computer engineering, electrical engineering **C6**
- Plant Science Building and Greenhouses** **E4-5**
- Plantations (Cornell) Lewis (Richard M.) Education Center** **F4**
- Rand Hall:** architecture studios **C3**
- Rhodes (Frank H. T.) Hall:** computer graphics, engineering facilities, Cornell Theory Center **CD6**
- Rice Hall:** various program offices **F5**
- Riley-Robb Hall:** agricultural and biological engineering **FG5-6**
- Robert Purcell Community Center:** cafeteria; Campus Life Housing and Dining Office, Conference Services offices, student activities and services **E1-2**
- Roberts (Isaac P.) Hall:** agriculture and life sciences, Cornell Cooperative Extension, landscape architecture **D4**
- Rockefeller Hall:** Asian, Asian American, and Latino studies; science and technology studies **CD4**
- Sage Chapel** **C5**
- Sage Hall:** cafeteria; executive education, management studies, library **C5-6**
- Sage House:** Cornell University Press—ILR Press **A7**
- Savage Hall:** nutritional sciences **D4**
- Schoellkopf Memorial Hall:** Athletic Hall of Fame, athletics and physical-education offices, physical therapy **DE6**
- Schoellkopf (Paul) House:** athletics and physical-education offices **D6**
- Schurman Hall:** veterinary-college administrative and other facilities **H4-5**
- Schwartz, (Sheila W. and Richard J.) Center for the Performing Arts** **B7**
- Sibley Hall:** coffeehouse; architecture, art, and planning; fine-arts library **C3**
- Snee (William E.) Hall:** earth and atmospheric sciences **BC6**
- Space Sciences Building:** radiophysics and space research; National Astronomy and Ionosphere Center; rooftop teaching radio telescope **D4**
- Statler Hall and Hotel:** dining and lodging facilities, executive-education center, hotel administration, library **C5-6**
- Stimson Hall:** biological sciences, ombudsman **C5**
- Stocking Hall:** Dairy Bar/Store; food science, microbiology **FG5**
- Straight (Willard) Hall:** cafeterias, information, student activities/services, theatre **B5**
- Surge 3 Facility:** OHR and statutory business and finance offices **G5**
- Tatkon (Carol) Center:** in Balch Hall; café, new-student services **D2-3**
- Teagle Hall:** athletics and physical-education facilities, fitness center **D5-6**
- Thurston Hall:** theoretical- and applied-mechanics engineering **C6**
- Tjaden (Olive) Hall:** visual arts **B3**
- Transportation Services (116 Maple Avenue):** information on parking, bus service, and traffic regulations **E7**
- Upson Hall:** computer science, industrial and mechanical engineering, plasma studies **C6**
- Uris Hall:** cognitive studies; economics; feminist, gender, and sexuality studies; international studies; psychology; sociology **C5**
- Uris Library:** café; chimes, chimes museum (McGraw Tower); undergraduate library **BC5**
- Veterinary Medicine, College of:** cafeteria (Vet Res. Tower); facilities, library **HJ4-5**
- Ward Center for Nuclear Sciences** **C6**
- Warren Hall:** cafeteria; applied economics and management; biometrics; development sociology **E4**
- White Hall:** government, Jewish studies, Near Eastern studies **B4**
- White (Andrew D.) House:** Society for the Humanities **C4-5**
- Willard Straight Hall:** cafeterias, information, student activities/services, theatre **B5**
- Wilson (Robert Rathbun) Synchrotron Laboratory:** CHESS, CESR/CLEO **F6**
- Wing Hall:** biochemistry, environmental engineering, microbiology **FG5**



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Human Ecology

Industrial and  
Labor Relations

Johnson Graduate  
School of Management

Law School

Nutritional  
Sciences

Officer  
Education

Physical Education  
and Athletics

Veterinary  
Medicine

Arts and  
Sciences

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USPS 132-860  
OFFICE OF THE UNIVERSITY REGISTRAR  
B07 DAY HALL  
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